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FOOD PROTECTION TRENDS

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DECEMBER 2007

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International Association for Food Protection

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FOOD PROTECTION TRENDS
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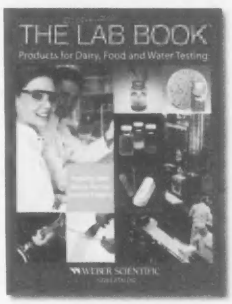

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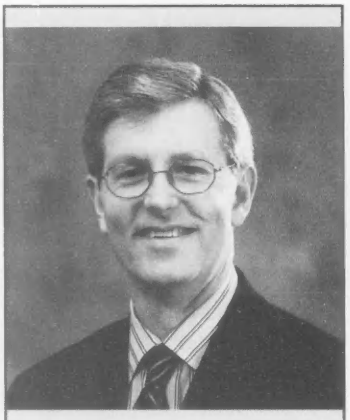
"LONE STAR PERSPECTIVE"
FROM YOUR PRESIDENT

It is hard to believe that 2008 is right here in front of us. Although it seems like yesterday, about this time last year we were celebrating the successful completion of our second European IAFP meeting in Barcelona, and now we have completed our third successful meeting in Rome. The international presence of IAFP is alive and well in Europe. But there is even more good news on the international front: IAFP supported the China International Food Safety and Quality Conference and Expo in Beijing a couple of months ago. And, just prior to our meeting in Europe, David Tharp and I traveled to São Paulo, Brazil where the local affiliate members are helping us plan our first Latin American IAFP meeting. Our members there are very excited about hosting the first meeting in Brazil, and the program is really coming together with some top-notch speakers and timely topics. Our mission of advancing food safety worldwide is moving ahead at a rapid pace, and while much of that progress is due to a committed Executive Board, I have to say that most of the credit for our growth in the international arena should be awarded to our members. Our Association is made up of people who are very dedicated to our mission and the international presence of our organization, and they are ready to help in any way possible.

Beyond impressive growth in global food safety, the New Year also allows us to note additional landmark accomplishments in 2007. We broke our record for



By GARY ACUFF
PRESIDENT

"Our Association is made up of people who are very dedicated to our mission and the international presence of our organization"

Annual Meeting attendance in Orlando this year with 2,126 attendees at what, I think, was one of our most successful meetings ever. We are in outstanding financial condition. Our Foundation Fund continues to grow, and I believe our financial state otherwise has never been as solid as it is now. Of course, credit for that goes primarily to David Tharp and Lisa Hovey and the previous Executive Boards who were wise enough to see that David was a perfect fit for our organization. I can't praise David, Lisa and the IAFP Staff enough for the great job they do keeping our organization running on a daily basis.

As President, I have the opportunity to visit with many of our affiliate groups and talk with them about what IAFP has been doing and how their involvement is crucial to our success. Our affiliate members are always extremely interested to learn about the new membership dues restructure. You have likely heard this before, but I think it bears repeating. Several years ago, our Board began discussing how to enhance the value of membership in IAFP. In our discussions, it was determined likely that a large group of potential members exists who are not currently part of IAFP because of the previous significant cost of joining IAFP. While it is beneficial to be a member of IAFP and receive all of the perks of being a member, not everyone needs all those benefits. Some members require only a basic membership in the Association, and others may need only one of the publications we provide. The Board decided that we could best serve our membership by providing a "buffet line" of membership options. That means all members are provided the opportunity to sign up for only what they want from IAFP. If all you require is a basic membership, that is available. If you would prefer to receive *Food Protection Trends*, but not *Journal of Food*

Protection, or vice versa, you can do that, too. Basically, you can select as much or as little as you need. And that has made the price for membership in IAFP very reasonable. The Board is determined to meet our primary goal of serving the needs of the membership, and the restructuring of membership dues is part of our promise to do that.

Of course, we all know nothing is free. The lowered cost of membership is likely going to reduce the income generated from membership dues, so we are going to have to make up that difference some way. One of the most beneficial ways we can support IAFP would also likely be the easiest way to fill the financial gap—recruit new members.

I think most of you would agree with the idea that the benefit we receive from our membership in IAFP is directly related to what we give. I know that my involvement in IAFP has helped make me a better scientist. The valuable professional and personal relationships I have with colleagues in IAFP are most often a direct result of involvement with committees, local affiliates and attendance at annual meetings. If you are like me, the value of IAFP membership is obvious, and you don't need convincing it is an essential organization for food safety professionals. What about those who do not know the benefits of belonging to IAFP? I don't know what convinced you to initially become a member, but for many of us, it was one of our respected colleagues who mentioned the benefits of the Association and led us to join. Do you know anyone who could benefit from membership in IAFP and could help advance our goals? Tell them of the outstanding Annual Meetings. Show them our online monthly newsletter and printed or online journals. Talk about your colleagues in IAFP and how membership provides so many networking opportunities and chances for professional growth. And, best of all, show them how our dues structure is designed to specifically meet their needs. Just a few minutes of your time could result in great benefits for your colleague and for IAFP.

As this New Year arrives, I would ask you to resolve to help recruit one new IAFP member in 2008. If you know of someone who could benefit by joining, please take a few minutes and introduce them to our association. You could be doing your colleague a great favor, helping support our Association, and meeting a New Year's resolution all at once! And like we say in Texas, "you can't beat that with a stick." If that doesn't make sense, ask Carl Custer. He can translate Texan.

As always, it would be great to hear from you regarding your dreams for IAFP. You can contact me at gacuff@tamu.edu. If you are just looking for someone to translate Texan, Carl can be reached at carl.custer@gmail.com.

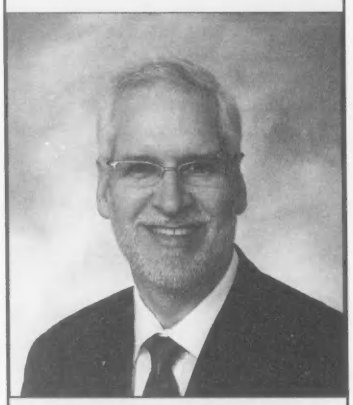
"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR

As the year 2007 comes to a close, it is a good time to reflect back and also to look forward. Today I want to cover three items: the Third European Symposium on Food Safety, our upcoming Secretary election, and the financial results for fiscal year ending August 31, 2007. So let's get started!

The Third European Symposium on Food Safety was held October 18–19 in Rome, Italy with an audience of 140 attendees. This year, the attendance was equal to the attendance in Barcelona at our Second European Symposium but our sponsorship monies increased as did the technical poster session participation. There are pictures and a report from the Symposium on page 979 in this issue. Be sure to take a look and plan now to attend IAFP's Fourth European Symposium on Food Safety in 2008. Location and dates will be announced in February!

The Nominating Committee recently met to select candidates to stand for election to the position of IAFP Secretary for the year 2008–2009. Those candidates will be announced by February 1, 2008 when the voting begins. On or about February 1, all IAFP Members with E-mail addresses will receive an E-mail with instructions on how to vote in this year's election. Balloting will take place via the Internet or by "electronic ballot."

IAFP contracted with an independent, third-party vendor to conduct this election. It is of utmost importance to ensure that our election is held without any opportunity for vote tampering and



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"We hope you will take advantage of the electronic election capabilities and make your vote count this year!"

the vendor we selected is the leader in conducting electronic elections because of their built-in security features. Each IAFP Member will receive a unique alpha-numeric password that allows you, as an IAFP Member to place your vote. Of course the system will only allow one vote per Member to be registered.

Once your vote is recorded, it is allocated to the proper candidate, but without your name or identification number(s) tied to the actual vote. Upon conclusion of the election, the vote results will be certified to the IAFP Teller who will then inform the IAFP President about the election outcome. Board Members, staff or the Teller from IAFP will not be able to determine who, specifically, voted for which candidate.

We are comfortable with this new system of conducting elections for the IAFP Secretary. It offers IAFP Members a quick and convenient method of voting for the future leaders of IAFP. We hope you will take advantage of the electronic election capabilities and make your vote count this year! Watch for your notification in early February. As always, you can call the IAFP office should you have any questions on the electronic voting system.

The last subject to cover this month is our financial results for the fiscal year ending August 31, 2007. It was a very successful year financially for IAFP. On page 1010, the General Fund Statement of Activity for the year is presented. From that statement, you can see that the Association added more than $182,000 to the General Fund from its activities during the year. The "Change in General Fund" is one of the most important numbers on the page as even though we are a "not-for-profit" organization, we must still break even or do better to continue as a viable organization. This excess revenue sounds like a large amount, but when compared to total revenue, it is only a modest seven percent.

Another important number on this report is the General Fund amount under "Net Assets as of 8/31/07." This shows the General

Fund at $760,474. Again, that number sounds like a large one, but for not-for-profit organizations, the target is to hold 50% of your annual revenue in our General Fund ($1.3 million in our case). So, we are making great progress financially, but we still have a ways to go!

The last aspect of the financial report that I want to point out is the balance held by IAFP's Foundation (under Net Assets as of 8/31/07). You can see that we have a little more than $711,000 in the Foundation. This shows wonderful progress for the Foundation in its fundraising efforts over the past few years. For the year ending August of 2007, we added more than $340,000 to the Foundation's balance. We are well on the way to achieving our goal of raising the balance to $1 million by 2010!

Since beginning our fundraising effort in 2005, the IAFP Foundation increased its spending in support of IAFP's activities related to Annual Meeting and our new international pursuits. The Foundation supported five students' travel expenses to attend IAFP 2007 in Orlando in addition to supporting the "Leafy Greens" Symposium in October 2006 and the European Symposium in November 2006 and October of 2007. As we enter the new financial year, the Foundation will continue supporting many programs that it has over the years, but will continue to increase its support of IAFP's student development and international efforts. We see both of these areas as our "new frontier" for expansion in IAFP's Membership and our increasing network of food safety professionals. We are pleased to see the rapid growth of support offered to IAFP's Foundation by both individual contributions and those from companies.

Happy Holidays and best wishes for a happy and prosperous New Year!

ARTICLES

Food Protection Trends, Vol. 27, No. 12, Pages 952–956

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

International Association for Food Protection

Inactivation of *Escherichia coli* O157:H7 in Apple Juice as Affected by Cranberry Juice Concentration and Holding Temperature

ASHLEY S. PEDIGO, FAITH J. CRITZER and DAVID A. GOLDEN*

Dept. of Food Science and Technology, University of Tennessee, 2605 River Drive, Knoxville, TN 37996-4591, USA

SUMMARY

Cranberry juice concentration and holding temperature were evaluated for efficacy at reducing *Escherichia coli* O157:H7 populations in pasteurized apple juice. Pasteurized 100% cranberry (CJ) and apple juices were combined to yield mixtures containing 0 (control) to 50% CJ. *E. coli* O157:H7 (5-strain mixture) was inoculated into juice mixtures to obtain an initial population of approximately 7 log CFU/ml. Juices held at 4 and 25°C were sampled at interals for up to 120 h, while juices held at 45°C were sampled at intervals for up to 8 h. Samples were plated in duplicate on tryptic soy agar (TSA) and sorbitol MacConkey agar (SMAC). After 120 h of storage at 4°C, *E. coli* O157:H7 populations were reduced < 1 log in 0 – 30% CJ mixtures, but were reduced by > 2 and 4 logs in 40 and 50% CJ, respectively. In juices held at 25°C, *E. coli* O157:H7 populations were undetectable in 10% CJ after 120 h, in 20 and 30% CJ after 48 h, and in 40 and 50% CJ after 24 h; the population in 0% CJ was reduced by 5 logs after 120 h. At 45°C, *E. coli* O157:H7 was reduced to non-detectable levels in 30, 40, and 50% CJ after 6, 5, and 4 hours, respectively. Reductions of approximately < 1, 2, and 6 logs were observed in 0, 10, and 20% CJ, respectively. When combined with temperatures of 25 or 45°C and minimal holding time, concentrations of 30–50% pure CJ could serve to effectively reduce *E. coli* O157:H7 populations in juice.

A peer-reviewed article

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E-mail: david.golden@tennessee.edu

INTRODUCTION

Recent outbreaks involving *Escherichia coli* O157:H7 in apple juice and cider have prompted research on developing practical and inexpensive, but effective, methods for controlling contamination of unpasteurized juice. According to Rangel et al. *(14)*, seven of the 183 *E. coli* O157:H7 outbreaks reported from 1982–2002 were associated with consumption of apple cider or apple juice. In response to these outbreaks, the US Food and Drug Administration *(2)* issued regulations requiring juice processors to incorporate strategies to provide a minimum 5-log reduction in the population of pertinent pathogens; these strategies could include pasteurization or use of other antimicrobial treatments *(3)*.

Thermal pasteurization is considered the method of choice for achieving the mandatory pathogen reduction. However, because of cost of the pasteurization process to small processors *(7)*, perceived changes in quality, and consumer demand for non-thermally treated juice, alternative methods are being investigated. Buchanan et al. *(1)* reported that UV irradiation, which is FDA approved, would be sufficient to achieve a 5-log reduction at a dose of 1.8 kGy, and Quintero-Ramos et al. *(13)* agreed that the UV dose was effective at inactivating *E. coli* O157:H7. Other processes that have been investigated include treatment with ozone *(18)* and supercritical fluid processing *(10)*.

Another method of pathogen inactivation in juices that is actively being explored is the addition of natural compounds with known antimicrobial activity. Some of these compounds include essential oils such as carvacrol and p-cymene *(5)* and organic acids, such as benzoic and sorbic acids, and their salts *(6, 21)*. Other researchers have evaluated the indirect effects of organic acids on survival of *E. coli* O157:H7 in pineapple juice *(11)*, cranberry, lemon, and lime juice concentrates *(12)*, apple juice, and orange juice *(16, 18, 19)*. Specifically, the addition of cranberry juice to apple juice and cider has been investigated because the known antimicrobial properties of cranberries and their positive association with treatment of urinary tract infections *(15)*. Marwan and Nagel *(9)* found that proanthocyanidins (21.3%), flavonols (18.5%), and benzoic acid (15.6%) in pure cranberry juice provided the majority of microbial inhibition. A "cran-cider process," which is the addition of cranberry juice at 15% (v/v) followed by warm holding (45°C for 2 h) and freeze-thaw steps (-20°C for 24 h, 5°C for 24 h), was demonstrated to achieve the FDA-mandated pathogen reduction *(4)*.

The purpose of this investigation was to evaluate the effects of cranberry juice concentration and holding temperature on inactivation of *E. coli* O157:H7 to determine if these treatments would provide the mandatory 5-log reduction.

MATERIALS AND METHODS

Preparation of inoculum

Five strains of *E. coli* O157:H7 [43888 (isolated from human feces), 43889 (feces of patient with hemolytic uremic syndrome, NC), 43890 (human feces, CA), 43894 (feces of a patient with hemorrhagic colitis, MI), 43895 (raw hamburger meat)], were used to inoculate juices. Test stains were cultured in tryptic soy broth (TSB; Difco Becton Dickinson Microbiology Systems; Sparks, MD) for 24 h at 37°C. Cultures were transferred a minimum of three times at 24-h intervals before use. The five test strains were combined to yield a mixed culture containing equal proportions of each strain (25 ml total volume).

Preparation of juices

Pasteurized apple juice (100% apple juice from concentrate, with no added sugar, and no preservatives) was purchased from a local supermarket. Pasteurized 100% cranberry juice (CJ) (with no added sugar, but with added vitamin C) was purchased from a local health food specialty store. Juices were stored at room temperature until opened, after which they were stored at 4°C. Apple juice and CJ were combined in sterile 500 ml bottles to yield 250 ml of juice containing 0, 10, 20, 30, 40, and 50% (v/v) CJ. The pH was recorded for each mixture immediately after addition of CJ. Prepared juice mixtures were allowed to reach appropriate temperature (4, 25, or 45°C) before inoculation.

Inoculation and sampling of juices

Juices were inoculated with 2.5 ml of a 24-h mixed culture (to yield approximately 7 log CFU/ml) and gently mixed to suspend cells. Samples (1 ml) were taken from each bottle at 24-h intervals for up to 120 h for juices held at 4 and 25°C, while juices held at 45°C were sampled at 1-h intervals for up to 8 h. Samples were serially diluted in 0.1 M phosphate buffer (PB; Becton Dickinson Microbiology Systems; Sparks, MD). Juice samples were surface plated on tryptic soy agar (TSA; Difco Becton Dickinson Microbiology Systems; Sparks, MD) and sorbitol MacConkey agar (SMAC; Oxoid Limited; Hampshire, England) in duplicate, using a spiral plater (Don Whitley Scientific Limited; Yorkshire, England). Plates were incubated for 48 h at 37°C before *E. coli* O157:H7 were enumerated by use of a Protocol automatic plate counter (Synoptics Limited; Cambridge, UK). Preliminary evaluation of uninoculated juices revealed that the pasteurized juices used in this study did not contain background microflora that would have interfered with counts of inoculated *E. coli* O157:H7. Therefore, counts obtained on TSA and SMAC were considered positive for *E. coli* O157:H7 without further confirmation. Additionally, counts obtained from TSA were used to evaluate overall survival, while counts obtained on SMAC were used for the calculation of injury as follows:

$$\% \text{ injury} = \frac{\text{Counts from TSA} - \text{counts from SMAC}}{\text{Counts from TSA}} \times 100\%$$

Data analysis

All experiments were replicated three times. The statistical model consisted of a randomized block design, blocking on replication. Statistical analysis was conducted using the mixed models procedure (PROC MIXED) of SAS® 9.1 (SAS Institute Inc.; Cary, NC). Analysis of variance was used to determine the statistical significance of differences in survival of pathogens in juice.

RESULTS AND DISCUSSION

Initial pH of juice mixtures was 3.83, 3.55, 3.35, 3.20, 3.07, and 2.95 for 0, 10, 20, 30, 40, and 50% CJ, respectively. Most samples were diluted in 0.1 M PB, which raised sample pH to 6.4–6.63 before plating. However, near the end of sampling, when *E. coli* O157:H7 populations were reduced to near the detection limit, it was necessary to surface plate directly from juice mixtures without dilution in PB. We observed that plating samples at lower pH did not adversely affect recovery.

FIGURE 1. Survival of *E. coli* O157:H7 in apple juice containing 0–50% cranberry juice (CJ) held at 4°C and recovered on TSA (A) and SMAC (B). Data points represent means of three trials. Values shown as 0 Log CFU/ml represent no detection

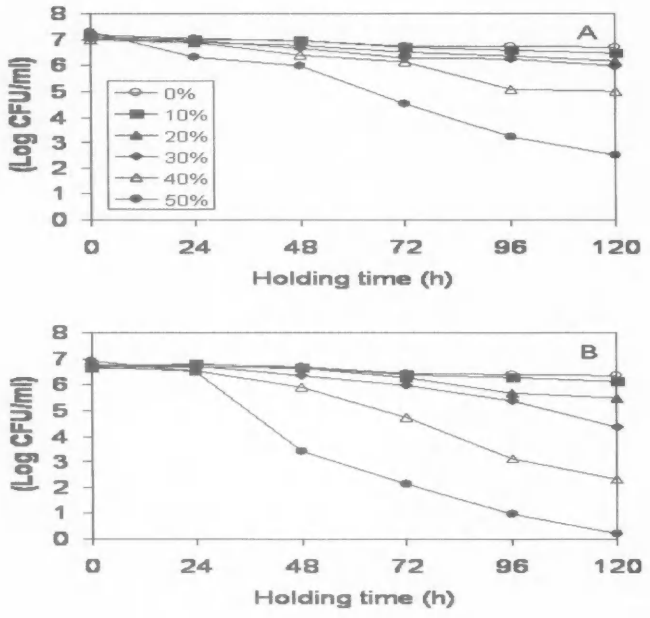
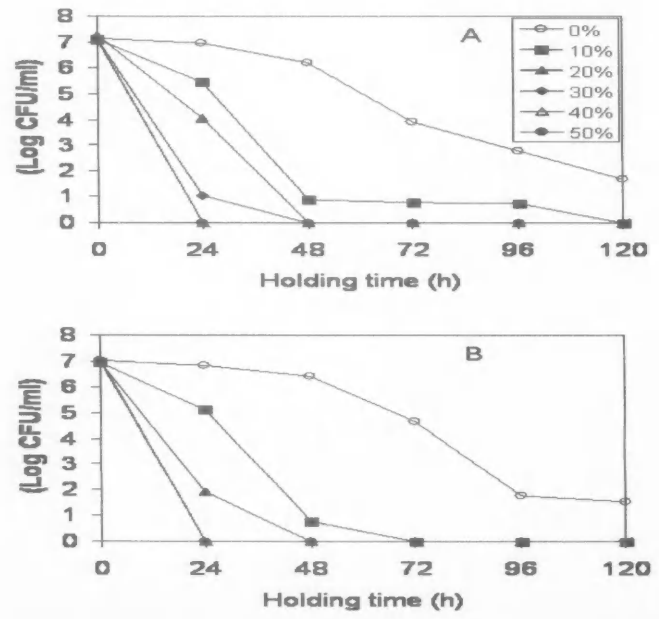


FIGURE 2. Survival of *E. coli* O157:H7 in apple juice containing 0–50% cranberry juice (CJ) held at 25°C and recovered on TSA (A) and SMAC (B). Data points represent means of three trials. Values shown as 0 Log CFU/ml represent no detection



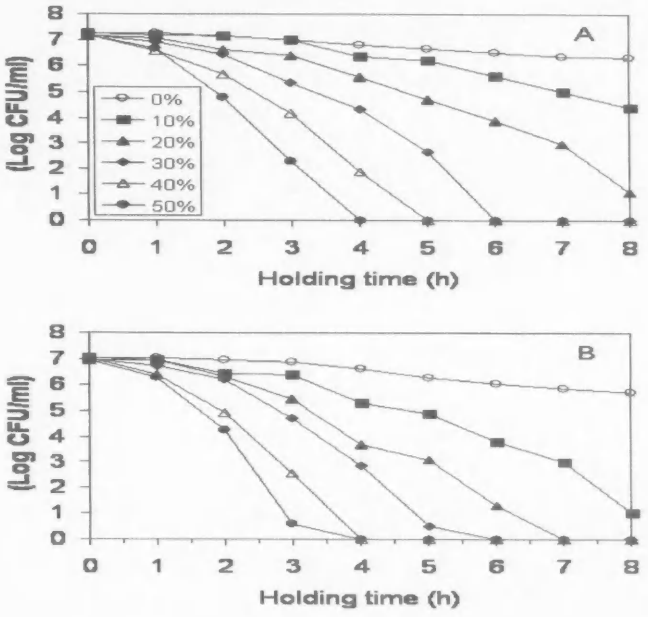
The effects of percent CJ, holding temperature, and time, as well as all interactions, were significant ($P < 0.01$). Addition of CJ had a significant effect on lethality of *E. coli* O157:H7 ($P < 0.01$), which increased with percent CJ at all holding temperatures. Lethality was significantly greater ($P < 0.01$) with increasing time and holding temperature. Ingham et al. *(4)* also found that the addition of CJ and subsequent holding temperature treatments significantly affected lethality of *E. coli* O157:H7 and *Salmonella* serovars. The most lethal treatment in this study was 50% CJ held at 45°C, in which the combinations of low pH, CJ intrinsic components, and elevated temperature provided the maximum synergistic effect.

In all samples, substantial proportions of populations were sublethally injured during holding, as indicated by poorer recovery on SMAC than on TSA. Development of injury was more pronounced at higher holding temperatures, with 100% injury observed in 20, 30, 40, and 50% CJ after holding for 7, 5–6, 4, and 3–4 h, respectively at 45°C. The development of injury, without death, is an important factor to consider, because injured organisms are typically more susceptible to additional adverse treatments. Because of this, combinations of treatments that alone would not result in lethality could provide adequate reduction of *E. coli* O157:H7 in apple juice, as was observed in this study.

Marques et al. *(8)* demonstrated survival of *E. coli* O157:H7 during prolonged exposure to a pH range of 2.51 to 3.26, confirming that acid resistance systems remain active over prolonged periods of cold storage. Similarly, we observed enhanced survival of *E. coli* O157:H7 held at 4°C (Fig. 1). After 120 h of storage at 4°C, populations were reduced < 1 log CFU/ml in 0 to 30% CJ, and 2- and 4-log reductions occurred in 40 and 50% CJ, respectively. Inactivation of *E. coli* O157:H7 at 4°C was poorer than inactivation at warmer holding temperatures, with none of the CJ mixtures providing a 5-log reduction at 4°C.

Figure 2 shows survival of *E. coli* O157:H7 held at 25°C. Populations were undetectable in 20 and 30% CJ after 48 h, and in 40 and 50% CJ after 24 h. Mutaku et al. *(11)* found that, in pineapple juice (pH 3.57), a decline in *E. coli* O157:H7 populations occurred during ambient (20–25°C) temperature storage, but complete inhibition was not observed after 120 h. In the present study, *E. coli*

FIGURE 3. Survival of *E. coli* O157:H7 in apple juice containing 0–50% cranberry juice (CJ) held at 45°C and recovered on TSA (A) and SMAC (B). Data points represent means of three trials. Values shown as 0 Log CFU/ml represent no detection



O157:H7 populations were reduced by > 5 log units in 0% CJ (pH 3.83) and complete inhibition was observed in 10% CJ (pH 3.55) after 120 h storage at 25°C. Uljas and Ingham *(17)* found that when combined with freeze-thaw steps, holding of pH 3.7 apple cider at 25°C for 2 h provided the targeted 5-log reduction of *E. coli* O157:H7.

Survival of *E. coli* O157:H7 held at 45°C is illustrated in Figure 3. Populations were reduced to below detectable levels in 30, 40, and 50% CJ after 6, 5, and 4 h, respectively. A near 6-log reduction was observed in 20% CJ, whereas only 1- to 2-log reduction occurred in 0 and 10% CJ. Ingham et al. *(4)* reported similar results, stating that application of a warm hold (45°C for 2 h) to 10 or 15% CJ does not achieve the 5-log reduction target.

SUMMARY AND CONCLUSIONS

Results of this study demonstrate that addition of CJ to apple juice, in combination with elevated holding temperature and time treatments, can provide the FDA-mandated 5-log reduction in *E. coli* O157:H7. The purpose of this investigation was to evaluate and determine the most effective combination of temperature and added CJ. It was determined that when combined with warm hold temperatures of 25 or 45°C, 30–50% CJ effectively reduce *E. coli* O157:H7 populations in juice; 50% CJ would be the most effective concentration, but this could result in a product that consumers find unacceptable because of undesirable sensory attributes of high CJ concentrations. Further, it should be noted that pasteurized juices were used in this study. For this reason, growth of mold, yeast, or other normal juice spoilage organisms was not observed during holding at 25°C for up to five days (120 h). However, holding unpasteurized cider for extended time at 25°C would almost certainly result in extensive spoilage. Most mold growth would be precluded at a holding temperature of 45°C. Further study with individual antimicrobial components of CJ and their addition to juices is warranted, because the individual components could provide satisfactory inhibition without the undesirable sensory characteristics associated with CJ. Additionally, the effect of warm temperature holding on unpasteurized juice quality should be investigated.

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Food Safety Practices of Poultry Slaughter Plants: Findings from a National Survey

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SUMMARY

Practices and technologies implemented by poultry slaughter plants for controlling foodborne pathogens and other hazards may help reduce the risk of salmonellosis, campylobacteriosis, and other foodborne illnesses. To characterize the use of food safety practices and technologies in the United States' poultry slaughter industry, we conducted a survey of all poultry slaughter plants (219 completed surveys, 78% response rate). The majority of plants have adopted many of the food safety technologies and practices asked about in the survey. In particular, 86% of plants use some type of carcass decontamination intervention, and 50% use some type of decontamination intervention for processed product. About 80% of plants have their slaughter and processing operations audited for food safety by an independent third party or its customers. Most plants conduct voluntary microbiological testing (85%) and environmental sampling (75%). Nearly all plants provide food safety training for new employees and also provide food safety training on an ongoing basis. In general, large and small plants are more likely than very small plants to use many of the food safety practices and technologies ($P < 0.01$). The survey findings, along with other data, can be used to characterize poultry slaughter plants' food safety risk management practices.

INTRODUCTION

Paratyphoid serotypes of *Salmonella* and *Campylobacter jejuni* are the two pathogens of greatest concern in poultry and poultry products, because they cause the highest number of foodborne illnesses directly attributed to those products *(26)*. From 1998 to 2002, nearly 5,000 cases of foodborne illness were attributed to poultry *(9)*. *Salmonella* infections from all food sources result in an estimated 1.3 million human illnesses, 16,000 hospitalizations, and 553 deaths annually in the United States, and *Campylobacter* spp. foodborne infections result in an estimated 1.9 million illnesses, 10,000 hospitalizations, and 99 deaths annually *(10)*. From the baseline of 1996–1998 to 2006, the estimated incidence of infection from *Campylobacter* decreased 30% and the estimated incidence of infection from *Salmonella* did not change significantly compared with the baseline *(2)*. Regarding specific *Salmonella* serotypes, the incidence of *S.* Typhimurium decreased significantly (41%) and there were significant increases in incidence compared with baseline for *S.* Enteritidis (28%), *S.* Newport (42%), and *S.* Javiana (92%). The estimated incidence of *S.* Heidelberg and *S.* Montevideo did not change significant-

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ly compared with baseline *(2)*. Despite these declines, the *Healthy People 2010* goals for *Campylobacter* (12.3 cases per 100,000) and *Salmonella* (6.8 cases per 100,000) have not been met *(25)*, suggesting that further improvements in the farm-to-table continuum are warranted to reduce foodborne illness from these pathogens.

Under the Poultry Products Inspection Act, the US Department of Agriculture, Food Safety and Inspection Service (USDA, FSIS) is responsible for protecting and regulating the nation's poultry supply. In 1996, FSIS mandated the Pathogen Reduction: Hazard Analysis Critical Control Points (PR: HACCP) Final Rule (9 CFR 417), aiming to reduce the microbiological hazards that can occur during meat and poultry slaughter and processing.

Harmful pathogens can be introduced into a poultry slaughter plant on the live bird and harbored in the skin, feathers, and gastrointestinal tract *(7)*. Slaughter plants therefore must strive to eliminate these pathogens during processing. To determine whether plants are meeting the performance standards established by the PR: HACCP Final Rule, FSIS conducts microbiological testing for *Salmonella* on an intermittent basis. Many plants conduct their own microbiological testing in addition to the required FSIS testing. Recent results of testing by FSIS demonstrated a sustained increase in chicken-broiler carcasses testing positive for *Salmonella* during 2002 to 2005 *(23)*. As a result, FSIS launched an initiative to reduce *Salmonella* in raw meat and poultry products *(24)*.

FSIS contracted with RTI International to conduct a national survey of poultry slaughter plants to collect uniform information on practices and technologies used to control biological, chemical, and physical hazards and to promote food safety *(13)*. We used the survey data to determine the prevalence of various food safety technologies and practices used in the United States poultry slaughter industry, to characterize the use and types of microbiological testing, and to determine the prevalence of different types of employee food safety training. FSIS can use these results to inform regulatory policy making and for required economic analyses. Additionally, the survey findings, along with other data, can be used to characterize poultry slaughter plants' food safety risk management practices. Increased adoption of risk management practices may help to reduce *Salmonella* and other pathogens in raw poultry.

MATERIALS AND METHODS

We used a multimodal survey approach to conduct a nationally representative survey of federally and state-inspected poultry slaughter plants. The sampling methods, questionnaire development, survey administration, and analysis procedures are described below.

Sampling methods

We used an FSIS database of federally and state-inspected establishments to construct the sampling frame for the survey. The database contains plant-level information on production volume, annual revenue, number of employees, inspection activities, and contact information from various USDA sources and a commercial data source for company information.

Plants that currently slaughter poultry species were included in the sampling frame for the survey. To ensure that the sampling frame was representative of the vast majority of federally and state-inspected plants, we excluded from the sampling frame plants that operate for objectives that are not strictly commercial (e.g., nonprofit, prison, education, and government facilities); plants that slaughter ducks only, geese, and rabbits; and state-inspected plants that conduct only custom-exempt slaughter. Also, because of the potential for language barriers, plants located in a United States territory were excluded from the sampling frame. The sample design specified a sample size that was expected to yield precision of +/– 5 percent or better for estimates of all proportions. Because the sample size would require surveying all or nearly all establishments, we took a complete census of all plants in the final sampling frame: 289 federally inspected plants and 29 state-inspected plants.

Questionnaire development

The questionnaire was designed to collect information on the use and frequency of sanitation practices, use of food safety technologies and practices, types and frequency of microbiological testing, food safety training procedures, and plant characteristics (e.g., age, size, and number of shifts).

To test the survey instrument, we used a structured, standardized instrument review methodology. This approach evaluated the survey questions in terms of the tasks required of the respondents to understand and respond to the questions, as well as evaluating the structure and effectiveness of the questionnaire form. We also conducted interviews with several poultry slaughter plants to pretest the survey instrument. In addition, several industry trade associations reviewed the survey instrument. The pretest participants and trade associations provided suggestions for improving the survey instrument. We subsequently revised the survey instrument based on the pretest findings. The survey instrument and study design were approved by the Office of Management and Budget's (OMBs) information collection clearance process.

Survey administration

We implemented several procedures aimed at maximizing the survey response rate, including many of the procedures recommended by Dillman *(4)*. Before the start of data collection, we worked with several poultry trade organizations to secure their support of the survey. These organizations sent an e-mail message to their membership that described the survey and encouraged their participation. We contacted sampled establishments by telephone to identify the plant manager and then mailed a letter on FSIS letterhead that described the upcoming survey. We subsequently contacted plant managers by telephone to screen for eligibility (e.g., plants were not eligible for the survey if they conduct only custom-exempt slaughter and are exempt from inspection) and to identify the target respondent for the survey (if not the plant manager). We mailed target respondents the self-administered questionnaire via Federal Express and sent a thank you/reminder postcard. We made a series of telephone calls and remailed the questionnaire to nonrespondents to encourage response. We conducted the survey in fall 2004.

We received completed surveys from 219 plants; 51 plants were eligible but did not complete the survey (i.e., nonrespondents); 34 plants were ineligible (e.g., plants that were out of business and

TABLE 1. Poultry slaughter plant characteristics (weighted % of plants)

	Very Small	Small	Large	All Plants
Number of slaughter and evisceration shifts operated daily				
Plant does not operate daily	70.4	1.6	0.0	13.2
One	29.6	67.2	8.6	29.1
Two or three	0.0	31.2	91.4	57.7
Number of deboning shifts operated daily				
None	29.6	31.2	18.8	24.3
Deboning shift is not operated daily	55.6	3.1	0.0	11.0
One	14.8	42.2	9.4	19.7
Two or three	0.0	23.4	71.1	44.7
No response	0.0	0.0	0.8	0.4
Number of further processing shifts operated daily				
None	44.4	45.3	31.2	37.6
Further processing shift is not operated daily	33.3	4.7	0.8	7.8
One	22.2	29.7	3.1	14.1
Two or three	0.0	20.3	61.7	38.8
No response	0.0	0.0	3.1	1.7
Number of USDA- or state-inspected plants owned by the company that owns this plant				
1	96.3	39.1	5.5	31.5
2 to 5	0.0	29.7	19.5	18.9
6 to 20	0.0	14.1	33.6	22.0
21 or more	0.0	15.6	40.6	26.2
No response	3.7	1.6	0.8	1.5
Total plant sales revenue				
Under $2.5 million	81.5	4.7	0.8	16.5
$2.5 million to $49.9 million	7.4	53.1	6.2	19.8
$50 million to $249.9 million	0.0	32.8	56.2	39.4
$250 million or more	0.0	0.0	22.7	12.1
No response	11.1	9.4	14.1	12.2

TABLE 2. Use of food safety technologies for poultry slaughter and deboning operations (weighted % of plants)

	Very Small	Small	Large	All Plants
Use of some type of carcass decontamination	33.3	95.3+++	98.4***	85.7
Intervention				
Inside-outside bird washers	29.6	95.3+++	98.4***	85.1
Organic acid rinse	3.7	21.9++	28.1***	21.9
Metal detection equipment	3.7	42.2+++	85.9***	58.6
Automatic bird transfer (from kill line to evisceration line)	0.0	23.4+++	61.7***	39.7
Conveyor belts made from materials designed to prevent bacterial growth	3.7	34.4+++	33.6***	28.4
Bioluminescent testing system	0.0	20.3+++	37.5***	25.8

Notes:

+++ = Difference between small and very small plants is statistically significant at the 0.01 level.

++ = Difference between small and very small plants is statistically significant at the 0.05 level.

+ = Difference between small and very small plants is statistically significant at the 0.10 level.

*** = Difference between large and very small plants is statistically significant at the 0.01 level.

** = Difference between large and very small plants is statistically significant at the 0.05 level.

* = Difference between large and very small plants is statistically significant at the 0.10 level.

custom-only plants); and for 14 plants we were unable to determine their eligibility for the survey. We calculated weighted response rates (respondents/[nonrespondents + respondents]) by stratum, using the initial sampling weights adjusted for unknown eligibility so that cases with unknown eligibility were distributed between eligibles (nonrespondents) and ineligibles in the same proportions that existed among cases with known eligibility. Ineligible plants were excluded from the response rate calculation. The overall weighted response rate for the survey was 78%.

Analysis procedures

Before tabulating the survey data, we conducted data editing and coding and data cleaning. The edited and coded questionnaires were double-keyed for quality control purposes. The survey data were weighted to reflect the selection probabilities of sampled units and to compensate for differential nonresponse *(8)*. Nonresponse adjustments ensure that, within each weighting class, respondent weights sum to the population counts of eligible establishments. These adjustments, implemented with the computation and application of adjustment factors in each weighting class (in this case, HACCP size), can help reduce nonresponse bias to the extent that respondents within weighting classes are homogeneous.

We computed weighted proportions for questions in which respondents could select one or more responses from a list of responses and computed weighted means for questions that required a numeric response from respondents. We computed weighted proportions and means by HACCP size (large, small, and very small). Large plants have 500 or more employees, small plants have at least 10 employees but fewer than 500, and very small plants have fewer than 10 employees or less than $2.5 million in annual sales. We performed a chi-square test for the relationship between the variable of interest and plant size (large versus very small and small versus very small). We conducted all analyses using Stata® *(16)*.

RESULTS AND DISCUSSION

Plant characteristics

The poultry slaughter industry is characterized by large slaughter plants, accounting for most of the industry's production volume and sales revenue. About 23% of poultry slaughter plants are very small and account for less than 1% of total industry revenue, 29% are small and account for 11% of total industry revenue, and 48% are large and account for 89% of total industry revenue. The median plant age (or years since most recent renovation) was 10 years, the mean plant size was 111,586 square feet (standard error = 7,918), and the mean number of employees was 645 (standard error = 39). Table 1 provides additional information on plant characteristics by HACCP size.

TABLE 3. Use of food safety practices for poultry slaughter and deboning operations (weighted % of plants)[a]

	Very Small	Small	Large	All Plants
Sanitation Practices				
Sanitizes hands or gloves that contact raw product in slaughter area on a specified frequency	63.0	79.7+	85.2***	79.6
Sanitizes hands or gloves that contact raw product in deboning area on a specified frequency	48.1	78.0++	85.6***	76.5
Uses chemical sanitizers for food contact hand tools during operations	59.3	62.5	80.5**	71.5
Rotates sanitizing chemicals on annual or more frequent basis	29.6	62.5+++	61.7***	56.1
Uses sterilizer pots for heat sterilization of hand tools during operations	14.8	39.1++	43.8***	37.2
Other Practices				
Has written polices and procedures for product recalls	44.4	90.6+++	100.0***	87.3
Identifies and tracks products—forward	51.9	79.7+++	94.5***	82.6
Identifies and tracks products—backward	55.6	79.7++	85.9***	78.7
Conducts audits of slaughter and deboning operations	22.2	78.1+++	96.1***	77.6
Requires and documents that bird growers use stipulated practices for controlling chemical residues	44.4	71.9++	91.4***	77.3
Has food safety manager on staff	44.4	68.8++	85.9***	73.5
Has written polices and procedures to protect against bioterrorism	18.5	51.6+++	90.6***	66.5
Conducts fat pad sampling on a regular schedule	3.7	46.9+++	89.8***	62.0
Requires and documents that bird growers use stipulated practices for pathogen control	37.0	57.8+	70.3***	60.7

[a]See Table 2 for description of notation used to indicate statistical significance.

Use of food safety technologies for slaughter and deboning

Poultry slaughter plants have implemented technologies and practices to control *Salmonella*, *Campylobacter*, and other pathogens during slaughter and deboning operations. Because multiple points exist for the introduction and spread of foodborne pathogens, multiple intervention strategies are required for successful control of contamination of poultry throughout the slaughter and processing process *(14, 26)*. Table 2 presents the percentage of plants, by HACCP size, using the food safety technologies for slaughter and deboning asked about in the survey.

The most frequently used food safety technology for slaughter operations was some type of carcass decontamination intervention (86% of all plants). The use of inside-outside bird washers can help meet zero tolerance regulations for fecal matter; this practice has also been shown to reduce the incidence of *Campylobacter* on poultry carcasses *(15)*. Another study found that the combined use of an inside-outside bird washer for removal of visible contamination and an online acidified sodium chlorite spray system to reduce microbial levels was more effective than standard offline reprocessing *(6)*. Most plants (85%) use inside-outside bird washers, but fewer (22%) use an organic acid rinse as a decontamination intervention. Nearly 60% of plants use metal detection equipment to help detect physical hazards in incoming birds. Forty percent of plants use automatic bird transfer (from kill line to evisceration line). Less than one-third of plants use conveyor belts made from materials designed to prevent bacterial growth. About one-fourth of plants use bioluminescent testing systems; this technology allows plants to determine the effectiveness of their sanitation procedures immediately and address

TABLE 4. Use of food safety technologies for further processing of poultry (weighted % of plants)[a]

	Very Small	Small	Large	All Plants
Metal detection equipment	8.3	61.5+++	96.6***	76.8
Use of some type of decontamination intervention during processing operations	41.7	46.2	53.4	50.2
Application of antimicrobial chemicals	41.7	46.2	48.9	47.3
High-pressure processing	8.3	0.0	9.1	7.1
Other types of pasteurization	8.3	7.7	4.5	5.7
Infrared technology	0.0	3.8	6.8	5.2
Irradiation	0.0	0.0	0.0	0.0
Conveyor belts made from materials designed to prevent bacterial growth	0.0	26.9++	30.7***	25.5

[a]See Table 2 for description of notation used to indicate statistical significance.

TABLE 5. Use of food safety practices for further processing of poultry (weighted % of plants)[a]

	Very Small	Small	Large	All Plants
Sanitation Practices				
Sanitizes hands or gloves that contact RTE product in further processing area on a specified frequency	_b	_b	_b	90.1
Sanitizes hands or gloves that contact raw product in further processing area on a specified frequency	41.7	80.8++	89.8***	81.0
Rotates sanitizing chemicals on an annual or more frequent basis	50.0	73.1	68.2	66.6
Uses chemical sanitizers for hand tools during operations	66.7	57.7	68.2	65.8
Treats drains with sanitizers for pathogen control	58.3	80.8	55.7	61.2
Other Practices				
Conducts audits of further processing operations	16.7	76 9+++	97.7***	81.9
Treats food contact equipment to remove biomatter during operations	58.3	50.0	70.5	64.5
Requires and documents that raw poultry suppliers use stipulated practices for controlling chemical residues[c]	25.0	50.0	66.2**	58.5
Uses antimicrobial treatment for food contact equipment during operations	50.0	53.8	58.0	56.0
Requires and documents that raw poultry suppliers use stipulated practices for pathogen control[c]	37.5	50.0	57.5	53.8

[a]See Table 2 for description of notation used to indicate statistical significance.

[b]Results suppressed because of small number of respondents.

[c]Results are for plants that purchase raw poultry.

any problems before production. Large and small plants are more likely than very small plants to use the technologies listed in Table 2 ($P < 0.01$ for most comparisons).

Use of food safety practices for slaughter and deboning operations

Poultry plants are required to develop and implement Standard Sanitation Operation Procedures (SSOPs) to prevent product contamination and adulteration (9 CFR 416.11 through 416.17). These SSOPs describe the process and frequency with which equipment, utensils, and processing areas (walls and floors) should be cleaned (i.e., free of foreign material such as fat, blood, hair, grease, rust, and cleaning chemicals). With the exception of the use of sterilizer pots for heat sterilization of hand tools during operations, the majority of poultry plants use the sanitation practices listed in Table 3. Large and small plants are more likely than very small plants to use these sanitation practices ($P< 0.05$ for most comparisons).

Many plants have implemented the other food safety practices asked about in the survey (see Table 3). Recalls, which are voluntarily initiated by the manufacturer or distributor, are intended to remove from commerce foods that are believed to be adulterated or misbranded *(20)*. Although there is no regulatory requirement that an establishment include a recall plan in its HACCP plan or as a prerequisite program, FSIS recommends that establishments have these plans *(18)*. A recall plan should specify, in detail, actions that the company will take in deciding whether to recall a product and, in case of a recall the procedures for conducting it *(18)*. All large plants and 91% of small plants have written policies and procedures for recalls; however, fewer than half of very small plants have such procedures in place. Recalls are facilitated when tracking procedures are in place. About 80% of plants have procedures in place to identify and track products one step forward and one step backward in the supply and distribution chain. Large and small plants are more likely than very small plants to have tracking procedures ($P < 0.01$ for most comparisons).

Audits are conducted to ensure that food safety, good manufacturing practices (GMPs), quality, sanitation, and other programs are meeting internal and external standards *(5)*. Plants may hire a third party to conduct audits, or their customers may require audits that are conducted by the customer's own audit team or by a third-party auditor. Seventy-eight percent of plants have their slaughter and deboning operations audited for food safety either by an independent third party or by its customers. Large and small plants are more likely than very small plants to have their operations audited ($P < 0.01$).

In 2002, FSIS issued a set of security guidelines to help meat, poultry, and egg products establishments identify ways to strengthen food security protection to prevent intentional product contamination *(17)*. About two-thirds of plants have written policies and procedures to protect against bioterrorism. Large and small plants are more likely than very small plants to have such policies and procedures ($P < 0.01$).

As part of their HACCP plan or prerequisite plan, plants may require their bird growers to use specific production practices for controlling pathogens and chemical residues. Many plants require and document that their bird growers use stipulated practices for controlling chemical residues (77%) and for controlling pathogens on incoming birds (61%). Large ($P < 0.01$) and small ($P < 0.10$) plants are more likely than very small plants to require these practices of their bird growers.

Use of food safety technologies for processing operations in poultry slaughter plants

Fifty-six percent of plants produce ground poultry or conduct other further processing activities, in addition to their slaughter operations. Of these, 24% produce ready-to-eat (RTE) products, 87% produce not-ready-to-eat (NRTE) products, and 61% produce inputs to further processing by another plant.

The interim final rule on the control of *Listeria monocytogenes* in RTE meat and poultry products (9 CFR 430) provides incentives for producers of RTE products to use postlethality treatments, antimicrobial ingredients at formulation, and other intervention technologies to significantly reduce the risk of the presence or growth of *Listeria* on these products *(1)*. Additionally, plants may implement technologies and practices to control *Salmonella*, *E. coli*, and other pathogens during processing operations. Table 4 presents the percentage of plants with processing operations that use the food safety technologies asked about in the survey by HACCP size.

Ninety-seven percent of large plants, 62% of small plants, and 8% of very small plants use metal detection equipment to help detect physical hazards in processed product. One-half of plants use some type of decontamination intervention during processing operations, with similar results reported across all sizes of plants. Application of antimicrobial chemicals is used most often (47% of all plants). Less than 10% of plants use high pressure processing, other types of pasteurization methods, or infrared technology. No plants reported using irradiation as a decontamination intervention.

Use of food safety practices for processing operations in poultry slaughter plants

Table 5 presents the percentage of plants using the food safety practices asked about in the survey for their processing operations by HACCP size. The majority of plants use the sanitation procedures listed in Table 5, such as treating drains with sanitizers for pathogen control and using chemical sanitizers for hand tools during operations. With the exception of sanitizing hands or gloves that contact raw product in the further processing area on a specified frequency, the use of these practices is similar across very small, small, and large plants.

Nearly all large plants (98%), 77% of small plants, and 17% of very small plants have their processing operations audited for food safety either by an independent third party or by its customers. Large and small plants are more likely than very small plants to have their operations audited ($P < 0.01$).

Fifty-six percent of plants use antimicrobial treatments for food contact equipment during operations, and 65% treat food contact equipment to remove biomatter during operations. The use of these practices is similar across all sizes of plants. For plants that purchase raw poultry, more than one-half require and document that suppliers use stipulated practices for controlling pathogens and chemical residues. The use of these practices is similar across all sizes of plants,

TABLE 6. Microbiological testing practices in poultry slaughter plants (weighted % of plants)[a]

	Very Small	Small	Large	All Plants
Conducts voluntary microbiological testing	44.4	92.2+++	95.3***	85.2
Has company-owned lab for microbiological testing	3.7	65.6+++	94.5***	69.9
Tests carcasses before deboning[b]	66.7	78.0	93.4***	86.2
Tests raw poultry after deboning (before processing)	50.0	45.8	73.8*	62.9
Tests RTE finished products (for plants producing RTE product)[b]	_c	_c	_c	95.1
Tests NRTE finished product (for plants producing NRTE product)[b]	62.5	78.0	81.6	79.0
Conducts environmental sampling	22.2	84.4+++	88.3***	75.2

[a]See Table 2 for description of notation used to indicate statistical significance.

[b]Results are for plants that conduct microbiological testing.

[c]Results suppressed because of small number of respondents.

TABLE 7. Food safety training for poultry slaughter plant employees (weighted % of plants)[a]

	Very Small	Small	Large	All Plants
Newly hired employees[b]				
On the job	81.5	70.3	81.2	78.2
Written materials	11.1	73.4+++	84.4***	68.0
Formal coursework	7.4	28.1++	39.8***	30.6
No training	11.1	1.6++	0.0***	2.5
Continuing food safety training[b]				
On the job	77.8	82.8	85.2	83.2
Written materials	3.7	31.2+++	53.1***	37.9
Formal coursework	7.4	34.4+++	49.2***	37.4
No training	18.5	1.6+++	1.6***	4.6
HACCP training				
One or more production employees has completed formal HACCP training	85.2	93.8	96.1**	93.4

[a]See Table 2 for description of notation used to indicate statistical significance.

[b]Respondents could select multiple responses.

with the exception that large plants are more likely than very small plants to require suppliers to use stipulated practices for controlling chemical residues.

Microbiological testing practices

Poultry slaughter plants are required by FSIS to conduct generic *E. coli* testing of carcasses (9 CFR 381.94[a]). Many plants voluntarily conduct other testing of raw product, finished product, equipment, and food contact surfaces. Monitoring for the presence of *Salmonella* on a routine basis is a way to validate that control programs are working *(19)*. Table 6 presents the percentages of plants conducting various types of microbiological testing by HACCP size. As described below, many plants test for *Salmonella* species and other pathogens at different stages in the production process.

Eighty-five percent of plants conduct voluntary microbiological testing using either its own lab or an independent lab. The majority of plants use traditional cultural methods. Seventy percent of plants have a company-owned lab for microbiological testing. Large and small plants are more likely than very small plants to conduct voluntary microbiological testing and to have a company-owned lab ($P < 0.01$).

For plants that conduct microbiological testing, 86% test carcasses before deboning. Plants most often test for *Salmonella* species (90%) and generic *E. coli* (76%), in addition to mandatory testing. Large plants are more likely than very small plants to test carcasses before deboning ($P < 0.01$). For plants that conduct microbiological testing, 63% test raw poultry after deboning. The majority test for total coliforms and generic *E. coli* and conduct aerobic plate count (APC) and total plate count (TPC) testing. Forty-nine percent test for *Salmonella* species. Large plants are somewhat more likely than very small plants to test carcasses before deboning ($P < 0.10$).

For plants that conduct microbiological testing and produce RTE finished product, 95% test their finished product. The majority test for total coliforms, *Salmonella* species, generic *E. coli*, *Staphylococcus aureus*, *Listeria* species, and *Listeria monocytogenes* as well as conducting APC and TPC testing. Because of the small number of responses, we were unable to evaluate differences in testing of RTE finished product by size of plant. For plants that conduct microbiological testing and produce NRTE finished product, 79% test their finished product. The majority test for total coliforms, *Salmonella* species, and generic *E. coli* as well as conducting APC and TPC testing. Differences in testing of NRTE finished product by size of plant were not observed.

Seventy-five percent of plants sample for indicator or target microorganisms on product contact surfaces, surfaces of equipment, or facility structures. Large and small plants are more likely than very small plants to conduct environmental sampling ($P < 0.01$). Most plants use traditional cultural methods and sample equipment surfaces in RTE and NRTE areas. Most plants that produce RTE finished product also sample walls, overhead structures, and drains.

Employee food safety training

Table 7 presents the percentage of plants, by HACCP size, conducting various types of food safety training for employees. Nearly all plants provide food safety training for new employees. Most plants conduct on-the-job training (78%) and/or provide written materials on food safety (68%) to new employees. Nearly all plants provide continuing food safety training for their employees. Most plants conduct on-the-job training (83%). Very small plants are less likely than small and large plants to conduct food safety training for new and current employees ($P < 0.01$ for most comparisons). Most plants have one or more production employees who have completed formal HACCP training (93%). Large plants are more likely than very small plants to have HACCP-trained employees ($P < 0.05$). Because very small plants have few employees (9 or fewer), it may be more difficult for employees to attend training programs *(3)*.

CONCLUSION

This study surveyed poultry slaughter plants to collect uniform information on practices and technologies used to control biological, physical, and chemical hazards and promote food safety in the poultry slaughter industry. This was a nationally representative survey with a high response rate (78%). The data are self-reported, and the extent of self-reporting bias is not known; however, the results provide a comprehensive view of food safety practices in the poultry slaughter industry. The survey findings, along with other data, can be used to characterize poultry slaughter plants' food safety risk management practices.

The majority of plants have adopted many of the food safety technologies and practices asked about in the survey. We found that large and small plants are more likely than very small plants to use many of the food safety technologies and practices asked about in the survey, to conduct microbiological testing and environmental sampling, and to conduct food safety training for their employees. However, we do not have data indicating that large and small plants produce a safer product. Furthermore, a 2001 survey conducted by USDA's Economic Research Service found that large plants typically relied on sophisticated equipment and testing, while smaller plants tended to focus more on SSOPs and plant operations to comply with the PR: HACCP rule *(12)*. To increase small and very small plants' use of food safety technologies, FSIS is funding cooperative agreements to identify technologies feasible for smaller plants and to foster their adoption to enhance the beneficial effects of new technology on food safety and public health *(21)*. In addition, FSIS recently announced a series of initiatives aimed at providing assistance necessary for small and very small plant owners to further improve their establishments' food safety programs *(22)*. Curtis *(3)* identified fewer personnel, less scientific expertise, wider variety of products produced, and less automation as processing and sanitation issues that are unique to very small establishments. Thus, very small plants may benefit from these types of initiatives.

Several intervention strategies have proven useful to reduce the prevalence of *Salmonella* and other pathogens on poultry carcasses during processing. However, for plants to be completely successful at controlling *Salmonella* and other pathogens, intervention strategies need to be implemented during the breeding, hatching, growout (period during which day-old chicks are raised to 6- to 7-week old broiler chickens), and transportation phases of poultry production as well *(14, 26)*. Intervention strategies during poultry production can help reduce *Salmonella* and *Campylobacter (26)* on incoming birds. Likewise, poultry must be handled properly at retail outlets and by the consumer, including cooking poultry to 165°F to kill any foodborne pathogens that might be present *(11)*.

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When Epidemiological Evidence Should Suffice

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SUMMARY

Each year *Salmonella* transmitted via eggs cause many foodborne outbreaks. Because of European legislation (Zoonoses Directive 2003/99/EC) and national requirements (e.g., the Zoonoses Act 128/2005 in Austria), more and more of these outbreaks are investigated. Frequently the infectious vehicle can be found by epidemiological studies and the source of infection confirmed by microbiological testing of fecal and environmental samples from incriminated flocks of laying hens, but proof of the infectious vehicle cannot be obtained because the outbreak strain cannot be detected in the incriminated food. In Austria, two outbreaks have been traced back to one egg production plant. We report on three further outbreaks linked to this egg production plant that again did not lead to proper actions by health authorities because of missing microbiological proof in the eggs originating from the incriminated flocks.

INTRODUCTION

Because of European legislation (Zoonoses Directive 2003/99/EC) and national requirements (e.g., the Zoonoses Act 128/2005 in Austria) more and more foodborne outbreaks are investigated *(2, 3)*. Recently Schmid et al. reported on outbreaks of *Salmonella* Enteritidis phage type (PT) 4 and PT6 in Austria in November 2005 and June 2006 *(7)*. Although epidemiological findings clearly implicated egg producing plant A as the source of these 58 cases, no restrictions were placed on the incriminated flocks. Regardless of sampling of fecal droppings and dust between January and July 2006 revealed 11 different *Salmonella enterica* subspecies *enterica* strains, laying hens were kept in production until they stopped laying because of age in September 2006. Microbiological investigation of 1,200 eggs (examined after shell disinfection) collected in May 2006 had yielded no *Salmonella*. In June 2006, a cluster of 23 cases of *S.* Enteritidis PT6 infection was again associated with this egg production plant A *(7)*. Schmid et al. complained that scientific evidence provided by analytical epidemiological studies — in her case, a cohort study — is often disregarded by decision makers *(7)*. We now report on three further

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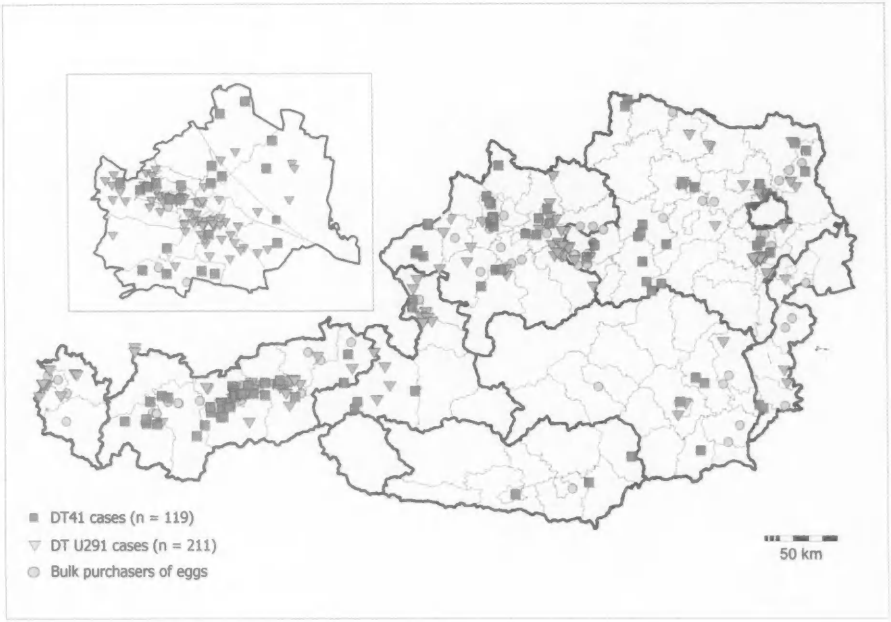
FIGURE 1. Geographical distribution of human outbreaks – and sporadically cases caused by *S.* Typhimurium DT41 and *S.* Typhimurium DT U291, and the location of bulk purchasers of the eggs produced at plant A in Austria, January 2003 to February 2007



outbreaks linked to this egg production plant A, outbreaks that again did not lead to proper actions by health authorities because of absence of microbiological proof in the incriminated food.

OUTBREAK INVESTIGATIONS

Outbreak I

In May 2006, ten persons were affected by a *S.* Typhimurium definitive type 41 (DT41) outbreak in the Austrian province of Tyrol. The epidemiologically most likely source for this outbreak was a cream cake produced with "pasteurized" eggs and sold at a local coffeehouse/bakery; all ten laboratory-confirmed cases had consumed this food item. The pasteurized eggs could be traced to a producer who purchased from the previously mentioned egg production plant A, a laying hen farm that also supplies eggs to egg packing station B. Raw eggs used at the coffeehouse were traced to this packing station B. A sample of pasteurized egg from a container in use at the bakery yielded *S.* Enteritidis PT4, the same phage type causing the outbreak reported by Schmid et al. *(7)*. Again, microbiological investigation of 12 table eggs collected in May 2006 at the coffeehouse yielded no *Salmonella*. *S.* Typhimurium DT41 was one of the 11 different serotypes discovered by sampling of fecal droppings and dust at the farm in February 2006. We hypothesize that the pasteurized egg was possibly cross contaminated with *S.* Typhimurium DT41 (originating from contaminated table eggs) in the bakery or that the bakery did not use pasteurized egg as claimed. *S.* Typhimurium DT41 was repeatedly discovered in dust samples of egg producing plant A.

Outbreaks II and III

In October 2003, two outbreaks with *S.* Typhimurium DT U291, affecting a total of 37 cases, occurred in Tyrol. A hotel-associated outbreak comprised 24 laboratory-confirmed cases and six epidemiologically related clinical cases (without laboratory confirmation). The patients were Austrian and German tourists and employees. Case series data indicated that illness was associated with consumption of a house-made tiramisu, which was served in the hotel on the evening of October 4 and the following morning and which was finished off by employees during the next two days. All cases had consumed this house-made tiramisu.

On October 21/22 a family outbreak affected seven persons. These seven laboratory-confirmed cases caused by *S.* Typhimurium DT U291 were linked by common time and place of exposure to a home made tiramisu consumed on October 20. Epidemiological investigations revealed that the eggs used for preparing the tiramisus in both outbreaks were bought from egg handlers who purchased their eggs from the same egg wholesaler. A total of 68 egg producing farms who supplied egg packing station B, which served this

wholesaler (information provided by the packing station B), were screened in June 2004 for *Salmonella* (testing pooled fecal samples). While 12 of 68 (16%) farms tested positive for *Salmonella*, none yielded *S.* Typhimurium DT U291. In February (as in July) 2006, when *S.* Enteritidis PT4 was being sought as described by Schmid et al. *(7)*, dust samples of one flock of laying hens of the egg producing plant A yielded *S.* Typhimurium DT U291. Eggs of plant A had been sold to egg packing station B.

DISCUSSION

Foodborne outbreaks often wax and wane, thereby lulling decision makers into the misconception that the problem will disappear by itself. In all the above mentioned outbreaks, decision makers misinterpreted negative results of microbiologically tested food samples as evidence against a causal association between egg producing plant A and the outbreaks. Our report of three further *Salmonella* outbreaks connected to egg production plant A underlines the importance of epidemiological evidence for a targeted approach against foodborne diseases.

For none of these three outbreaks were analytical epidemiological studies performed by the respective local health authorities. Nevertheless, the epidemiological findings for outbreak I (all ten laboratory confirmed cases had consumed cream cake produced with eggs from egg producing plant A, known to harbor the causative microorganism) and for outbreaks II and III (a total of 31 laboratory confirmed cases and six cases without laboratory confirmation had consumed one of two tiramisus prepared with eggs from packing station B served by plant A) underline the causative role of egg producing plant A, as previously shown in a cohort study by Schmid et al. *(7)*. Case control studies or cohort studies are resource consuming endeavours, and local health authorities in Austria are often reluctant to perform such proper analytical epidemiological investigations. We consider the results of the descriptive epidemiological investigations of outbreaks I, II, and III sufficient to warrant proper health action, especially in connection with the microbiological demonstration of the causative agents in the epidemiologically related egg producing plant A.

While field investigations of outbreaks frequently lead to discovery of the source of infection, the sources of infection of the large number of sporadic cases of foodborne illness often remain cryptic. Epidemiological outbreak investigation may also yield valuable hints to elucidate the source of seemingly unrelated sporadic cases. Fig. 1 presents all culture-confirmed human cases of salmonellosis due to *S.* Typhimurium DT41 (n=119) and *S.* Typhimurium DT U291 (n=211) documented in Austria from January 2003 to February 2007 and all bulk purchasers of egg producing plant A according to location. The finding that the areas of illness and egg distribution are closely related leads us to hypothesize that these seemingly sporadic cases may also be causally connected to egg producing plant A. As none of the listed strains have been detected in eggs in Austria between 2003 and 2007, proper public health action has not been taken so far. According to EU Regulation (EC) No 178/2002, the food business operators have primary legal responsibility for ensuring food safety for their products *(1)*. Lack of adequate prophylactic action therefore could lead to liability of the producer should "conclusive evidence" develop later.

Our findings further support the conclusion of Schmid et al. *(7)* that regulatory response should follow a strong epidemiological association from a well-conducted investigation even in the absence of confirmatory microbiological testing of food items. In the United States such procedure is widely accepted, as was seen in a recent *Salmonella* outbreak epidemiologically associated with Peter Pan peanut butter, where the epidemiological evidence sufficed for the FDA to recall the product and in which the causative microorganism was through subsequently found product and environmental sampling *(6)*. In Europe, as November 1 of 2007, European legislation will mandate that when, as a result of epidemiological investigation of foodborne outbreaks, *Salmonella* ssp. are identified in a flock of laying hens as the source of infection for humans, the food business operator is no longer allowed to market his products as table eggs *(5)*: "... these eggs originating from flocks which were identified as the source of infection in a specific human foodborne outbreak, may be used for human consumption only if treated in a manner that guarantees the destruction of all *Salmonella* serotypes with public health significance in accordance with Community legislation on food hygiene" *(5)*. Such eggs have to be considered as Class B eggs *(5)*, which are eggs of second quality that are allowed to be delivered only to the food industry and non-food industry *(4)*.

In our opinion, the finding that plant A was the source of not only 58 cases as shown by the cohort studies of Schmid et al., but also of 47 further cases as shown by our descriptive epidemiological studies and microbiological testing of fecal and environmental samples and possibly of 330 sporadic culture-confirmed salmonellosis cases, underlines the appropriateness of the decision of EC authorities to respond to epidemiological evidence alone in outbreaks associated with eggs *(7)*. Absence of microbiological proof in epidemiologically incriminated food must not preclude proper action by health authorities.

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95th Annual Meeting

IAFP 2008

Columbus, Ohio • August 3–6

AWARD NOMINATIONS

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

www.foodprotection.org

Nominations deadline is March 4, 2008

You may make multiple nominations. All nominations must be received at the IAFP office by March 4, 2008.

- Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members. GMA Food Safety Award nominees do not have to be IAFP Members.
- Previous award winners are not eligible for the same award.
- Executive Board Members and Awards Committee Members are not eligible for nomination.
- Presentation of awards will be during the Awards Banquet at IAFP 2008 – the Association's 95th Annual Meeting in Columbus, Ohio on August 6, 2008.

Contact IAFP for questions regarding nominations.

International Association for Food Protection®

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Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344
E-mail: info@foodprotection.org

Nominations will be accepted for the following Awards:

Black Pearl Award

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

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

Fellow Award

Distinguished Plaque

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

Honorary Life Membership Award

Plaque and Lifetime Membership in IAFP

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

Harry Haverland Citation Award

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

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

Food Safety Innovation Award

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

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

International Leadership Award

Plaque, $1,500 Honorarium and Reimbursement to attend IAFP 2008, *Sponsored by Cargill, Inc.*

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

GMA Food Safety Award

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

This Award alternates between individuals and groups or organizations. In 2008, the award will be presented to a group or organization in recognition of a long history of outstanding contributions to food safety research and education.

Maurice Weber Laboratorian Award

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

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

Sanitarian Award

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

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

Elmer Marth Educator Award

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

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

Harold Barnum Industry Award

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

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

95th Annual Meeting

IAFP 2008

Columbus, Ohio • August 3–6

Call for Abstracts

IAFP 2008

General Information

1. Complete the Abstract Submission Form Online.
2. All presenters must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
3. There is no limit on the number of abstracts individuals may submit. However, one of the authors must deliver the presentation.
4. Accepted abstracts will be published in the Program and Abstract Book. Editorial changes may be made to accepted abstracts at the discretion of the Program Committee.
5. Membership in the Association is not required for presenting a paper at IAFP 2008.

Presentation Format

1. Technical – Oral presentations will be scheduled with a maximum of 15 minutes, including a two to four-minute discussion. LCD projectors will be available and computers will be supplied by the convenors.
2. Poster – Freestanding boards will be provided for presenting posters. Poster presentation surface area is 48" high by 96" wide (121.9 cm × 243.8 cm). Handouts may be used, but audio-visual equipment will not be available. The presenter is responsible for bringing pins and velcro. All posters should include the title and author information.

Note: The Program Committee reserves the right to make the final determination on which format will be used for each presentation.

Instructions for Preparing Abstracts

1. All abstracts must be written in English. If the author is non-English speaking, consider having the abstract reviewed by an English-speaking person before submitting.
2. All abstracts must be approved and signed off by all authors before submission.
3. Title – The title should be short but descriptive. The title should be in title case.
4. Authors – List all authors using the following style: first name followed by the surname.
5. Presenter Name and Title – List the full name and title of the person who will present the paper.
6. Presenter Address – List the name of the department, institution and full postal address (including zip/postal code and country).
7. Phone Number – List the phone number, including area, country, and city codes of the presenter.
8. Fax Number – List the fax number, including area, country, and city codes of the presenter.
9. E-mail – List the E-mail address for the presenter.
10. Format preferred – Check the box to indicate oral or poster format. The Program Committee reserves the right to make the final determination of presentation format.
11. Category – The categories are used by the Program Committee to organize the posters and technical sessions. Please check 2–3 boxes which best describe the categories for which the abstract is suitable.
12. Developing Scientist Awards Competition – Check the box to indicate if the presenter is a student wishing to be considered in this competition. The student will make the initial submission, and IAFP will E-mail the abstract to the major professor, who will complete the submission process. For more information, see "Call for Entrants in the Developing Scientist Awards Competitions."
13. Abstract – Key the abstract into the web-based system. In addition, a double-spaced copy of the abstract, typed in 12-point font in MS Word, should be E-mailed to abstracts@foodprotection.org at the time of submission. Use no more than 300 words. Abstracts are most often rejected because of a failure to follow the instructions below.

In addition to following these instructions, authors should carefully review the sections on selection criteria and rejection reasons as well as the sample abstract before submitting the abstract. Original research abstracts MUST be in the following format:

Methods: State the methodology used in the study (2–3 sentences). The methods should be specific enough that researchers in the same or similar field would understand the basic experimental design or approach.

Results: Describe the results obtained in the study (2–3 sentences). NOTE: Specific results, with statistical analysis (if appropriate), MUST be provided. A statement of "results pending" or "to be discussed" is not acceptable and will be grounds for abstract rejection. Results should be summarized; do NOT use tables or figures.

Significance: State the significance of the findings to food safety and/or public health (1–2 sentences) NOTE: Do not include reference citations in the Abstract. Please see sample abstracts for further guidance on abstract structure.

Education abstracts MUST present an improvement or innovation on a proven method in order to educate others (about a food protection related topic). There should be a way to measure the outcomes and substantiate the improvements and/or outcomes. If measured, the sample size should be sufficiently large to represent the intended population.

Abstract Submission

Abstracts submitted for IAFP 2008 will be evaluated for acceptance by the Program Committee. Please be sure to follow the instructions above carefully; failure to do so may result in rejection. Information in the abstract data must not have been previously published in a copyrighted journal.

Abstracts must be received no later than January 29, 2008. Completed abstract and information must be submitted online. Use the online submission form at www.foodprotection.org. In addition, a double-spaced copy of the abstract, typed in 12-point font in MS Word, should be E-mailed to abstracts@foodprotection.org at the time of submission. You will receive an E-mail confirming receipt of your submission.

Selection Criteria

1. Abstracts must be structured as described above.
2. Abstracts must report the results of original research pertinent to the subject matter. Papers should report the results of new, applied studies dealing with: (i) causes (e.g., microorganisms, chemicals, natural toxicants) and control of all forms of foodborne illness; (ii) causes (e.g., microorganisms, chemicals, insects, rodents) and control of food contamination and/or spoilage; (iii) food safety from farm-to-fork (including all sectors of the chain including production, processing, distribution, retail, and consumer phases); (iv) novel approaches for the tracking of foodborne pathogens or the study of pathogenesis and/or microbial ecology; (v) public health significance of foodborne disease, including outbreak investigation; (vi) non-microbiology food safety issues (food toxiology, allergens, chemical contaminants); (vii) advances in sanitation, quality control/assurance, and food safety systems; (viii) advances in laboratory methods; and (ix) food safety risk assessment. Papers may also report subject matter of an educational nature.
3. Research must be based on accepted scientific practices.
4. Research should not have been previously presented nor intended for presentation at another scientific meeting. Papers should not appear in print prior to the Annual Meeting.

Rejection Reasons

1. Abstract was not prepared according to the "Instructions for Preparing Abstracts." This includes abstracts that are too lengthy.
2. Abstract reports inappropriate or unacceptable subject matter.
3. Abstract is not based on accepted scientific or educational practices and/or the quality of the research or scientific/educational approach is inadequate.
4. Potential for the approach to be practically used to enhance food safety is not justified.
5. Work reported appears to be incomplete and/or data and statistical validity are not presented. Percentages alone are not acceptable unless sample sizes (both numbers of samples and sample weight or volume) are reported. Detection limits should be specified when stating that populations are below these limits. Indicating that data will only appear in the presentation without including them in the abstract is NOT acceptable.
6. Abstract was poorly written or prepared. This includes spelling and grammatical errors or improper English language usage.
7. Results have been presented or published previously.
8. Abstract was received after the deadline for submission.
9. Abstract contains information that is in violation of the International Association for Food Protection Policy on Commercialism.
10. Abstract subject is similar to other(s) submitted by same author. (The committee reserves the right to combine such abstracts.)
11. Abstracts that report research that is confirmatory of previous studies and/or lacks originality will be given low priority for acceptance.

Projected Deadlines/Notification

Abstract Submission Deadline: January 29, 2008

Submission Confirmations: Within 48 hours of submission

Acceptance/Rejection Notification: March 21, 2008.

Contact Information

Questions regarding abstract submission can be directed to Tamara P. Ford, 515.276.3344 or 800.369.6337; E-mail: tford@foodprotection.org

Program Chairperson

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Call for Entrants in the Developing Scientist Awards Competitions

Supported by the International Association for Food Protection Foundation

The International Association for Food Protection is pleased to announce the continuation of its program to encourage and recognize the work of students and recent graduates in the field of food safety research. Qualified individuals may enter either the oral or poster competition.

Purpose

1. To encourage students and recent graduates to present their original research at the Annual Meeting.
2. To foster professionalism in students and recent graduates through contact with peers and professional Members of the Association.
3. To encourage participation by students and recent graduates in the Association and the Annual Meeting.

Presentation Format

Oral Competition – The Developing Scientist Oral Awards Competition is open to graduate students (enrolled or recent graduates) from M.S. or Ph.D. programs or undergraduate students at accredited universities or colleges. Presentations are limited to 15 minutes, which includes two to four minutes for discussion.

Poster Competition – The Developing Scientist Poster Awards Competition is open to students (enrolled or recent graduates) from undergraduate or graduate programs at accredited universities or colleges. The presenter must be present to answer questions for a specified time (approximately two hours) during the assigned session. Specific requirements for presentations will be provided at a later date.

General Information

1. Competition entrants cannot have graduated more than a year prior to the deadline for submitting abstracts.
2. Accredited universities or colleges must deal with environmental, food or dairy sanitation, protection or safety research.
3. The work must represent original research completed and presented by the entrant.
4. Entrants may enter only one paper in either the oral or poster competition.
5. All entrants must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
6. Acceptance of your abstract for presentation is independent of acceptance as a competition finalist. Competition entrants who are chosen as finalists will be notified of their status by the chairperson by April 30, 2008.
7. Entrants who are full-time students, with accepted abstracts will receive a complimentary, one-year Student Membership with *JFP* Online.
8. In addition to adhering to the instruction in the "Call for Abstracts," competition entrants must check the box to indicate if the paper is to be presented by a student in this competition. A copy of the abstract will be E-mailed to the major professor for final approval.
9. You must also specify full-time student or part-time student.

Judging Criteria

A panel of judges will evaluate abstracts and presentations. Selection of up to ten finalists for each competition will be based on evaluations of the abstracts and the scientific quality of the work. All entrants will be advised of the results by April 30, 2008. Only competition finalists will be judged at the Annual Meeting and will be eligible for the awards.

Judging criteria will be based on the following:

1. Abstract – Clarity, comprehensiveness and conciseness.
2. Scientific Quality – Adequacy of experimental design (methodology, replication, controls), extent to which objectives were met, difficulty and thoroughness of research, validity of conclusions based upon data, technical merit and contribution to science.
3. Presentation – Organization (clarity of introduction, objectives, methods, results and conclusions), quality of visuals, quality and poise of presentation, answering questions, and knowledge of subject.

Finalists

Awards will be presented at the International Association for Food Protection Annual Meeting Awards Banquet to the top three presenters (first, second and third places) in both the oral and poster competitions. All finalists are expected to be present at the banquet where the award winners will be announced and recognized.

Awards

First Place – $600 and an engraved plaque
Second Place – $400 and a framed certificate
Third Place – $200 and a framed certificate

Award winners will receive a complimentary, one-year Membership including *Food Protection Trends*, *Journal of Food Protection*, and *JFP* Online.

Policy on Commercialism

for Annual Meeting Presentations

1. INTRODUCTION

No printed media, technical sessions, symposia, posters, seminars, short courses, and/or other related types of forums and discussions offered under the auspices of the International Association for Food Protection (hereafter referred to as to Association forums) are to be used as platforms for commercial sales or presentations by authors and/or presenters (hereafter referred to as authors) without the express permission of the staff or Executive Board. The Association enforces this policy in order to restrict commercialism in technical manuscripts, graphics, oral presentations, poster presentations, panel discussions, symposia papers, and all other type submissions and presentations (hereafter referred to as submissions and presentations), so that scientific merit is not diluted by proprietary secrecy.

Excessive use of brand names, product names or logos, failure to substantiate performance claims, and failure to objectively discuss alternative methods, processes, and equipment are indicators of sales pitches. Restricting commercialism benefits both the authors and recipients of submissions and presentations.

This policy has been written to serve as the basis for identifying commercialism in submissions and presentations prepared for the Association forums.

2. TECHNICAL CONTENT OF SUBMISSIONS AND PRESENTATIONS

2.1 Original Work

The presentation of new technical information is to be encouraged. In addition to the commercialism evaluation, all submissions and presentations will be individually evaluated by the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff on the basis of originality before inclusion in the program.

2.2 Substantiating Data

Submissions and presentations should present technical conclusions derived from technical data. If products or services are described, all reported capabilities, features or benefits, and performance parameters must be substantiated by data or by an acceptable explanation as to why the data are unavailable (e.g., incomplete, not collected, etc.) and, if it will become available, when. The explanation for unavailable data will be considered by the Program Committee chairperson and/or technical reviewers selected by the Program Committee chairperson to ascertain if the presentation is acceptable without the data. Serious consideration should be given to withholding submissions and presentations until the data are available, as only those conclusions that might be reasonably drawn from the data may be presented. Claims of benefit and/or technical conclusions not supported by the presented data are prohibited.

2.3 Trade Names

Excessive use of brand names, product names, trade names, and/or trademarks is forbidden. A general guideline is to use proprietary names once and thereafter to use generic descriptors or neutral designations. Where this would make the submission or presentation significantly more difficult to understand, the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff, will judge whether the use of trade names, etc., is necessary and acceptable.

2.4 "Industry Practice" Statements

It may be useful to report the extent of application of technologies, products, or services; however, such statements should review the extent of application of all generically similar technologies, products, or services in the field. Specific commercial installations may be cited to the extent that their data are discussed in the submission or presentation.

2.5 Ranking

Although general comparisons of products and services are prohibited, specific generic comparisons that are substantiated by the reported data are allowed.

2.6 Proprietary Information (See also 2.2.)

Some information about products or services may not be publishable because it is proprietary to the author's agency or company or to the user. However, the scientific principles and validation of performance parameters must be described for such products or services. Conclusions and/or comparisons may be made only on the basis of reported data.

2.7 Capabilities

Discussion of corporate capabilities or experiences are prohibited unless they pertain to the specific presented data.

3. GRAPHICS

3.1 Purpose

Slides, photographs, videos, illustrations, art work, and any other type visual aids appearing with the printed text in submissions or used in presentations (hereafter referred to as graphics) should be included only to clarify technical points. Graphics which primarily promote a product or service will not be allowed. (See also 4.6.)

3.2 Source

Graphics should relate specifically to the technical presentation. General graphics regularly shown in, or intended for, sales presentations cannot be used.

3.3 Company Identification

Names or logos of agencies or companies supplying goods or services must not be the focal point of the slide. Names or logos may be shown on each slide so long as they are not distracting from the overall presentation.

3.4 Copies

Graphics that are not included in the preprint may be shown during the presentation only if they have been reviewed in advance by the Program Committee chairperson, session convenor, and/or staff, and have been determined to comply with this policy. Copies of these additional graphics must be available from the author on request by individual attendees. It is the responsibility of the session convenor to verify that all graphics to be shown have been cleared by Program Committee chairperson, session convenor, staff, or other reviewers designated by the Program Committee chairperson.

4. INTERPRETATION AND ENFORCEMENT

4.1 Distribution

This policy will be sent to all authors of submissions and presentations in the Association forums.

4.2 Assessment Process

Reviewers of submissions and presentations will accept only those that comply with this policy. Drafts of submissions and presentations will be reviewed for commercialism concurrently by both staff and technical reviewers selected by the Program Committee chairperson. All reviewer comments shall be sent to and coordinated by either the Program Committee chairperson or the designated staff. If any submissions are found to violate this policy, authors will be informed and invited to resubmit their materials in revised form before the designated deadline.

4.3 Author Awareness

In addition to receiving a printed copy of this policy, all authors presenting in a forum will be reminded of this policy by the Program Committee chairperson, their session convenor, or the staff, whichever is appropriate.

4.4 Monitoring

Session convenors are responsible for ensuring that presentations comply with this policy. If it is determined by the session convenor that a violation or violations have occurred or are occurring, he or she will publicly request that the author immediately discontinue any and all presentations (oral, visual, audio, etc.) and will notify the Program Committee chairperson and staff of the action taken.

4.5 Enforcement

While technical reviewers, session convenors, and/or staff may all check submissions and presentations for commercialism, ultimately it is the responsibility of the Program Committee chairperson to enforce this policy through the session convenors and staff.

4.6 Penalties

If the author of a submission or presentation violates this policy, the Program Committee chairperson will notify the author and the author's agency or company of the violation in writing. If an additional violation or violations occur after a written warning has been issued to an author and his agency or company, the Association reserves the right to ban the author and the author's agency or company from making presentations in the Association forums for a period of up to two (2) years following the violation or violations.

Rome Highlights

The International Association for Food Protection, in collaboration with ILSI Europe and the World Health Organization hosted IAFP's Third European Symposium: Advancements in Food Safety. The Symposium was held 18–19 October 2007 at the Sheraton Roma Hotel & Conference Center in Rome, Italy. More than 135 attendees from 24 countries participated.

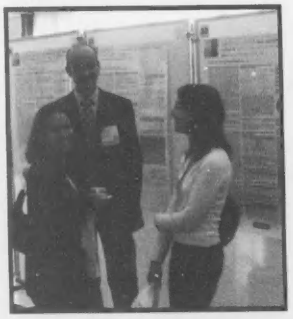
The meeting began with a key-note speech by Professor Patrick Wall, Chair of the EFSA Management Board and Associate Professor of Public Health, University College Dublin, Ireland. The symposium provided insights from experts representing industry, academia and government from both Europe and North America on recent advancements in food safety.

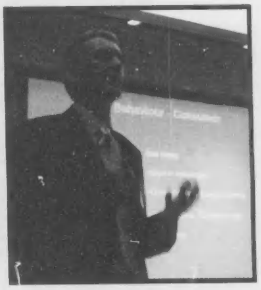
The sessions included Assessment and Enumeration Aspects; Food Safety Management and Control; and Current & Emerging Food Safety Issues. The symposium concluded with a Hot Topics session in which Christine Little, Head of Food Studies & Response Section, Health Protection Agency, United Kingdom, and Robert Brackett, Director, Center for Food Safety & Applied Nutrition, US Food & Drug Administration, United States gave the UK and US perspectives on food safety, respectively. In total, there were 17 presentations which are now posted on the IAFP Web site.

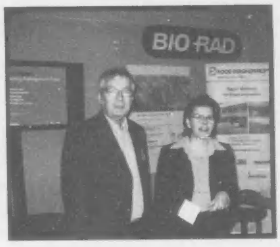
In addition to the sessions, 48 posters were presented. Seventeen companies or organizations provided current food safety products and information through their stands in the exhibit area. The exhibitors were: 3M Microbiology, BD Diagnostics, Inc., BioControl Systems, Inc., bioMérieux Industry, Bio-Rad Laboratories, *British Food Journal*, DuPont Qualicon, Food and Agricultural Organization of the United Nations (FAO), FOOD DIAGNOSTICS AS, ILSI Europe, International Food Hygiene, MATRIX Microscience Ltd., Neogen Europe Ltd., SDI Europe Limited, Society for Applied Microbiology, Springer Science & Business Media, and World Health Organization. Attendees networked during coffee breaks, a Thursday evening reception, and Friday lunch, which were all held in the exhibit area and poster session area. An evening Rome city tour and dinner, hosted by bioMérieux Industry provided opportunity for casual networking with colleagues from around the world.

IAFP thanks the Organizing Committee, chaired by Leon Gorris, for their effort in making the symposium a success. A special thank you to the sponsoring organizations (listed on page 981), for their support of the symposium. It is through this support that IAFP is able to develop its international involvement and expand our international network of food safety professionals. We are looking forward to continuing IAFP's European presence with a fourth symposium in fall 2008.

Photos from Rome







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December 2007

Fellow IAFP Members:

As we prepare for a new year, I want to encourage you to become involved in the International Association for Food Protection's Committees and Professional Development Groups (PDGs). From personal experience, I can tell you that participation in IAFP's Committees and PDGs is truly a win-win. Through your involvement, you can help provide guidance and information for the Association, your profession, and fellow IAFP Members. While you are helping the Association and others, you'll also be networking with leading experts in the field, learning from their experiences, and developing valued relationships.

Committees and PDGs are a vital component of IAFP. They meet during the Annual Meeting and share information throughout the year via conference calls or E-mail. Therefore, even if you're unable to attend IAFP 2008 in Columbus, Ohio, your involvement is still possible. Please review the list of Committees and PDGs and their respective mission statements listed on the following pages. If you find one that sounds interesting, simply contact the IAFP office to let us know which group you want to join. Getting started is really that simple.

For those of you who have participated in our Committees or PDGs in the past, I want to thank you for your service and encourage you to stay involved. Your continued participation is important to the success of the Association.

As usual, your comments, questions, and suggestions are welcomed. Please do not hesitate to contact the IAFP office or myself if we can be of help.

I'd like to leave you with a quote that I recently heard, "Why not go out on a limb? Isn't that where the fruit is?" More often than not receive proportionately to what you give. I invite you to extend yourself, go out on a limb; get involved in IAFP's Committees or PDGs. Together we'll reap the awards and help *Advance Food Safety Worldwide*.

Best Regards,

Vickie Lewandowski
Vice President, IAFP

"Our mission is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."
Publisher of the *Journal of Food Protection* and *Food Protection Trends*

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IAFP COMMITTEES, PROFESSIONAL DEVELOPMENT GROUPS, TASK FORCE, AND AFFILIATE COUNCIL MISSION STATEMENTS

STANDING COMMITTEES

FPT Management Committee

The mission of the *FPT* Management Committee is to provide guidance to the Executive Board on matters concerning *Food Protection Trends.*

JFP Management Committee

The mission of the *JFP* Management Committee is to provide guidance to the Executive Board on matters concerning the *Journal of Food Protection.*

Program Committee

The mission of the Program Committee is to develop the Annual Meeting program, evaluate abstracts, identify symposia and speakers, identify all sessions' convenors, and oversee Developing Scientist Awards Committee.

SPECIAL COMMITTEES

3-A Committee on Sanitary Procedures

The mission of the 3-A Committee on Sanitary Procedures is to serve as IAFP representatives to the 3-A Sanitary Standards Committee; to review and provide comments on proposed changes and revisions to the 3-A Sanitary Standards.

Audiovisual Library Committee

The mission of the Audiovisual Library Committee is to review and evaluate audiovisual materials for accuracy and appropriateness of content, make recommendations regarding the purchase of audiovisual materials, and provide guidance on matters concerning the AV Library.

Awards Committee

The mission of the Awards Committee is to select recipients for the IAFP awards.

Black Pearl Selection Committee

The mission of the Black Pearl Selection Committee is to select the recipient of the Black Pearl Award.

Committee on Control of Foodborne Illness

The mission of the Committee on Control of Foodborne Illness is to review information on epidemiology and control of communicable diseases of primary concern to food safety and related areas, and prepare manuals and articles addressing investigation of control of food safety-related problems.

Constitution and Bylaws Committee

The mission of the Constitution and Bylaws Committee is to review and study the Constitution and Bylaws of IAFP and make recommendations to the Executive Board for changes to be considered for submission to the Membership for ratification.

Developing Scientist Awards Committee

The mission of the Developing Scientist Awards Committee is to select finalists and judge the Developing Scientist Awards Competition at the IAFP Annual Meeting.

Fellows Selection Committee

The mission of the Fellows Selection Committee is to solicit nominations and make recommendations to the Executive Board for eligible Members to be confirmed as Fellows by the Executive Board.

Foundation Committee

The mission of the Foundation Committee is to oversee IAFP Foundation monies, solicit gifts to the Foundation, and identify and fund programs which further the goals and objectives of the Association.

Membership Committee

The mission of the Membership Committee is to develop strategies to retain current members and attract new members.

Nominating Committee

The mission of the Nominating Committee is to select and submit names of nominees for the office of Executive Board Secretary for election by the IAFP Membership.

Past Presidents' Committee

The mission of the Past Presidents' Committee is to serve as an advisory committee to the Executive Board.

Tellers Committee

The mission of the Tellers Committee is to count and certify the results of each election and other membership votes.

PROFESSIONAL DEVELOPMENT GROUPS

Applied Laboratory Methods PDG

The mission of the Applied Laboratory Methods PDG is to provide a forum for the exchange and sharing of information related to the development and use of laboratory methods for the analysis of food and related commodities.

Beverage PDG

The mission of the Beverage PDG is to provide a forum to discuss and develop symposia on issues facing the beverage industry.

Dairy Quality and Safety PDG

The mission of the Dairy Quality and Safety PDG is to promote the production and processing of safe, high quality dairy products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

Food Chemical Hazards and Food Allergy PDG

The mission of the Food Chemical Hazards and Food Allergy PDG is to facilitate communication on topics in food toxicology including food allergens.

Food Hygiene and Sanitation PDG

The mission of the Food Hygiene and Sanitation PDG is to provide information on the developments in hygiene and sanitation in the food industry.

Food Law PDG

The mission of the Food Law PDG is to provide an international forum for the exchange of information on the scientific issues associated with food laws, regulations and policy.

Food Safety Education PDG

The mission of the Food Safety Education PDG is to provide IAFP members and their clientele information on food safety education.

Fruit and Vegetable Safety and Quality PDG

The mission of the Fruit and Vegetable Safety and Quality PDG is to provide a forum to discuss items of interest to the safe production of fruit and vegetable products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

Meat and Poultry Safety and Quality PDG

The mission of the Meat and Poultry Safety and Quality PDG is to provide a forum to discuss items of interest to the safe production of meat and poultry products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

Microbial Risk Analysis PDG

The mission of the Microbial Risk Analysis PDG is to facilitate communication on the topic of microbial risk analysis (MRA), promote application and use of MRA and encourage research and data reporting methods that support MRA.

Retail Food Safety and Quality PDG

The mission of the Retail Food Safety and Quality PDG is to provide the retail food safety industry worldwide with information to prepare and serve safe food.

Seafood Safety and Quality PDG

The mission of the Seafood Safety and Quality PDG is to provide a forum to discuss items of interest to the safe production of seafood products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

Student PDG

The mission of the Student PDG is to provide students of food safety with a platform to enrich their experience as members of IAFP.

Viral and Parasitic Foodborne Diseases PDG

The mission of the Viral and Parasitic Foodborne Diseases PDG is to promote awareness of non-bacterial causes of foodborne disease by encouraging food safety professionals and others to seek education and training that will enable them to contribute to preventing non-bacterial foodborne infections and outbreaks.

Water Safety and Quality PDG

The mission of the Water Safety and Quality PDG is to provide a forum to discuss items as to the role the safety and quality of water plays globally in the farm-to-table chain and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

TASK FORCE

Rapid Response Task Force

The mission of the Rapid Response Task Force is to identify developing conditions affecting food safety and organize meetings on these issues to educate IAFP members.

AFFILIATE COUNCIL

The Affiliate Council is an advisory body to the IAFP Board, represents Affiliate Associations' interests, responsible for IAFP Awards Committee, interchanges ideas and recommendations on programs, awards and procedures between Affiliates and the Board.

NEW MEMBERS

ARGENTINA

Carlos A. Hermida
Rioplatense SAICIF
Pacheco, Buenos Aires

CANADA

Raquel F. Lenati
3M Canada Co.
London, Ontario

Juliana M. Ruzante
University of Guelph
Guelph, Ontario

DENMARK

Karen Blom
FORCE Technology
Broendby

Ulf Nonboe
FORCE Technology
Broendby

JAPAN

Naoki Mochizuki
Asahi Breweries, Ltd.
Moriya-shi, Ibaraki

SPAIN

Marta Hernandez-Perez
ITACYL
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Agri-Food & Biosciences Institute
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Georgia State University
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www.foodprotection.org

UPDATES

Grocery Manufacturers Association Appoints Robert E. Brackett Senior Vice President and Chief Science and Regulatory Affairs Officer

Grocery Manufacturers Association (GMA) president and CEO, Cal Dooley, has announced the appointment of Robert E. Brackett, Ph.D., as senior vice president and chief science and regulatory affairs officer.

"I am delighted to welcome Bob to the GMA team," said Cal Dooley. "His demonstrated leadership, deep experience in the food safety arena and his academic background will help GMA and its member companies continue to deliver on their promise to provide consumers with safe, abundant and affordable food."

Dr. Brackett previously served as director of the US Food and Drug Administration's (FDA) Center for Food Safety and Applied Nutrition (CFSAN), a position he has held since 2004. Prior to his appointment as CFSAN director, he also served as the director of food safety and security, and as senior microbiologist at the center.

Prior to joining the FDA, Dr. Brackett served as a professor at the University of Georgia's Center for Food Safety, and as an assistant professor at North Carolina State University's Extension Foods and Nutrition division.

"I am honored to join the Grocery Manufacturers Association, and look forward to working with Cal Dooley and the association's staff and members to advance the organization's mission," said Dr. Brackett.

Dr. Brackett is the recipient of numerous professional awards, and holds a Ph.D. and a master's degree in food microbiology from the University of Wisconsin. He also earned his bachelor's degree in bacteriology from the University of Wisconsin.

In his new position, Dr. Brackett will report to GMA President and CEO, Cal Dooley, and will oversee all of the association's scientific and regulatory activity, including the operation of its in-house food safety laboratory.

Center for Produce Safety at the University of California, Davis, Has New Director

The new Center for Produce Safety at the University of California, Davis, has named Dr. Devon Zagory as interim executive director. The center was established earlier this year to work with the agricultural and food industries, government regulatory agencies, trade associations, research institutions, and consumer groups to enhance the safety of fresh fruits and vegetables through research, education, and information exchange.

The Center for Produce Safety was established following national *E. coli* outbreaks last year. Initial funding for the center came from a coalition of the Produce Marketing Association, Taylor Farms of California, the California Department of Food and Agriculture, and the University of California.

Dr. Zagory has 25 years of experience working on produce safety with agricultural producers, fresh-cut industries, and university researchers. He has worked internationally as a consultant in the fields of food microbiology and modified atmosphere packaging. Dr. Zagory was a founder of Davis Fresh Technologies, now NSF Davis Fresh, and continues to serve as senior vice president for Food Safety and Quality Programs.

"The Center for Produce Safety will address the quest for safer fruits and vegetables on a number of fronts. The center will serve as a nexus for developing and implementing safer practices with its many collaborators. We must reinforce consumers' confidence in the benefits of eating fresh fruits and vegetables as an integral part of a healthful diet," said Dr. Zagory.

Dr. Zagory has a doctoral degree and a master's degree in plant pathology from the University of California, Berkeley, and a bachelor's degree in agricultural science from UC Berkeley. He spent eight years as an associate pomologist in the former Department of Pomology (now Plant Sciences) at UC Davis.

Dr. Zagory was co-chair of the Technical Committee of the International Fresh-cut Produce Association and was editor-in-chief of the third edition of the IFPA Food Safety Guidelines for the Fresh-cut Produce Industry. He has written numerous chapters and scientific publications, and has given many presentations on produce microbial safety, packaging, quality, and operations.

NEWS

Women Better at Hand Hygiene Habits, Hands Down

Ninety-one percent of American adults say they always wash their hands after using public restrooms. But just 83 percent actually did so, according to a separate observational study.

These results were among those released by the American Society for Microbiology (ASM) and The Soap and Detergent Association (SDA), during a press conference highlighting National Clean Hands Week. Both groups have used surveys over the years to help highlight a vital public health message from the Centers for Disease Control and Prevention (CDC).

The single most important thing we can do to keep from getting sick and spreading illness to others is to clean our hands.

An August 2005 study conducted for ASM and SDA by Harris Interactive® observed 6,336 individuals wash their hands – or not – at six public attractions in four major cities: Atlanta (Turner Field), Chicago (Museum of Science and Industry, Shedd Aquarium), New York City (Grand Central Station, Penn Station), and San Francisco (Ferry Terminal Farmers Market).

Ninety percent of the women observed washed their hands, compared to 75 percent of men. By contrast, in an August 2005 telephone survey of 1,013 American adults also conducted by Harris Interactive®, 97 percent of women and 96 percent of men say they always or usually wash their hands after using a public restroom.

"The American Society for Microbiology has been focusing on increasing public awareness of clean hands in periodic campaigns since 1996, and this message remains one of our most important priorities," according to Judy Daly, Ph.D. Dr. Daly is the elected secretary of the society and director of the Microbiology Laboratories, Primary Children's Medical Center, Salt Lake City, Utah and professor in the Department of Pathology, University of Utah School of Medicine.

"Good health is within reach," said Brian Sansoni, vice president of communication at The Soap and Detergent Association. "Washing with soap and water is still the gold standard when it comes to removing dirt and grime from our hands. But if soap and water are out of reach, hand sanitizers and wipes are great hygiene tools to have on hand."

Among those observed, fans at Atlanta's Turner Field had the worst hand hygiene habits. Approximately a quarter (26%) did not wash their hands after using the facilities (84% of the women washed their hands; 37% of the guys didn't).

The greatest gender disparity observed between women and men handwashers was in New York's Penn Station: 92 percent of the women washed their hands, compared to only 64 percent of the men.

Those traveling through San Francisco's Ferry Terminal Farmers Market and Chicago's Shedd Aquarium and Museum of Science and Industry fared best in the observed handwashing study. In both cities, 88 percent were observed washing their hands.

The telephone survey questioned a nationally representative sample of 1,013 American adults. Large majorities answered they always wash their hands after such activities as using a public restroom (91%), using the bathroom at home (83%), before handling or eating food (77%), and changing a diaper (73%).

Much poorer habits were revealed as fewer indicated they always washed their hands after petting a dog or cat (42%), after handling money (21%), and, most shockingly, after coughing or sneezing (32%).

"Only 24 percent of men and 39 percent of women say they always wash their hands after coughing or sneezing," said the SDA's Brian Sansoni. "We have to do a better job here in stopping the spread of the germs that make us sick."

Contrary to what many people believe, cold and influenza viruses are spread much more often by hands than through airborne transmission from sneezing, according to Dr. Daly. "We unconsciously touch our mouths, noses, and eyes many, many times each day," she said. "These mucous membranes are welcome mats for cold and flu viruses, which are readily transferred from unclean hands."

Survey respondents may be more forthcoming about their hygiene habits than in the past – or else their habits are getting worse. Over the last seven years, men's admitted handwashing habits have declined slightly when it comes to washing their hands after using the bathroom at home, changing a diaper and before handling food.

Meantime, in 2005, slightly fewer women admit to washing their hands after using a public restroom (97% of women said they did in an August 2003 Wirthlin Worldwide survey for ASM, 94% said so in the 2005 Harris Interactive survey).

"Although many Americans are beginning to recognize the importance of washing their hands, we still need to reach many others. Our message is clear: one of the most effective tools in preventing the spread of infection is literally at our fingertips," Dr. Daly says.

USDA Awards More Than $14 Million in Food Safety Grants

Acting Agriculture Secretary Chuck Conner announced more than $14 million in food safety grants to researchers and educators at 17 universities throughout the United States. The USDA grants will focus on improving food safety nationwide, while reducing the incidence of foodborne illness among children, adults and older Americans.

"USDA places a high importance on ensuring Americans have access to a safe food supply. These research projects will address food safety issues across a broad range of topics that include on-farm production, post-harvest processing, shipping, storage, food buying, food preparation and food consumption," Mr. Conner said.

Each year, USDA's Cooperative State Research, Education, and Extension Service (CSREES) awards National Integrated Food Safety Initiative (NIFSI) grant funds so that sound, practical, science-based knowledge can be shared among teachers, scientists, health professionals, researchers, farmers, food processors, food service workers and all who impact the safety of the US food supply. NIFSI grant funds are frequently used to develop education and outreach programs for consumers.

The University of Georgia, for example, received $2.5 million to study the growth and survival of *E. coli* bacteria in soil and water and develop strategies to minimize *E. coli* contamination of leafy green vegetables grown in the United States.

Total Fiscal Year 2007 grants of $304,150 to $2.5 million were awarded to:

Cornell University, $599,984
Iowa State University, $509,252
Kansas State University, $599,265
Michigan State University, $578,681
New Mexico State University, $599,691
Ohio State University, $2.5 million
Oregon State University, $596,440
Purdue University, $599,972
Tennessee State University, $599,814
Texas Tech University, $597,652
Texas Woman's University, $456,606
University of California-Davis, $599,997
University of Georgia, $2.5 million
University of Georgia, $304,157
University of Idaho, $598,926
University of Missouri, $598,914
University of Rhode Island, $480,264
Utah State University, $596,396

CSREES advances knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education and extension program in the Land-Grant University System and other partner organizations. For more information, visit www.csrees.usda.gov.

UK: *E. coli* O157 Report Published

The Report of the Outbreak Control Team into the outbreak of *E. coli* O157 in South Wales in the autumn of 2005 has been published.

The report was completed in June 2006 but publication was delayed pending legal proceedings involving the local meat supplier at the center of the outbreak.

Legal proceedings ended on September 7 in Cardiff.

In September 2005, the largest *E. coli* O157 outbreak ever seen in Wales occurred. There were 157 cases meeting the case definition of which 118 were microbiologically confirmed. One-hundred nine of these confirmed cases were of phage type 21/28 and of a strain unique to this outbreak. Primary cases were mostly among schoolchildren attending 44 schools in Bridgend, Caerphilly, Merthyr Tydfil and Rhondda Cynon Taf, although there were also three cases in the Vale of Glamorgan.

Thirty-one cases were hospitalized, 11 of which were transferred to tertiary hospitals, and one child died.

An Outbreak Control Team (OCT) was convened and a number of investigations were carried out to identify the cause of the outbreak. From the results (which are detailed in this report), the OCT concluded that cooked sliced meats supplied to the school meals service were the source for the transmission of *E. coli* O157 to primary cases in the four main Local Authority areas affected.

Control measures were successful in rapidly terminating the presentation of primary cases connected with schools outbreak, but secondary household cases continued to present in October. Fifty percent of all cases excreted the organism for between 5 and 32 days. Some cases continued to excrete *E. coli* O157 for prolonged periods, the longest being 80 days. The outbreak was declared over on December 20, 2005.

During November 2005, 16 cases of *E. coli* O157 infection occurred associated with Abercynon Infants School in Rhondda Cynon Taf. After exhaustive investigation, these were declared a separate outbreak not connected with the main outbreak. However, as the investigative and geographical context was the same in both outbreaks, the Abercynon outbreak report is nested within this document.

The full report is available to download from the following link: http://www2.nphs.wales.nhs.uk:8080/PressReleasesDocs.nsf/Main%20Frameset?OpenFrameSet&Frame=Right&Src=%2FPressReleasesDocs.nsf%2F61c1e930f9121fd080256f2a004937ed%2F0f033baa21b9660c80257353004d0d2f%3FOpenDocument%26AutoFramed.

USDA Web Portal Offers Big Food Safety Benefits for Small Food Processors

The US Department of Agriculture (USDA) has unveiled a new Internet resource to help smaller companies answer food safety questions and help food processors make science-based food production decisions. The Internet portal, available at http://www.ars.usda.gov/naa/errc/mfsru/portal, is one of the most comprehensive decision support tools available.

"Scientists, food safety risk managers, researchers and government decision-makers can use this access to predictive modeling tools and food microbiology information," said Edward B. Knipling, administrator of USDA's Agricultural Research Service (ARS). "The portal is geared towards small and very small processors, but the information it contains will benefit companies of all sizes."

"This partnership builds on our extensive efforts to provide more resources and better tools to the small and very small plants so they can enhance the safety of their products," said Al Almanza, administrator of USDA's Food Safety and Inspection Service (FSIS).

The Predictive Microbiology Information Portal (PMIP) was developed by ARS scientists at Wyndmoor, PA, working with colleagues at FSIS, Rutgers University, and Decisionalysis Risk Consultants, Inc., in Canada. FSIS will also provide a link to the portal to facilitate access by the meat and poultry industry, especially small and very small plants.

PMIP focuses on processors with 500 or fewer employees. ARS microbiologist Vijay K. Juneja and his ARS and FSIS colleagues met with many industry members to tailor the Web portal to their diverse needs in providing safe and wholesome products to consumers.

Currently, PMIP offers information on research, regulations and resources related to *Listeria monocytogenes* in ready-to-eat foods, the prototype identified for the project by FSIS. In the coming months, it will be expanded to include other pathogen and food combinations. A searchable database allows users to find information that can also be used by food processors to develop plans for Hazard Analysis Critical Control Point, to ensure the safety of food processes.

The Web portal also includes a tutorial section with instructions on using and interpreting predictive models and links users directly to the ARS Pathogen Modeling Program and ComBase. The Pathogen Modeling Program is a multi-lingual modeling tool that is used by food processing companies around the world. ComBase is an international relational database of predictive microbiology information that contains more than 30,000 datasets describing the growth, survival and inactivation of bacteria under diverse environments relevant to food processing operations.

ARS is USDA's chief intramural scientific research agency. FSIS is USDA's public health agency responsible for ensuring that meat, poultry and egg products are safe, wholesome and correctly labeled. FSIS provided funding for the collaborative project.

Grocery Manufacturers' Association Unveils Action Plan for Strengthening Imported Food Safety

Hal Dooley, president and CEO of the Grocery Manufacturers Association (GMA) has unveiled Commitment to Consumers: The Four Pillars of Food Safety, a unique proposal designed to protect consumers by strengthening, modernizing and improving the system governing the safety of food and food ingredients imported into the United States.

"Ensuring the United States has the safest food supply in the world is priority number one for the food and beverage industry," said Mr. Dooley. "Because we cannot simply inspect our way to a safer food supply, industry can apply its vast knowledge and practical experience along the entire supply chain to prevent problems before they arise. And, under our proposal, a fortified FDA will be right there with us, side by side, to make sure we do it right."

Prevention and a stronger public-private food safety partnership are the foundation of GMA's Four Pillars proposal. If adopted, all importers of record would be required to adopt a foreign supplier quality assurance program and verify that imported ingredients and products meet US Food and Drug Administration (FDA) food safety and quality requirements. The program would be based on FDA guidance and industry best practices, and would be monitored and enforced by the FDA.

The second pillar of the proposal would allow FDA to focus even greater resources on products and countries deemed of higher risk through a program that would allow food companies/importers to qualify their products as lower risk by sharing test results, data and supply chain information with the FDA in a confidential manner. Qualifying products and ingredients would receive expedited treatment at the borders, allowing the FDA to train its resources on products that carry greater risk of contamination.

The third leg of the proposal focuses on building capacity within foreign governments to facilitate food safety standards that are more closely aligned with those of the FDA.

Finally, recognizing that FDA must be armed with the appropriate resources to administer this program and adequately fulfill its food safety mission, the fourth pillar seeks to expand the capacity of FDA, by providing the Agency with the resources it needs to get the job done.

Echoing a major theme from last week's White House Interagency Working Group on Import Safety report, the Four Pillars program proposal is intended to improve the safety of food imports through an integrated, "life-cycle" approach centering on prevention.

"The 'Four Pillars' proposal is an innovative and comprehensive approach that offers effective and practical solutions to the latest challenges to our food safety net. It builds upon a long and successful history of partnership and cooperation between the public and private sectors that has provided our country with what is still one of the safest food supplies in the world. I look forward to working with Congress, the Bush Administration and appropriate agencies to adopt this prevention-first strategy," concluded Mr. Dooley.

Food Safety: Overview

Each year federal and state food safety authorities and private enterprises spend billions of dollars on food-safety-related activities. Yet 76 million US consumers still contract foodborne illnesses, resulting in 325,000 hospitalizations, 5,000 deaths, and an unknown number of chronic complications each year.

Are some foodborne illnesses inevitable, or can they be prevented through government regulation? If food safety could be observed, this would not be a troubling question. Consumers could choose the level of food safety they were willing to pay for, thereby creating powerful economic incentives for food suppliers to make all possible cost-effective investments in plants, equipment, and labor training that promote food safety.

If a food supplier produced foods that were not as safe as consumers wanted, consumers would simply turn to other suppliers, buying safer food elsewhere. The supplier of insufficiently safe foods would have to offer safer foods or face financial ruin. Consumers could also choose their own level of food safety: consumers who are willing to scrupulously clean their kitchens and thoroughly heat their foods might not feel the need to buy the same level of safety as those who are less adept at defensive actions. Under these conditions, there would be no reason to involve the public sector in food safety.

But food safety is usually not discernable as foods move from farms to manufacturers to distributors to consumers. Food contaminated with disease-causing pathogens may look, smell, and taste exactly like a safe product. Many pathogens cause illnesses and disease only after a period of days or weeks, so being able to definitively link illnesses and disease with particular foods is a rare event. If consumers cannot identify unsafe foods, they have no way of choosing safer foods. Consequently, suppliers are not rewarded for producing safer foods and are not penalized for ignoring safety. Consumers' food purchases create few financial incentives for suppliers to provide food safety.

ERS food-safety research examines how markets, consumers, and regulators interact to provide safe food, and analyzes the economic efficiency of these interactions. The aim of ERS research is to inform public sector food-safety policies, by addressing the following questions:

Do consumers' food choices create sufficient incentives or are consumers' demands for safety unmet even though suppliers are physically and financially able to meet those demands?

Can food safety be marketed and, if so, how do sellers (all along the food supply chain) gain buyers' trust that foods meet advertised safety margins? Is trust bought with third-party certification or made with contracts?

What would greater food safety cost at different points in the food supply chain?

Can public-sector intervention solve problems of unmet safety demands and, if so, at what cost?

Do regulatory actions increase economic incentives for food-safety innovation and adoption of better practices throughout the supply chain? Regulatory options include hazard analysis critical control point (HACCP) requirements and enforcement applied to food manufacturers, school lunch contracts, pathogen testing from farm to retail, and consumer safe-food handling labels.

New Zealand: FSA Announces Additions to *Campylobacter* Strategy

The New Zealand Food Safety Authority's updated *Campylobacter* in Poultry Risk Management Strategy identifies some stringent additions that it anticipates will lead to significant reductions in this country's high levels of human campylobacteriosis.

Together with the poultry industry, NZFSA will introduce an interim performance target that aims to see human cases of foodborne campylobacteriosis fall by 50 percent over the next five years.

This approach seeks to encourage the greatest reductions in bacteria numbers as early as possible in the processing food chain. The

interim performance target that the poultry industry has agreed to meet represents a 90 percent reduction in current contamination levels and will be mandated from April 1, 2008. This time lag will allow industry sufficient time to put the necessary changes to production systems in place, and introduce new food safety technologies.

With the support of the poultry industry, NZFSA will take strong action against premises that do not meet the target. Ultimately, sanctions could escalate to closing down poor-performing premises.

"Like the rest of New Zealand, NZFSA is very concerned about this country's high levels of *Campylobacter*, but mandatory freezing of poultry across all of industry is not a practical or effective option, or one that New Zealand consumers appear keen to adopt," says Dr. Andrew McKenzie, NZFSA's acting chief executive. "NZFSA has decided to take a science-based approach to implementing controls."

"Precipitous decisions could add high costs with no benefits to consumers, and this is unacceptable." Dr. McKenzie says he is hopeful that mandating a performance target will considerably reduce human cases of campylobacteriosis while leaving the intervention decisions to industry.

This, together with a range of other measures being introduced as a consequence of NZFSA's *Campylobacter* Strategy, should significantly reduce foodborne *Campylobacter* infections in New Zealand. However, the rate of reduction is open to conjecture and re-evaluation of the performance target will take place as soon as enough human illness data becomes available.

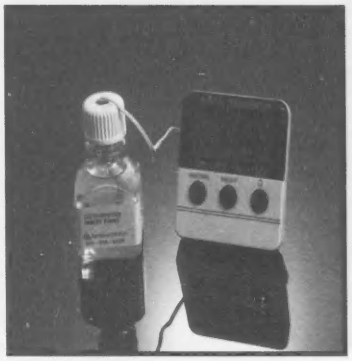
"Additional interventions further along the processing, packaging and retail continuum are being progressed and there already is much work being done by the retail sector that will minimize cross contamination."

"This is a complex problem and New Zealand is just one of dozens of countries grappling with it." While poultry is recognized as the primary pathway for over half the country's reported rates of foodborne campylobacteriosis, NZFSA is also looking at the environment, food in shops, and domestic animals in efforts to reduce the country's unacceptably high infection rates.

NZFSA continues to stress the need for ongoing consumer vigilance in the home. "While everything possible is presently being done to improve this country's high rates of campylobacteriosis, New Zealanders need to heed our simple Clean, Cook, Cover, Chill and '20 seconds wash+20 seconds dry = clean hands' messages, which will help ensure they have the best chance of avoiding campylobacteriosis, as well as most other foodborne illnesses."

Campylobacter in Poultry Risk Management Strategy is available online at: www.nzfsa.govt.nz/consumers/food-safety-topics/foodborne-illnesses/campylobacter.

INDUSTRY PRODUCTS



Hardy Diagnostics

Hardy Diagnostics New Exact-Temp Thermometer

The new Exact-Temp Thermometer stays inside your refrigerator, incubator, or freezer, while the digital display stays outside. There is no need to open the door to take daily temperature readings because the sensor cable is 9 feet in length. The temperature probe is in a plastic bottle with an insulating liquid (25% glycol, 75% distilled water) which acts as a temperature buffer for more accurate readings. The digital display can be set to either Celsius or Fahrenheit. This thermometer comes with an audible and programmable minimum/maximum temperature alarm feature, immediately notifying you that a piece of equipment is drifting out of temperature range. Each exact-temp thermometer is N.I.S.T. certified and comes with a certificate.

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Santa Maria, CA
www.hardydiagnostics.com

Duralab State-of-the-Art Fume Hoods

Duralab Corporation offers a broad line of fume hoods designed to meet all size and application requirements.

Fume Hoods are available with bypass, variable air volume and add air designs.

Special hoods designed to meet the unique needs of wheelchair operators can be supplied.

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ConAgra Foods Inc., Adopts Pathatrix® from Matrix MicroScience

Matrix MicroScience Inc. has announced that ConAgra Foods Inc., has adopted the Pathatrix® technology as an integral part of its comprehensive food safety program.

Dr. Paul A. Hall, Global VP of Food Safety for ConAgra Foods Inc., comments that, "The Pathatrix® system successfully addresses the up-front selection and concentration of target organisms. The Pathatrix® system is extremely flexible in that it is compatible with a number of existing rapid microbiological methods, and, when applied in a sample pooling format, allows for higher sample throughput, leading to significant cost savings, without any compromise in sensitivity. The ability to gain rapid results using the Pathatrix® technology is critical in the use of positive release programs."

Launched in 2002, the Pathatrix system requires less than two minutes hands-on time per test and utilizes a proven technology, which can be adopted in any microbiology laboratory, with the minimum of retraining. Viable cultures are produced during the test allowing full and detailed analysis of any positive results.

Pathatrix is unique in that it is the only microbial detection system that can analyze the entire 225 ml + 25 g sample simultaneously by re-circulating the sample through a "capture phase" where the antibody coated magnetic beads are immobilized.

A standard 25 g food sample is homogenized with 225 ml of growth media in a stomacher. Pathatrix capture reagent, which consists of antibody coated magnetic particles specific to the target pathogen, are then added directly to the sample. The sample is loaded onto the Pathatrix workstation using a Matrix

proprietary consumable pack, connecting the sample to the circulatory system in preparation for the Capture-Culture step.

Once loaded, the Pathatrix workstation is typically pre-programmed to run for 30 minutes at the desired incubation temperature. Upon completion of the run, the target microorganisms are bound onto the phase by the capture reagent. Residual debris and non-specific binding are removed during a single wash step.

The capture phase is disconnected from the system and the capture reagent/pathogen complexes are eluted by washing the phase into a vessel. The captured pathogen complexes are then concentrated into a small volume. The sample can be plated directly onto selective media and incubated overnight for visualization the following morning or be directly analyzed by PCR for a very rapid result.

There are a variety of Pathatrix tests that enable results to be obtained within as little as 5 h to 24 h from point of sample to result.

Pathatrix pooling involves taking 50 ml sub-samples from 5 individual samples, pooling them to create a 250 ml wet composite sample which can then be analyzed by a single Pathatrix run. If the sample is "positive" the original individual samples can be re-tested separately by Pathatrix to determine which sample(s) is/are positive. However if the wet composite sample is shown to be negative no further analysis of the 5 original samples is required. Thus the Pathatrix pooling approach can be used as a rapid and cost effective screen for all samples.

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

Biolog Announces Additional Phenotype MicroArray™ Capabilities for Mammalian Cells

Biolog, Inc. has announced the expansion of its Phenotype MicroArray™ (PM) product line to enable nearly 1,500 simultaneous phenotypic assays of human and other mammalian cells. PM technology is a powerful assay platform that allows phenotyping to be performed in a simple, rapid, cost-effective, and comprehensive manner. Phenotypes are the biological properties of a cell that result from its genetic and epi-genetic blueprints. Tools for sequencing and manipulating cellular genetics are well advanced. More and better tools are needed to understand how genetic changes alter cellular phenotypes. PM technology is designed to fill that need.

The first PM assays for mammalian cells, released in December, 2005, measure the in vivo activity of about 400 potential energy producing pathways of cells. These assays are important for biologists working in many areas of biology R&D where they seek to understand the pathways involved in cellular energy production, their coordination and their regulation. This is fundamental to studies of metabolic disorders such as diabetes, obesity, and nutrition research where energy metabolism may be regulated improperly. Cancer and aging also have strong aspects of altered cellular energy metabolism.

Now Biolog has added capabilities to measure many more phenotypes as well as a greater diversity of phenotypes: nitrogen metabolism assays (approximately 300), ion, hormone, and metabolic effector assays (approximately 400), and cytotoxic anti-cancer drug assays (approximately 400). The assays for nitrogen, ion, and hormone metabolic effects extend the scope of Biolog's core focus by providing assays to assess important aspects of cellular metabolism. The assays for cytotoxic chemicals are the first step toward expanding the assay technology into areas of basic and applied cancer research, toxicology, and chemical biology. The PM assays can be used with cell lines as well as with primary cells and do not require any modification or derivatization of the cell lines.

In addition to research, the PM technology is a fundamental tool for QC and Bioprocess development. Each cell type has different metabolic properties, which can be measured easily and with a high degree of reproducibility using PM assays. Different cell types can be distinguished and, if a cell changes during the course of subculturing, this can also be detected. Furthermore, PM technology provides a powerful tool for streamlining Bioprocess development.

Cells can easily be cultured and monitored under thousands of different conditions to optimize growth or productivity of cells secreting a product. Biolog has presented data at several Bioprocess conferences demonstrating improvements in growth of CHO cells and in secretion of monoclonal antibodies by hybridoma cells.

PM technology is by far the most powerful and versatile cell phenotyping tool available. "So-called high content screening technologies in fact measure a relatively small number of cellular traits," says Barry Bochner, Ph.D., Biolog's chairman and CEO.

"Furthermore, these high content platforms typically require

expensive, complex, and specialized microscopic or flow cytometric instrumentation. Biolog's PM testing format is based on cell respiration, a universal property of cells that can be measured easily with a robust chromogenic dye technology." Labs can start using PM technology without having to purchase any equipment. However, for labs using PM technology in high-throughput or with kinetic phenotype applications, Biolog offers its OmniLog® instrument which can simultaneously incubate and read 50 microplates.

Biolog, Inc.
510.785.2564 ext. 312
Hayward, CA
www.biolog.com

Portable, Hi-Tech Gas Burners from WLD–TEC Gmbh

WLD-TEC Gmbh has introduced the new Fuego PRO Laboratory Burner.

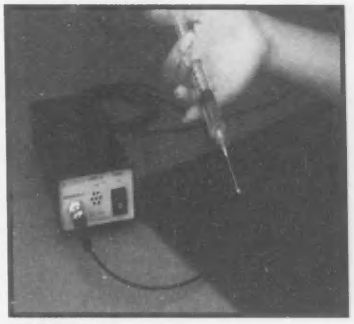
The Fuego PRO offers a modern alternative to the classic bunsen burner. In addition to the modern design, this burner provides Safety Features and Portability not available in any other burners.

The Safety Control System (SCS) demonstrates state-of-the-art safety technology which constantly analyzes potential hazards and, if necessary, initiates safety measures, such as an interruption of the gas supply.

The Fuego PRO is ideal for Field Operations or any location where natural gas is not available. Designed for use with either propane or butane cylinders, the electrical control system operates on rechargeable batteries.

The Fuego PRO Burner is supplied complete with the Touch Free IR-Sensor. Available are a wide range of optional accessories including a foot pedal, windshield, or pathogenic spray protector.

WLD-TEC Gmbh
310.589.3709
Chicago, IL
www.WLD-TEC.com



KD Scientific

KD Scientific Spill Detector Protects from HPLC Solvent Spills

KD Scientific has released the new OS-250, a system which detects spills and leaks before they cause a problem around your HPLC.

As little as 3 drops of liquid will cause the OS-250 to react. The system consists of a moisture sensing mat and control unit. The mat is made from a material specially developed for detecting liquid spills. It is connected to the control unit by a simple connection cable.

When liquid is detected on the sensing mat the OS-250 Controller will sound an audible alarm, flash an LED and will turn off the power of any device plugged into the single outlet, solid state power controller. The switched power outlet can control up to 8 amps.

The OS-250 spill sensor is supplied with the controller and four reusable 30 x 30 cm mats that can be cut to any size with a sharp scissors or knife. It also includes the connector cable between the mat and the controller.

Applications for the OS-250 spill detector exist in any areas where spill will cause problems to equipment.

KD Scientific
508.429.6809
Holliston, MA
www.kdscientific.com

E-Control Systems, Inc. Presents IntelliHACCP, Its Wireless Temperature Monitoring and HACCP Control Solution for School Food Services

E-Control Systems, Inc., presented IntelliHACCP, an enterprise suite and comprehensive wireless solution for HACCP compliance and remote temperature monitoring, at the Colorado School Nutrition Association Exhibition on October 5–6 2007.

E-Control Systems' IntelliHACCP solution is built around Fusion, a single platform for monitoring of all E-Control Systems IntelliProducts.

Fusion features its own dashboard interface – MyFusion, which allows full screen customization so that you can centrally monitor your IntelliProducts in a single view.

With Fusion and MyFusion, all your food safety, temperature monitoring, and HACCP controls are centrally managed and easy to monitor.

CSNA attendees saw Fusion in action with E-Control Systems Intel-

liProducts and HACCP/food safety solutions, including:

- IntelliSense™ – a family of low-cost, wireless temperature, door, humidity, pressure and leak monitoring solutions for monitoring in refrigeration and warming equipment.
- IntelliCheck™ – a complete, web-based handheld PDA and wireless IntelliProbe™ system for taking product temperature readings, managing and deploying HACCP inspection programs for the foodservice industry, including a corrective action system for ensuring operators fix problems upon detection.
- IntelliTrack™ – a logging device for temperature data collection, ideal for monitoring temperatures during transportation, for example, from central to satellite kitchens.
- IntelliRinse™ – a pioneering, wireless dishwasher rinse temperature monitoring solution for either new or existing dishwasher upgrades.
- IntelliQuip™ – HACCP monitoring of NAFEM Data Protocol compliant foodservice equipment [i.e. combi-ovens, blast chillers, ice machines, food carts, warmers, etc.]
- IntelliMonitor™ – a solution for monitoring food temperatures at prep tables, food wells, and other stations.

E-Control Systems, Inc.
888.384.3274
Chatsworth, CA
www.eControlSystems.com

Anritsu's Exclusive Dual Wave Series Metal Detectors Offers Advanced Detection Accuracy in Food, Pharmaceutical and Cosmetics Inspection

Featuring exclusive Dual Wave (DuW) Technology, DuW Series Metal Detectors from Anritsu Industrial Solutions USA Inc. provide enhanced food, pharmaceutical and cosmetic inspection accuracy. Trusted and accepted by processors worldwide, more than 40,000 Anritsu metal detectors have been installed to date.

To maximize detection accuracy and flexibility, Anritsu engineers analyzed and completely revised the design of a conventional metal detector to include multi-frequency technology as standard with the additional advancement of Dual Wave (DuW) Technology. Dual Wave Technology, the industry's first simultaneous 2-frequency magnetic field detecting method, is extremely sensitive to all types of metals, including ferrous and stainless steel contaminants. The DuW Technology increases overall detection of metal contaminants with a significant improvement in stainless detection in most applications versus traditional single wave inspection technology.

Other advanced features of the DuW Series include an automatic Set-Up Wizard for easy and accurate product set-up with minimal training, 30-second (no tool) conveyor disassembly for easy cleaning and a simple design that results in easy maintenance. Variable speed conveyors and numerous software-assignable I/Os come standard for line control purposes.

Anritsu Industrial Solutions USA Inc.
847.419.9729
Buffalo Grove, IL
www.anritsu-industry.com

Saniguard® Becomes the First Antimicrobial Treatment to Meet NSF Protocol Standards

Component Hardware Group (CHG), a manufacturer and distributor of plumbing and specialty hardware components to healthcare, foodservice, institutional and commercial markets, announced that its antimicrobial treatment SANIGUARD has met standards set forth by the National Sanitation Foundation's Protocol P345.

SANIGUARD is a proven, cost-effective, inorganic antimicrobial treatment that utilizes a silver ion-based technology to retard the growth of bacteria, molds and some viruses on treated surfaces such as faucet handles, door knobs and other touch points for the life of the product. CHG worked closely with NSF to establish the first ever Antimicrobial Protocol, P345, for "antimicrobial efficacy of products containing incorporated inorganic antimicrobial agent(s)." SANIGUARD is currently the only antimicrobial treatment to meet these protocol standards. SANIGUARD has been previously certified under NSF Standards 2, 51 and 61, and its epoxy coating is additionally NSF certified for direct food contact up to 300°F.

"We are proud to make this announcement, as SANIGUARD continues to prove its effectiveness in several different kinds of tests and studies," said Tom Carr, president of CHG.

CHG continually conducts extensive third-party research and evidence-based testing of its SANIGUARD antimicrobial treatment against various microorganisms including: Norovirus, legionella, *Staphylococcus*, *Salmonella*, *Listeria*, *E. coli* and others. CHG has documented these results to support its claims.

SANIGUARD has proven to be highly effective against hospital acquired infections (HAIs) and is widely accepted by healthcare infection control professionals in the United States and Canada. SANIGUARD has also been implemented in restaurants, cruise ships, schools, labs, prisons and extended care facilities and where Norovirus and other microorganisms can lead to costly outbreaks of food poisoning.

Component Hardware Group
1.877.SANIGUARD
Lakewood, NJ
www.saniguard-online.com

In October 2007, the International Association for Food Protection participated at the Worldwide Food Expo in Chicago, Illinois. While exhibiting, we offered a drawing for a one-year membership with our association and a free registration to our Annual Meeting. We are pleased to announce the following winners of the drawing:

IAFP Membership

Adrian Fidanza
Salerno Dairy Products Limited
Hamilton, Ontario, Canada

IAFP 2008 Annual Meeting Registration

Michael Deiling
Linette Quality Chocolates
Womelsdorf, PA

COMING EVENTS

JANUARY

- **7–10, Retail Food Systems Research Conference,** Peppermill Resort*Spa*Casino, Reno, NV. For more information, call O. Peter Snyder at 651.646.7077; E-mail osnyder@hi-tm.com.
- **9, SfAM 2008 Winter Meeting – Quality Assurance and Accreditation Issues in Microbiology,** Royal Society, Carlton House Terrace, London, UK. For more information, call 44.0.1234.328330 or go to www.sfam.org.uk.
- **14, British Columbia Food Protection Association Annual Meeting,** River Rock Conference Center, Richmond, British Columbia. For more information, contact Terry Peters at 604.666.1080; E-mail: terry_peters@telus.net.
- **17–18, GMA Sustainability Summit,** The Ritz-Carlton, Washington, D.C. For more information, call 202.639.5900 or go to www.gmabrands.com.
- **18–24, ILSI 2008 Annual Meeting,** Wyndham Rio Mar Beach Resort and Spa, Rio Mar, Puerto Rico. For more information, call 202.659.0074 or go to www.ilsi.org.
- **21–24, National Mastitis Council 46th Annual Meeting,** Marriott Riverwalk Hotel, San Antonio, TX. For more information, go to www.nmconline.org.
- **23–25, International Poultry Expo,** Georgia World Congress Center, Atlanta, GA. For more information, call 770.493.9401 or go to www.ipe08.org.

FEBRUARY

- **13–15, International Food Safety Conference,** Hotel Okura, Amsterdam, The Netherlands. For more information, call 33.1.44.69.84.84 or go to www.ciesfoodsafety.com.
- **19–21, 2008 Food Claims and Litigation Conference,** The Ritz-Carlton, New Orleans, LA. For more information, call 202.639.5900 or go to www.@gmabrands.com.
- **19–21, Kentucky Association of Milk, Food and Environmental Sanitarians Annual Education Meeting,** Holiday Inn South, Louisville, KY. For more information, contact Tony Hall at 859.234.0054; E-mail: tony.hall@ky.gov.
- **21–23, Molds and Mycotoxins in Foods Short Course,** Hilton-Qwest Center, Omaha, NE. For more information, call Jana Hafer at 402.472.2817 or go to www.fpc.unl.edu.
- **23–27, AFFI Frozen Food Convention,** Sheraton San Diego Hotel & Marina, San Diego, CA. For more information, call 703.821.0770 or go to www.affi.com.

  24–27, 6th ASM Biodefense and Emerging Diseases Research Meeting, Baltimore, MD. For more information, call 202.737.3600 or go to www.asm.org/Meetings/index.asp.
- **26, Georgia Association for Food Protection Annual Meeting,** H. C. Brill, Tucker, GA. For more information, contact Pam Metheny at 770.393.5455; E-mail: pamela.metheny@pilgrimspride.com.
- **27–29, QA/QC Strategy for Biologis and Biopharmaceuticals Conference,** Costa Mesa, CA. For more information, call 1.610.688.1708 or go to www.rapidmicrobiology.com.

MARCH

- **2–5, ASM Conference on Manipulation of Nuclear Processes by DNA Viruses,** Charleston, SC. For more information, call 202.737.3600 or go to www.asm.org/Meetings/index.asp.
- **12–15, FPSA 2008 Conference,** Hyatt Regency Coconut Point, Bonita Springs, FL. For more information, call 703.761.2600 or go to www.fpsa.org.
- **17, Ohio Association of Food and Environmental Sanitarians Spring Meeting,** Ohio State University, Columbus, OH. For more information, contact Don Barrett at 614.645.6195; E-mail: donb@columbus.gov.

APRIL

- **2, Information Systems & Logistics Distribution (IS/LD),** Westin Mission Hills Resort and Spa, Rancho Mirage, CA. For more information, call 202.639.5900 or go to www.gmabrands.com.
- **2–4, Missouri Milk, Food and Environmental Health Association Annual Educational Conference,** Stoney Creek Inn, Columbia, MO. For more information, contact Gala Miller at 573.659.0706; E-mail: galaj@socket.net.
- **9, SfAM 2008 Spring Meeting – Broadening Microbiology Horizons,** Aston University, Birmingham, UK. For more information, call 44.0.1234.328330 or go to www.sfam.org.uk.
- **11–16, The Conference for Food Protection Biennial Meeting,** The Omni San Antonio Hotel at the Colonnade, San Antonio, TX. For more information, contact Jeff Lineberry at executivedirector@foodprotection.org.
- **17, Ontario Food Protection Association Spring Technical Session, Mississauga Convention Centre,** Mississauga, Ontario, Canada. For more information, contact Gail Seed at 519.463.5674; E-mail: seed@golden.net.
- **27–29, 2008 ADPI/ABI Annual Conference,** Marriott Downtown, Chicago, IL. For more information, call 630.530.8700 or go to www.adpi.org.

MAY

- **4–7, The FMI Show plus MARKETECHNICS®,** Mandalay Bay Convention Center, Las Vegas, NV. For more information, call FMI at 202.452.8444 or go to www.fmi.org.
- **17–20, NRA Show 2008,** McCormick Place, Chicago, IL. For more information, call 312.853.2525 or go to www.restaurant.org.
- **18–20, 2008 APHL Annual Meeting,** St. Louis, MO. For more information, call APHL at 240.485.2745 or go to www.aphl.org.
- **19–22, 3-A SSI 2008 Annual Meeting,** Four Points Sheraton, Milwaukee Airport, Milwaukee, WI. For more information, call 703.790.0295 or go to www.3-a.org.

IAFP UPCOMING MEETINGS

AUGUST 3-6, 2008
Columbus, Ohio

JULY 12-15, 2009
Grapevine, Texas

AUGUST 1-4, 2010
Anaheim, California

The index and/or table of contents has been removed and photographed separately within this volume year.

For roll film users, this information for the current volume year is at the beginning of the microfilm. For a prior year volume, this information is at the end of the microfilm.

For microfiche users, the index and/or contents is contained on a separate fiche.

INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

General Fund Statement of Activity For the Year Ended August 31, 2007

Revenue:	
Advertising	$155,481
Membership & Administration	595,949
Communication	784,280
Annual Meeting	939,145
Workshops & Symposia	129,613
Total revenue	$2,604,468
Expense:	
Advertising	118,451
Membership & Administration	693,385
Communication	829,453
Annual Meeting	680,504
Workshops & Symposia	100,446
Total expense	$2,422,239
Change in General Fund	**$182,229**

Net Assets as of 8/31/07:	
General Fund	$760,474
Foundation Fund	711,189
Restricted Fund	39,753
Speaker Travel Fund	105,500
Total net assets	$1,616,916

ADVERTISING INDEX

Journal of Food Protection®

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The Perfect Fit

IAFP

Career Services

Make your career connection

@ IAFP Career Services

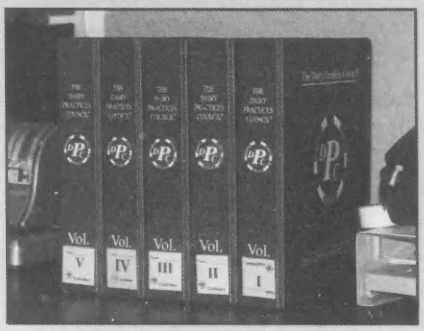
Visit http://careers.foodprotection.org

Many job seekers and employers are discovering the advantages of shopping online for industry jobs and for qualified candidates to fill them. But the one-size-fits-all approach of the mega job boards may not be the best way to find what you're looking for. **IAFP Career Services** gives employers and job seeking professionals a better way to find one another and make that perfect career fit.

Employers: Tailor your recruiting to reach qualified food safety industry professionals quickly and easily. Search the database of resumes and proactively contact candidates, and get automatic email notification when a candidate matches your criteria.

Job Seekers: Get your resume noticed by the people in the industry who matter most: the food protection industry employers. Whether you're looking for a new job, or ready to take the next step in your career, we'll help you find the opportunity that suits you.

Visit http//careers.foodprotection.org today to post or search job listings in the food protection industry.



IAFP Offers "Guidelines for the Dairy Industry" from The Dairy Practices Council®

This newly expanded Five-volume set consists of 80 guidelines.

1 Planning Dairy Freestall Barns
2 Effective Installation, Cleaning, and Sanitizing of Milking Systems
3 Selected Personnel in Milk Sanitation
4 Installation, Cleaning, & Sanitizing of Large Parlor Milking Systems
5 Directory of Dairy Farm Building & Milking System Resource People
6 Natural Ventilation for Dairy Tie Stall Barns
7 Sampling Fluid Milk
8 Good Manufacturing Practices for Dairy Processing Plants
9 Fundamentals of Cleaning & Sanitizing Farm Milk Handling Equipment
10 Maintaining & Testing Fluid Milk Shelf-Life
11 Sediment Testing & Producing Clean Milk
12 Tunnel Ventilation for Dairy Tie Stall Barns
13 Environmental Air Control and Quality for Dairy Food Plants
14 Clean Room Technology
15 Milking Center Wastewater
16 Handling Dairy Products from Processing to Consumption
17 Prevention of & Testing for Added Water in Milk
18 Fieldperson's Guide to High Somatic Cell Counts
21 Raw Milk Quality Tests
22 Control of Antibacterial Drugs & Growth Inhibitors in Milk and Milk Products
23 Preventing Rancid Flavors in Milk
24 Troubleshooting High Bacteria Counts of Raw Milk
25 Cleaning & Sanitation Responsibilities for Bulk Pickup & Transport Tankers
27 Dairy Manure Management From Barn to Storage
28 Troubleshooting Residual Films on Dairy Farm Milk Handling Equipment
29 Cleaning & Sanitizing in Fluid Milk Processing Plants
30 Potable Water on Dairy Farms
31 Composition & Nutritive Value of Dairy Products
32 Fat Test Variations in Raw Milk
33 Brucellosis & Some Other Milkborne Diseases
34 Butterfat Determinations of Various Dairy Products
35 Dairy Plant Waste Management
36 Dairy Farm Inspection
37 Planning Dairy Stall Barns
38 Preventing Off-Flavors in Milk
39 Grade A Fluid Milk Plant Inspection
40 Controlling Fluid Milk Volume and Fat Losses
41 Milkrooms and Bulk Tank Installations
42 Stray Voltage on Dairy Farms
43 Farm Tank Calibrating and Checking
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
70 Design, Installation & Cleaning of Small Ruminant Milking Systems
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
75 Direct Microscopic Exam of Milk from Small Ruminants (training CD)
78 Biosecurity for Sheep and Goat Dairies
80 Food Allergen Awareness In Dairy Plant Operations
83 Bottling Water in Fluid Milk Plants
85 Six Steps to Success - Production of Low SCC Milk (training CD)
99 On-Farm & Small-Scale Dairy Products Processing
91 HACCP - SSOP's and Prerequisites
92 HACCP - Principle Number One: Hazard Analysis
93 HACCP - Principles 2 & 3 Critical Control Points & Critical Limits
97 Direct Loading of Milk from Parlor into Bulk Tankers
100 Food Safety in Farmstead Cheesemaking
101 Farmers Guide To Somatic Cell Counts In Cattle
102 Effective Installation, Cleaning & Sanitizing of Tie Barn Milking Systems
103 Approving Milk and Milk Product Plants for Extended Runs
105 Sealing Bulk Milk Truck Tanks

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 37 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 renown 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 $367.00. We are offering the set, packaged in five looseleaf binders for $265.00.

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 $265 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.

Name _____ Phone No. _____

Company _____

Street Address _____

City, State/Province, Code _____

VISA/MC/AE No. _____ Exp. Date _____

AUDIOVISUAL LIBRARY ORDER FORM

The use of the Audiovisual Library is a benefit for **Association-Members only.** Limit your requests to five videos. Material from the Audiovisual Library can be checked out for 2 weeks only so that all Members can benefit from its use.

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
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Web Site: www.foodprotection.org

Member # _____

First Name _____ M.I. _____ Last Name _____

Company _____ Job Title _____

Mailing Address _____

Please specify: ❒ Home ❒ Work

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-Mail _____ Date Needed _____

PLEASE CHECK BOX NEXT TO YOUR VIDEO CHOICE

(Allow 4 weeks minimum from date of request.)

DAIRY

- ❒ D1010 The Bulk Milk Hauler: Protocol & Procedures
- ❒ D1030 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 Hauling Training
- ❒ D1110 Milk Plant Sanitation: Chemical Solution
- ❒ D1120 Milk Processing Plant Inspection Procedures
- ❒ D1125 Ohio Bulk Milk Hauling Video
- ❒ D1130 Pasteurizer: Design and Regulation
- ❒ D1140 Pasteurizer: Operation
- ❒ D1150 Processing Fluid Milk
- ❒ D1180 10 Points to Dairy Quality

ENVIRONMENTAL

- ❒ E2012 Better TEDs for Better Fisheries
- ❒ E3010 The ABCs of Clean – A Handwashing and 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 Ceriodaphniz)
- ❒ E3070 EPA Test Methods for Freshwater Toxicity Tests (Using Fathead Minnow Larva)
- ❒ E3075 EPA: This is Super Fund
- ❒ E3080 Fit to Drink
- ❒ E3110 Garbage: The Movie
- ❒ E3120 Global Warming: Hot Times Ahead
- ❒ E3125 Good Pest Exclusion Practices
- ❒ E3128 Integrated Pest Management (IPM)
- ❒ E3130 Kentucky Public Swimming Pool and Bathing Facilities
- ❒ E3131 Key Pests of the Food Industry
- ❒ E3133 Physical Pest Management Practices
- ❒ E3135 Plastics Recycling Today: A Growing Resource
- ❒ E3140 Putting Aside Pesticides
- ❒ E3150 Radon
- ❒ E3160 RCRA-Hazardous Waste
- ❒ E3161 The Kitchen Uncovered: Orkin Sanitized EMP The New Superfund: What It Is and How It Works
- ❒ E3170 Tape 1 – Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements
- ❒ E3180 Tape 2 – Changes in the Removal Process: Removal and Additional Program Requirements
- ❒ E3190 Tape 3 – Enforcement & Federal Facilities
- ❒ E3210 Tape 4 – Emergency Preparedness & Community Right-to-Know
- ❒ E3220 Tape 5 – Underground Storage Tank Trust Fund & Response Program
- ❒ E3230 Tape 6 – Research & Development/Closing Remarks
- ❒ E3235 Regulatory and Good Manufacturing Practices
- ❒ E3236 Rodent Control Strategies
- ❒ E3240 Sink a Germ
- ❒ E3245 Wash Your Hands
- ❒ E3250 Waste Not: Reducing Hazardous Waste
- ❒ E3251 Would Your Restaurant Kitchen Pass Inspection?
- ❒ E3260 Swabbing Techniques for Sampling the Environment and Equipment

FOOD

- ❒ F2005 A Lot on the Line
- ❒ F2007 The Amazing World of Microorganisms
- ❒ F2008 A Recipe for Food Safety Success
- ❒ F2009 Basic Personnel Practices
- ❒ F2010 Close Encounters of the Bird Kind
- ❒ F2011 Available Post Harvest Processing Technologies for Oysters
- ❒ F2013 Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments
- ❒ F2014 Controlling Food Allergens in the Plant
- ❒ F2015 Controlling *Listeria*: A Team Approach
- ❒ F2016 Bloodborne Pathogens: What Employees Must Know
- ❒ F2020 Egg Handling and Safety
- ❒ F2021 Egg Production
- ❒ F2030 "Egg Games" Foodservice Egg Handling & Safety
- ❒ F2035 Fabrication and Curing of Meat and Poultry Products
- ❒ F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef
- ❒ F2037 Cooking and Cooling of Meat and Poultry Products
- ❒ F2039 Food for Thought – The GMP Quiz Show
- ❒ F2040 Food Irradiation
- ❒ F2045 Food Microbiological Control
- ❒ F2050 Food Safe-Food Smart – HACCP and Its Application to the Food Industry (Part 1 & 2)
- ❒ F2060 Food Safe Series I (4 videos)
- ❒ F2070 Food Safe Series II (4 videos)
- ❒ F2080 Food Safe Series III (4 videos)
- ❒ F2081 Food Safety Begins on the Farm
- ❒ F2090 Food Safety: An Educational Video for Institutional Food Service Workers
  Food Safety for Food Service Series I
- ❒ F2095 Now You're Cooking
- ❒ F2100 Tape 1 – Food Safety for Food Service: Cross Contamination
- ❒ F2101 Tape 2 – Food Safety for Food Service: HACCP
- ❒ F2102 Tape 3 – Food Safety for Food Service: Personal Hygiene
- ❒ F2103 Tape 4 – Food Safety for Food Service: Time and Temperature Controls
  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 – Sanitation
- ❒ F2110 Food Safety is No Mystery
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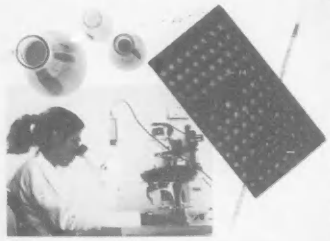

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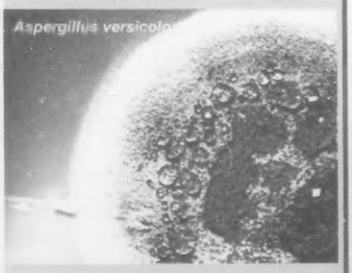

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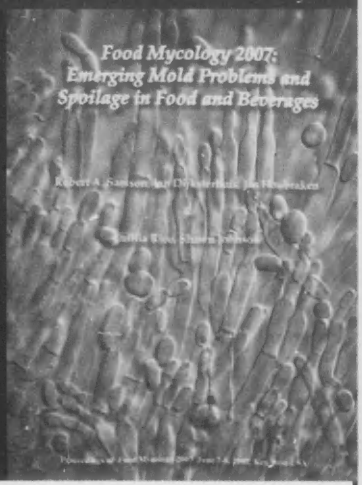

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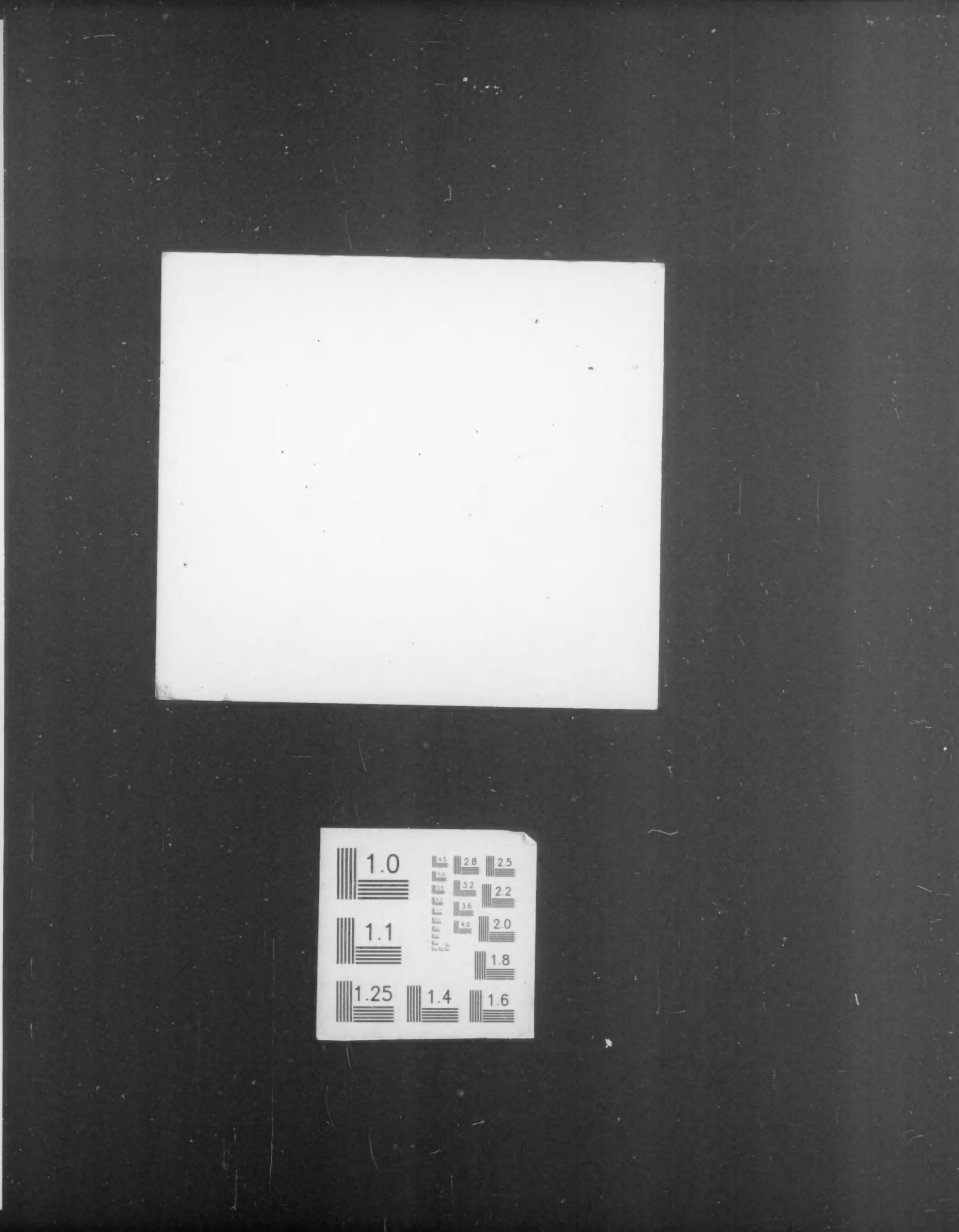
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