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FOOD PROTECTION TRENDS

SCIENCE AND NEWS

FROM THE
INTERNATIONAL ASSOCIATION
FOR FOOD PROTECTION

OCTOBER 2005



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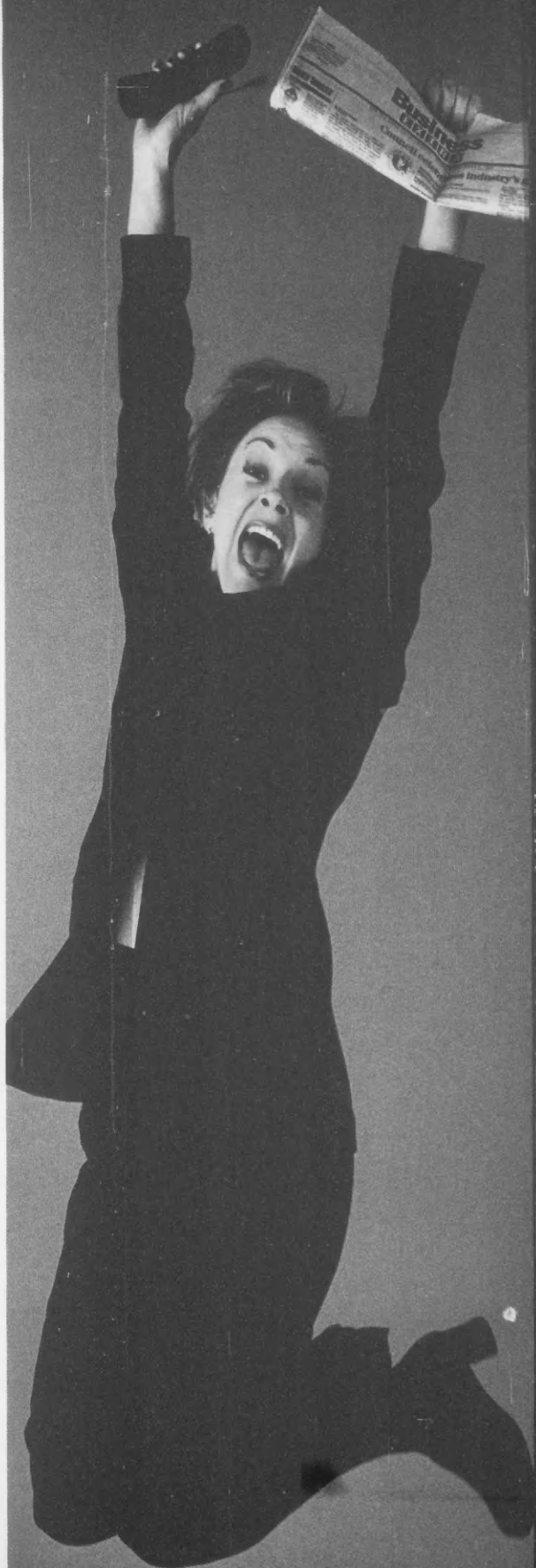
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FOOD PROTECTION TRENDS

VOLUME 25, NO. 10

■ ARTICLES

- 758 Assessing On-farm Food Handling Practices of Iowa-grown Produce and Eggs in Regard to Food Safety**
Jason D. Ellis, Catherine H. Strobbehn, and Daniel H. Henroid, Jr.
- 762 Comparison of the Statutory Environmental Health Inspection Rating and the Microbiological Quality of Ready-to-Eat Food Sampled from Premises in the United Kingdom**
R. J. Meldrum, R. M. M. Smith, D. Charles, C. Edwards, and J. Garside
- 767 Origin of the 60-day Minimum Holding Period Requirement for United States Cheeses Made from Sub- or Unpasteurized Milk**
Kathryn J. Boor

■ ASSOCIATION NEWS

- 752** Sustaining Members
754 Perspectives from North of the 49th
756 Commentary from the Executive Director
780 New Members

■ DEPARTMENTS

- 784** Updates
786 News
792 Industry Products
796 Coming Events
797 Career Services Section
799 Advertising Index

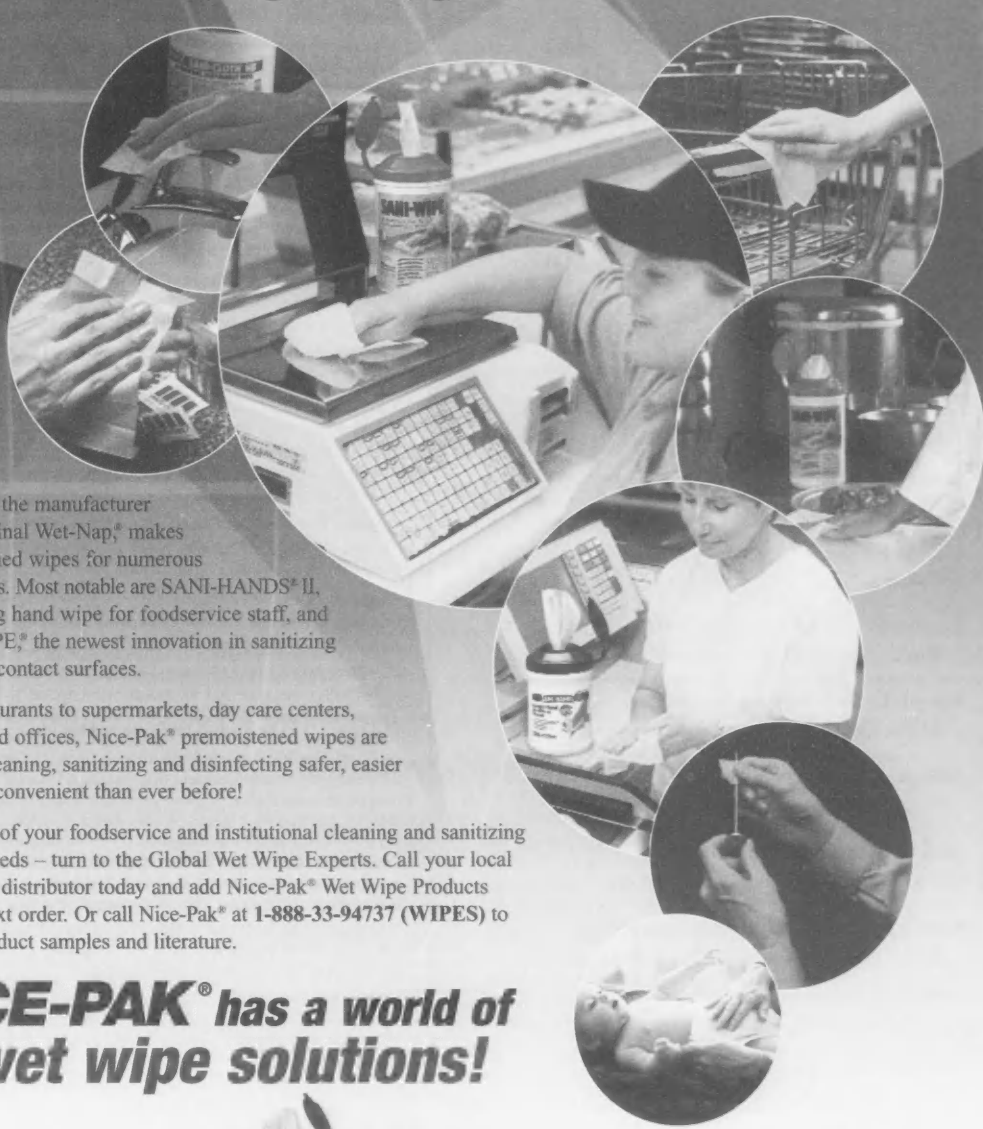
■ EXTRAS

- 772** Call for IAFP 2006 Abstracts
776 Policy on Commercialism
777 Call for Nominations 2006 Secretary
778 IAFP 2006 Award Nominations
800 *Journal of Food Protection* Table of Contents
802 Audiovisual Library Order Form
803 Booklet Order Form
804 Membership Application

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Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

FPT JOURNAL STAFF

David W. Tharp, CAE: *Executive Director*
E-mail: dtharp@foodprotection.org

Lisa K. Hovey, CAE: *Managing Editor*
E-mail: lhovey@foodprotection.org

Donna A. Bahun: *Production Editor*
E-mail: dbahun@foodprotection.org

Pam J. Wanninger: *Proofreader*

INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION STAFF

David W. Tharp, CAE: *Executive Director*
E-mail: dtharp@foodprotection.org

Lisa K. Hovey, CAE: *Assistant Director*
E-mail: lhovey@foodprotection.org

Donna A. Bahun: *Design and Layout*
E-mail: dbahun@foodprotection.org

Farrah L. Benge: *Accounting Assistant*
E-mail: fbenge@foodprotection.org

Julie A. Cattanch: *Membership Services*
E-mail: jcattanch@foodprotection.org

Donna Gronstal: *Senior Accountant*
E-mail: dgronstal@foodprotection.org

Nancy Herselius, CMP: *Association Services*
E-mail: nherselius@foodprotection.org

Karla K. Jordan: *Order Processing*
E-mail: kjordan@foodprotection.org

Didi Sterling Loynachan: *Administrative Assistant*
E-mail: dloynachan@foodprotection.org

Pam J. Wanninger: *Proofreader*

ADVERTISING

David Larson
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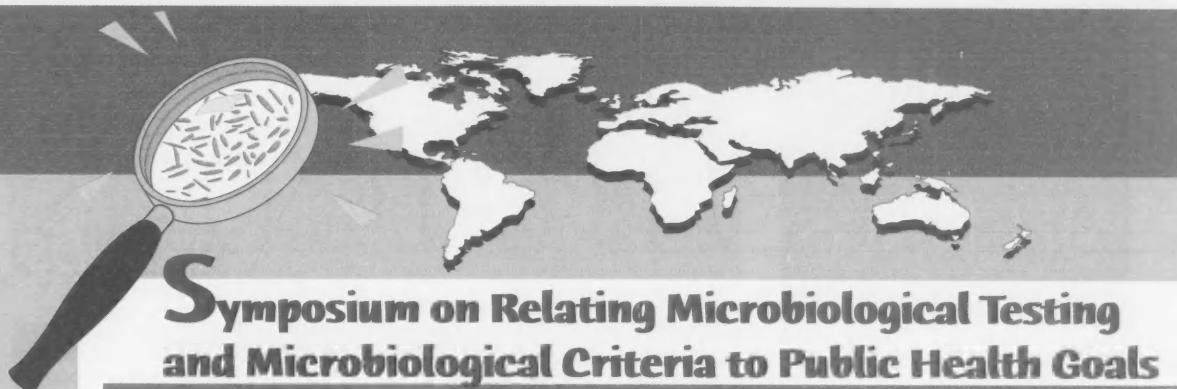
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Symposium on Relating Microbiological Testing and Microbiological Criteria to Public Health Goals

October 31-November 1, 2005

Gallaudet University, Kellogg Conference Center, Washington, DC

This is a two-day symposium not to be missed!

A major international effort is underway through organizations such as Codex Alimentarius to more effectively link the use of microbiological testing and microbiological criteria to improvements in public health. The sponsors of this symposium have made a commitment to assist in bringing the latest scientific concepts and tools to bear on this international effort.

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SYMPOSIUM OVERVIEW: Leading international experts on microbiological food safety testing, criteria, risk assessment, and policy will lead a thorough discussion of the issues surrounding the development of a risk-based approach to the establishment of microbiological criteria. This promises to be an important meeting, on a global basis, to better define ways of relating traditional food safety metrics to their public health outcomes.

REGISTRATION INFORMATION:

Registration is now available online! Participation will be limited, so early registration is strongly recommended. For program details and registration information, go to the ILSI web site at www.ilsi.org under "Events," send an E-mail to ilsimeetings@ilsi.org, or contact the ILSI Meetings Department at 202.659.0074.

Check this web site regularly for updates as they become available.

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Calgary, Alberta, Canada

IAFP 2007

JULY 8-11

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EXECUTIVE DIRECTOR

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

SCIENTIFIC EDITOR

Edmund A. Zottola, Ph.D., 2866 Vermilion Dr., Cook, MN 55723-8835, USA; Phone: 218.666.0272; E-mail: lansibay@cpinternet.com

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“PERSPECTIVES FROM NORTH OF THE 49TH”

Wow, what an Annual Meeting! We broke another record and topped the 1,700 mark for attendance. I think this is a great testament to the strength of our organization and the great reputation which we have been able to build up over the years. There are so many positive and exciting things happening in the Association right now – our future looks very bright.

The Sunday night opening session started off with a bang when Gale Prince made an impassioned appeal for donations to the Foundation Fund and generously pledged to give up to \$1,000 in matching funds. Well, our members came through again, with the totals for fundraising nearing \$6,000 and those for the Silent Auction being around \$5,000. Gale wants to have a dunk tank up on stage next year for the Executive Board! Should be quite a sight if this ever happens! I think that Gale will have to go first!

We also unveiled our excellent looking brochure on the Foundation Fund, which is such an important part of what we are trying to build as an Association. It gives us the flexibility to be innovative and to bring an improved program and new services for our membership.

The scientific program itself was outstanding, with our usual great ILSI-sponsored symposia drawing overflow crowds. The symposium on yeasts and molds was especially well attended; could it be that we need to think about the possibility of starting a yeast and mold PDG?

I cannot thank the Program Committee enough for their excellent contributions. Led very ably by Dr. Catherine Donnelly as



By **JEFFREY FARBER**
PRESIDENT

“I know this is going to be a great year for IAFP and its Members”

Chair and Vickie Lewandowski as Vice Chairperson, the team did an outstanding job not only in setting up the program, but also making sure that scheduling conflicts were kept to a minimum. A big thank you to the whole team for all their hard work and dedication to this committee. The late-breaking symposium on avian influenza provided our food safety professionals with an overview of avian influenza and its potential effect on public health worldwide. This hot topic was very well received by members. Presentations included a history of avian influenza, including the recent H5N1 epizootic, natural reservoirs

of the virus, surveillance and monitoring efforts (including diagnostics), and approaches to understanding and controlling the spread of the virus.

I had discussions with many attendees during the meeting about the program and what you thought of it. A number of people wanted to have more time to visit the exhibits and posters. Should we have less symposia, the same number of symposia but with less talks per symposium, longer exhibitor hours, etc.? I would love to get your thoughts on this!

As another year passes, we have to sadly say goodbye to one of our Executive Board members, Paul Hall, who did an outstanding job on the Board. Paul is going to be sorely missed. We also welcome Stan Bailey to the Board, who I know will be a tremendous asset to our organization.

A huge thank you to Stephanie Olmsted who did a great job this year as Affiliate Council Chairperson. We welcome our new Affiliate Chair, Terry Peters, who works for the Canadian Food Inspection Agency in British Columbia (a fellow Canadian!), and a big hearty congratulations and welcome to Maria Teresa Destro from Brazil, who is now our Affiliate Council Secretary. We are so glad that Maria Teresa accepted this position as it really enhances our international stature. We are also elated about our newest International Affiliate, New Zealand. This is really fantastic for our organization. Thanks to Roger Cook and his team for getting this Affiliate off the ground!

I am hoping that many of you had a chance to meet our new Affiliate Staff Liaison, Nancy Herselius. Nancy really seemed to

be enjoying herself at the Annual Meeting and it looks like she has hit the road running and will be a tremendous asset to IAFP now and into the future. I am sure that she would love to hear from you if you have any ideas, no matter how small, about improving our Affiliate structure.

There is so much that needs to be done behind the scenes to make an Annual Meeting such as ours run smoothly. Our IAFP office staff, Donna Bahun, Farrah Benge, Bev Brannen, Julie Cattnach, Donna Gronstal, Nancy Herselius, Karla Jordan, Didi Loynachan and Dave Larsen, ably led by Lisa Hovey and David Tharp, do not in my mind get enough recognition for the outstanding work that they do. In addition, Jill Snowdon and her team from the Capital Area Food Protection Association did an unbelievable job in helping set up for this

year's meeting. One can only imagine what it is like getting 1,700 goodie bags ready for participants!

For me, one of the highlights of this year's opening session was the IAFP Student Travel Scholarship Awards. Stephen Grove from the University of Tasmania in Victoria, Australia and Brooke Whitney of Virginia Tech, Blacksburg, Virginia, were the winners. We are going to be expanding the number of Awards next year to four, including one student from a developing country. I am very passionate about these student awards.

Students are truly the future of the Association, and if we can help get students to our Annual Meeting, they will be able to see first-hand, how great an organization we truly are, and they will be hooked for life!

Please remember as well that these student scholarships are fully

supported by the IAFP Foundation Fund.

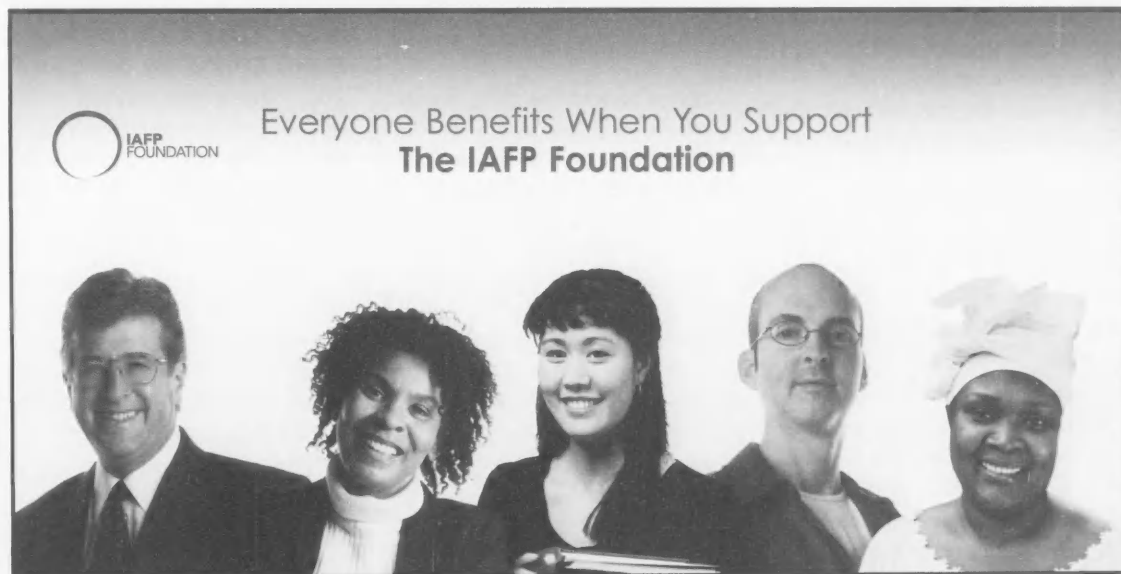
This year we awarded Fellow Awards to six truly outstanding individuals, Stan Bailey, Bob Brackett, Joe Frank, Gale Prince, Jenny Scott, and Susan Sumner. These individuals have truly made a difference and have helped IAFP grow as an organization.

So another great Annual Meeting has passed and we hope that next year's meeting in Calgary, Canada will be even better. As an aside, the weather should be cooler and there are numerous attractions all around so please try to bring your family! As always, I would love to hear from you and am only an E-mail away at jeff_farber@hc-sc.gc.ca. Until next time...

Quote of the month: *He who knows others is clever; he who knows himself is enlightened.* Lao-Tzu

Have a fabulous month!

Contribute Today!



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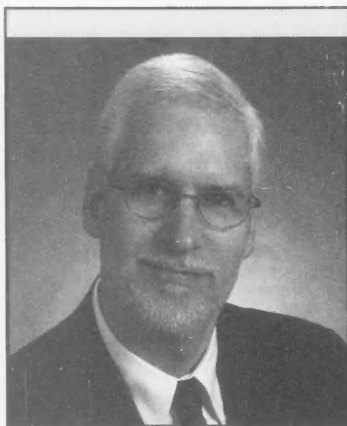
www.foodprotection.org or 515.276.3344

“COMMENTARY” FROM THE EXECUTIVE DIRECTOR

Today, I want to provide you with an update about the IAFP's Foundation fundraising efforts. You may recall that I wrote my column in August about the ways that we might all give up just a little of our luxuries in order to give to the IAFP Foundation and how this might lead to a safer food supply and improved health for all consumers. Before I go too far with the Foundation subject, I first must make mention of the destruction left by Hurricane Katrina.

The aftermath of Hurricane Katrina is incredibly huge. Death, destruction of homes and businesses, loss of family members (mothers, fathers, grandparents, children), relocation of so many people, and a total evacuation of the city of New Orleans. These are just the visible sights associated with this natural disaster. There is so much more and you know this better than I do – the public health issues are enormous! One week after the major blow and many neighborhoods are still flooded up to the eaves of their roofs.

I began this column with the intent of telling you about the success of fundraising for the IAFP Foundation and the further intent of encouraging your contribution to the Foundation. But after this past week of watching and learning about the extent of destruction in Louisiana, Mississippi and Alabama, I want to encourage you to consider contributions to agencies assisting the victims of Hurricane Katrina. This rebuilding effort will take many years in some areas, so if you have not contributed yet, please contact the appropriate agency today.



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

***“Think about
how good we
have it ourselves,
and then share
with others who
are in need”***

Now back to the IAFP Foundation. In my August column, I explained that the Foundation Fund would be much more visible at IAFP 2005 than in years past and that there would be filming taking place to produce a promotional DVD. The Foundation was more visible and filming did take place; now we are looking forward to the results of the filming and the DVD. I want to share with you a couple stories of people who made a difference for the Foundation.

On Sunday evening at the Opening Session, Gale Prince, an IAFP Past President and current

Chair of the Foundation Committee, set out a challenge to IAFP 2005 attendees. If attendees would make contributions to the Foundation, Gale would match all contributions up to a total of \$1,000. Well, I have to say that there were many people who wanted to see Gale make the contribution! Contributions totaled in excess of \$5,000 and with Gale's \$1,000 contribution; this effort raised more than \$6,000 for the Foundation!

We were very pleased with the results of this “fun” challenge and our thanks go to Gale for his commitment to the Foundation and to IAFP. It is worth noting that Gale's “creative effort” generated four \$500 contributions, one \$250 contribution, fifteen \$100 contributions and many \$10, \$20 and \$50 contributions. Without his effort, we would have missed out on over \$6,000 in contributions!

One contribution stands out in my mind as being a true sacrifice of the type I talked about in my August column. On Monday during IAFP 2005, a young lady stopped me in the hallway and asked how she could make a contribution to the IAFP Foundation. I happened to have an envelope with me and told her she could fill in her name and contact information, then include a contribution and drop it by the IAFP registration desk. She explained to me that it would not be very much, but she really wanted to assist the Foundation in helping others.

Well, come Thursday morning before she was to return home, she found me and asked if she could give me something. Of course, she had the envelope with her contribution

enclosed. She again said that she was sorry that it was not more. She explained she had gone without breakfast while at IAFP 2005 and felt that she could instead contribute this money to the IAFP Foundation where it would help benefit more people than just herself. Later, I opened the envelope expecting to see \$10 or maybe \$20 – I was surprised to see that she had

contributed \$50 to the IAFP Foundation!

What I didn't tell you is that this young lady is a student Member from Trinidad. I know that some of you reading this column will recognize her from this description, but I want to give recognition to her for her unselfishness and for her willingness to share with others. What a wonderful world this might

be if we could all follow this young woman's example!

I remind you, please contribute to the IAFP Foundation to help the Foundation support IAFP programs. And before ending for this month, do not forget to assist the recovery efforts related to Hurricane Katrina. Think about how good we have it ourselves, and then share with others who are in need.

IAFP Donates \$1,000 to Help Victims of Hurricane Katrina

To assist the relief efforts resulting from the devastation caused by Hurricane Katrina, IAFP has donated \$1,000 to the Red Cross. We hope that this donation will help in some small way to ease the suffering of the many people touched by this disturbing event.

We encourage each IAFP Affiliate and all individuals to consider donating to organizations designated to provide hurricane relief.

Assessing On-farm Food Handling Practices of Iowa-grown Produce and Eggs in Regard to Food Safety

JASON D. ELLIS,^{1*} CATHERINE H. STROHBEHN,² and DANIEL H. HENROID, JR.³

¹7W MacKay Hall, Iowa State University, Ames, IA 50011-1120, USA; ²31 MacKay Hall, Iowa State University, Ames, IA 50011-1120, USA; ³9E MacKay Hall, Iowa State University, Ames, IA 50011-1120, USA

SUMMARY

Concerns about food safety and recent headlines about foodborne illnesses from fresh produce items are justifiable reasons for producers to increase attention to on-farm practices. A qualitative study examining food safety practices used by Iowa produce growers and shell egg producers was conducted. Observational and in-depth interview techniques were used to assess current food safety practices at each operation, followed by a summary report with recommendations for improvement. Producers were conscious of product safety, but levels of awareness about risk varied. Areas for additional consideration by producers include improved handwashing facilities and practices; provision of employee training; and the development of cleaning and sanitizing protocols for both products and food contact surfaces. Outcomes included a participant workshop reviewing results and current research and three extension publications for Good Agricultural Practices (GAPs) implementation, on-farm product handling, and cleaning and sanitizing. This study provides a basis from which additional studies of on-farm handling practices can be developed.

INTRODUCTION

In October 1998, the United States (US) Food and Drug Administration's Center for Food Safety and Applied Nutrition (FDA CFSAN) and the US Department of Agriculture (USDA) jointly issued the Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables (7). The publication was developed to help growers, harvesters, packers, and shippers address microbial safety of produce. The produce industry also has taken a proactive approach to food safety with the United Fresh Fruit and Vegetable Association partnering with the University of Florida, Texas A&M University, and University of California-Davis to conduct workshops and regional training for operators. The Produce Marketing Association, with the Partnership for Food Safety Education, recently developed a joint educational campaign on the safety of produce. Cornell University developed a guide for growers to help identify food safety hazards, using FDA and USDA principles as a model (11). The Food Marketing Institute (FMI) purchased the global Safe Quality Food (SQF) certification program in an effort to inform retailers and wholesalers around the world of the need to ensure safe and quality products (6).

These efforts show that producers, packers and shippers working with wholesale quantities of product are aware of

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*Author for correspondence: 515.294.7549; Fax: 515.294.6364
E-mail: jdellis@iastate.edu

the importance of safe product handling. However, the practices used on the farm by small- to medium-size growers are less well understood. Increased consumer interest in farmers' markets; development of farm-to-school programs; and growth of direct marketing from the farm to consumers, restaurants and other foodservices have the potential to result in foodborne illnesses from produce. Licensing by USDA is not required unless wholesale quantities of fresh produce are transported and sold across state lines. Growers are still bound by federal and state laws to comply with Good Agricultural Practices (GAPs), such as adhering to Environmental Protection Agency's restrictions on amounts and application of chemicals and fertilizer. Producers growing fruits and vegetables may sell directly to consumers and foodservices in their local area. A grower is considered an approved supplier as long as the food is not processed and is grown and cultivated by the farmer. Foodservices must be sure that the product packaging protects the integrity of the food (5), yet consumers and establishment operators are unaware of what potential contamination may have occurred prior to packaging and purchase.

Produce often does not receive further heat treatment prior to consumption. Thus, the presence of pathogens poses a risk. Produce could be contaminated at any point from planting to sale. Areas of concern on the farm include use of organic fertilizers (including manure); water quality and safety; postharvest handling; facility cleanliness and sanitation; and worker hygiene (1, 3, 11). A mail survey assessing New York growers' practices and attitudes regarding foodborne illness risks identified the need to target education about produce-related outbreaks and GAPs to small-scale, direct-to-consumer operations (11).

The goal of this project was to identify and reinforce the critical role of producers in keeping food products safe while under the control of the producers. Specific objectives included (1) increase producers' awareness of on-farm practices that are consistent with GAPs; (2) increase producers' knowledge of food safety issues associated with their products; and (3) identify necessary improvements in production practices that will minimize risks of foodborne illness.

METHODS

A convenience sample of eleven producers was selected from recommendations by the project's advisory board. The

board consisted of horticulture extension specialists, food safety extension specialists, produce growers, and representatives from two producer organizations in the state. Initial contact with potential participants, which was made by the board members, was followed by a letter and telephone call from the project coordinator to confirm participation and to schedule the visit for conducting observations and interviews. Data collection using qualitative methods of interviews and observations was done during a visit to the operation during the growing season.

The United States Department of Agriculture's (USDA) Fresh Produce Audit Verification Program audit check list (13) and the Rhode Island Farm Audit form (9) were used as a basis for developing the observation guide. One observation guide was used for all assessments and was reviewed by the project's advisory board for content and face validity. The guide contained six sections: general information; the farm; field harvest and packing; packing/processing facility; transportation from farm to market; and pick your own. Each section consisted of a list of standard observational items written in the form of questions. The operations differed in type of product (eggs or produce), the items grown (types of produce), volume of product produced, operational designs, distribution methods and marketing outlets for products.

A designation of Yes, No, or Not Applicable was made by the researcher for each of the observational items. No scoring or "pass/fail" system was used for the observations because the results were intended to be a framework for assessment of current practices and recommendations for improvement, rather than a judgment of the operation.

In addition to observing practices that influence product safety, the researcher conducted interviews with each of the producers, using a semi-structured interview procedure. An interview guide was developed by the research team for facilitating the interview, but questioning was not limited to items on the guide. Interviews were conducted during and after the observation of practices. The interview and observation guides were reviewed by the advisory board for content and face validity.

The interview questions were organized into two primary subject areas: (1) general project and production information, and (2) food safety program and responsibilities. The first area's questions inquired about the producer's reason for participating in the project, their greatest

production challenges related to food safety, marketing practices, and concerns of customers. Questions also were asked about changes the producers had made to their production and processing systems to improve product safety or to meet buyers' concerns about food safety.

The food safety program and responsibilities section was included to determine whether the producers had developed an on-farm food safety plan and to identify the primary person responsible for oversight of the plan's use at the farm. Having a written food safety plan in place and a designated person responsible for oversight of the plan is an important component of producing safe products (2).

Following each observational visit and interview, operations were provided a written report summarizing all positive practices. Reports also included recommendations for improvement that were based on GAPs (2) and tailored to the specific operation. Following the project completion, project results and current research related to GAPs and product handling were presented to participants in a workshop at which additional resources pertaining to product safety and GAPs were provided. Data also were used to develop presentations for two Iowa producer organization's annual conferences and three extension publications.

RESULTS AND DISCUSSION

Summary of sites

The eleven participating operations consisted of produce growers ($n = 9$) and shell egg producers ($n = 2$), all of which were located in Iowa. Though many of the operators stated that they tried to produce as natural a product as possible, only three producers had completed the organic certification process for their respective operations.

Production and handling practices of the eleven project participants were fairly consistent with those recommended in the GAPs materials (2). Interview results revealed that most producers were not intentionally implementing practices that helped ensure product safety. In-place practices were typically the by-product of production management decisions. Management practices that improved product quality, such as pest management, culling, and use of cold storage and disease control, also helped improve product safety (10).

Products from the eleven operations were sold through numerous marketing channels. Marketing methods employed

by the participants included farmers' markets, community supported agriculture (CSA) systems, pick-your-own products, direct to consumers via an on-farm store, to retail grocery stores, to wholesale buyers or distributors, and to food service operations. The types of produce sold for each operation ranged from five to more than 40. The produce operations ranged from 1.5 acres to 80 acres in production.

The farm

All operations used a potable water source for irrigation (when applicable) and for product, equipment, and facility cleaning. Water sources included wells, rural water districts, or metropolitan water services. A majority of the operators ($n = 6$) reported that their water source had been tested within the past year and that test records were on file. None of the participating operations used surface water sources such as streams and ponds, which minimized the risk of contamination of the water supply by runoff. Two of the farms included livestock production in addition to the produce or shell egg operation. Noting the presence and location of livestock is important, especially at produce operations, because manure dust, runoff, and handling practices can have implications on water and product quality and safety.

Manure handling and application practices were adequate for the six produce operations that used manure as a nutrient source. Raw manure or composted manure was most commonly applied to land used for produce production at the end of the growing season or with a cover crop during the growing season. The three produce operations that composted on site were encouraged to more actively manage the composting process in regard to temperature monitoring and pile turning.

All operations lacked any formal policies regarding visitors. A written policy provides visitors with clear instructions as to where they may and may not go, what they may assist with, and how they can help ensure product quality and safety. The visitor policy was most important for the four produce growers who included a "pick your own" component to their operations.

Field harvest

All operations cleaned product in the field. Field cleaning consisted of removing soil, straw, dead leaves, and other foreign material that could have contami-

nated transport containers and packing/processing facilities and equipment. Only physical methods such as removing poor-condition foliage or brushing off soil and other visible contaminants were used for field cleaning. No water was used during the in-field cleaning process.

Proper hygiene practices in the field were observed for a large majority of the operations ($n = 10$). Such practices included clean hands and clothes, using gloves when appropriate, and covering open sores. None of the operations had adequate handwashing facilities at the harvest site. All operations were encouraged to improve the availability of handwashing facilities and to promote more frequent handwashing by field harvest employees.

Equipment segregation ($n = 7$), cleaning ($n = 6$), and sanitation practices ($n = 5$) needed to be improved at many of the sites. Containers used for harvesting also were frequently used in the packing/processing area with little or no cleaning and sanitation. Harvest containers were washed with soap and water and then sanitized only at the beginning of the season and then rinsed as needed throughout the remainder of the season. Frequent washing with soap, along with scrubbing, is necessary to remove organic matter that may contaminate products harvested later. Using a sanitizer on containers to reduce levels of microbial contaminants is most effective when containers have first been cleaned to remove physical contaminants.

Packing/processing facility

A majority of producers ($n = 8$) were using appropriate food-grade packaging for their products. Researchers were concerned with some producers using new grocery sacks or re-using plastic produce sacks from grocery stores and using plastic trash sacks for packaging bulk products. Re-using grocery sacks provides an opportunity for cross-contaminating product with something that might have been on the store-bought food items. The use of trash sacks and new grocery sacks is discouraged because some may contain fragrances or additives to help prevent odors, and these chemicals may contaminate the food. Some operations ($n = 3$) had acquired rolls of new produce sacks, like those available in grocery store produce departments, for packaging product.

Egg producers were encouraged to check state laws for labeling and egg handler licensing. For example, producers who sell eggs from their own flocks di-

rectly to consumers or licensed egg handlers, such as a retail outlet, are exempt from being required to have an egg handler's license.

The packing/processing facility was the area most in need of improvement with regard to practices that can affect product quality and safety. Prevalence and quality of handwashing facilities was the most common critique of packing/processing facilities. Often, those harvesting product also were the employees working in the packing/processing facility. Washing hands prior to handling product was often neglected because facilities did not exist or were inconveniently located, such as in a nearby house. Not washing between harvesting and packing/processing provides an opportunity for cross-contaminating product with microbial and physical contaminants from soil, compost, manure, and other environmental components via hands or clothes.

The quality and frequency of equipment cleaning and sanitizing was a second area in need of improvement. Tubs, sinks, crates, and other equipment were most commonly just rinsed with water when cleaning with soapy water, rinsing, and then sanitizing with an approved solution was necessary. Efforts were made to clean and sanitize equipment at the beginning of the season, but routine cleaning and sanitizing were not occurring as frequently as recommended (10).

Product washing and sanitizing also were identified, through observations and interviews, as needing improvement. Methods of washing varied, primarily because of the diversity of products. Though dependent on the product, some operations used a preliminary soaking for two purposes: to loosen any soil that may be on the product and to cool the product. When soaking was used, water was infrequently changed and never included a sanitizer, creating an opportunity for cross-contamination of "clean" product.

Rinsing with water was the primary method for washing product. If soaking was the first step in product cleaning, rinsing typically followed. Physical scrubbing of product was not commonly done, even when appropriate for the product (such as eggs, potatoes, apples, or carrots).

The use of sanitizers on products was most common at the egg operations and the larger produce operations ($n = 3$). Chlorine bleach and hydrogen peroxide were the two sanitizers used on products. Interviews with participants identified many reasons for not using sanitizers, such as sanitizers were too expensive; producers weren't sure what could be

used; consumers had shown a disinterest in sanitizer use; sanitizers caused discoloration of the products; or sanitizers left a residual taste or odor.

Transportation

All of the participating operations used proper practices when preparing product for transportation and used some form of enclosed container or packaging. Employees were handling product in a manner that minimized the risk of damage. Efforts were made to maintain low temperatures of product during transportation by using insulated transport containers or a refrigerated truck. Three of the operations needed to improve the use of refrigerated or insulated transportation units because the transport times were too long for the current temperature maintenance methods. Some producers selling at farmers' markets kept product on their sales display trailers between visits to farmers' markets and restocked with product from refrigerated storage.

Another concern with transportation of product was the cleanliness of the transport vehicle. Many of the operations were small and did not own a designated delivery vehicle. Most deliveries were made using pick-up trucks, vans, and cars. More than half of the operations (n = 6) used delivery vehicles with conditions that provided an opportunity for product contamination, such as being dirty or not being enclosed.

CONCLUSIONS

The assessment, interview, and reporting components of the project helped operators realize the impact practices already in place have on product safety and their responsibilities as food producers. Some project participants have contacted researchers for additional information since the project ended. The project components also provided positive reinforcement of appropriate existing practices and encouraged operators to continue to improve their operations and practices.

Results of the assessment and interview process identified GAPS, proper food handling, and cleaning and sanitizing as areas in which producers needed specific

resources for improvement. A search for existing producer-oriented materials addressing these three issues found nothing appropriate for sustainable produce and shell egg producers. As a result, three Extension publications were developed to provide producers with a concise guide for application of GAPS (4), proper food handling practices (12), and cleaning and sanitizing procedures (8).

Programming and resources could be developed to help sustainable produce and shell egg producers incorporate practices that improve the safety of their products into their respective production and management systems. The general focus of this project's participants was on production and management practices to make or keep the operation economically viable. Recommended production changes to improve product safety need to be complementary and compatible with operators' short-term and long-term production and management plans.

Additional research and outreach activities with this audience need to include the development of a food safety plan that is integrated into the production and marketing components of the business plan. Product safety is an increasingly important component of marketing that is most easily implemented in small operations when incorporated into existing aspects of the operation.

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Comparison of the Statutory Environmental Health Inspection Rating and the Microbiological Quality of Ready-to-Eat Food Sampled from Premises in the United Kingdom

R. J. MELDRUM,^{1*} R. M. M. SMITH,² D. CHARLES,¹ C. EDWARDS,³ and J. GARSIDE⁴

¹Public Health Laboratory, NPHS for Wales, Llandough Hospital, Penlan Road, Penarth, CF64 2XX, United Kingdom;

²CDSC Wales, Abton House, Wedal Road, Cardiff, CF14 3QX, United Kingdom; ³Caerphilly County Borough

Council, Council Offices, Pontllanfraidd, Blackwood, MP12 2YW, United Kingdom; ⁴Blaenau Gwent County Borough Council, Civic Centre, Ebbw Vale, NP23 6XB, United Kingdom

SUMMARY

The inspection rating of food premises is part of the United Kingdom food safety legislation and allows local authority environmental health departments to determine premises inspection frequency in a systematic, standardized and quantitative manner by using a predetermined, defined scoring system. The assessments for these measurements, which are carried out by environmental health and food safety officers, are usually based upon observation, interviews and examination of existing documentation rather than upon sampling or consideration of microbiological data. The objective of this study was to ascertain whether there was a statistically significant relationship between microbiological results from sampling ready-to-eat foods and inspection frequency rating. The microbiological results from 5,477 ready-to-eat foods were analyzed to ascertain if there was a significant difference between the rates of unsatisfactory microbiological results found with different inspection ratings. Parameters considered were aerobic colony count, indicator counts and pathogens, and these were compared against the food quality guidelines used by UK local authorities throughout the corresponding period of time. No significant differences were found between inspection ratings in terms of rates of unsatisfactory microbiological quality for any of the parameters considered.

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*Author for correspondence: +29.2071.5301; Fax: +29.2071.5134
E-mail: richard.meldrum@nphs.wales.nhs.uk

TABLE 1. Summary of inspection rating scheme

Score			
POTENTIAL HAZARD	Food/handling	Handling low risk	5
		Handling high risk	10
		Preparing low risk	30
		Preparing high risk	40
	Processing Consumers at risk	High risk activities?	0 or 20
		Very few	0
		Few	5
		Intermediate	10
		Substantial	15
		Vulnerable?	0 or 20
COMPLIANCE	Hygiene/safety	Excellent	0
		Very good	5
		Satisfactory	10
		Fair	15
		Bad	20
	Structural	Very bad	25
		Excellent	0
		Very good	5
		Satisfactory	10
		Fair	15
CONFIDENCE IN MANAGEMENT	Bad	20	
	Very bad	25	
	High	0	
	Moderate	5	
	Some	10	
SIGNIFICANCE OF RISK	Potential to be contaminated with <i>E. coli</i> O157, other VTEC, <i>Cl.botulinum</i> ?	Little	20
		No	30
		0 or 20	
INSPECTION RATING	RANGE: FROM	TO	FREQUENCY
A	91	195	6 months
B	71	90	12 months
C	41	70	18 months
D	31	40	24 months
E	21	30	36 months
F	zero	20	60 months

INTRODUCTION

Food legislation within the United Kingdom is detailed within the Food Safety Act 1990 and associated Codes of Practice (2). These documents, which are published by the UK Food Standards Agency (FSA), detail the procedures to be followed by local authorities across the

UK in order to carry out their statutory duty to ensure the safety of food available to consumers. One significant requirement within the Code of Practice No. 9 is a hygiene inspection of food premises. This inspection has three purposes: to establish if the food is being produced and handled hygienically, to establish if the food is safe to eat, and to identify

foreseeable incidences of food poisoning. Inspections should include a review of records held by the business, discussions with the management, identification of any food safety management systems in place, discussions with staff on the identification of hazards and the use of critical control points, a physical examination and an assessment of whether or not to take

TABLE 2. Summary of current guideline limits for ready-to-eat foods—UK local authorities and public health laboratories

Parameter	Category	Guideline limit (CFU/g)
ACC (Food Category 1, e.g., beef burgers, desserts)	Unsatisfactory	$\geq 10^4$
ACC (Food Category 2, e.g., sausages, flans)	Unsatisfactory	$\geq 10^5$
ACC (Food Category 3, e.g., coleslaw, cooked rice)	Unsatisfactory	$\geq 10^6$
ACC (Food Category 4, e.g., smoked fish, sliced meat)	Unsatisfactory	$\geq 10^7$
ACC (Food Category 5, e.g., yogurt, vegetables)	Not applicable	No limit
<i>Escherichia coli</i>	Unsatisfactory	≥ 100
<i>Listeria</i> spp.	Unsatisfactory	≥ 100
<i>Salmonella</i>	Unacceptable	Detected in 25 g
<i>Campylobacter</i>	Unacceptable	Detected in 25 g
<i>Listeria monocytogenes</i>	Unacceptable	≥ 100
<i>Staphylococcus aureus</i>	Unsatisfactory	10^2 – $<10^4$
<i>Staphylococcus aureus</i>	Unacceptable	$\geq 10^4$
<i>Clostridium perfringens</i>	Unsatisfactory	10^2 – $<10^4$
<i>Clostridium perfringens</i>	Unacceptable	$\geq 10^4$
<i>Bacillus cereus</i>	Unsatisfactory	10^4 – $<10^5$
<i>Bacillus cereus</i>	Unacceptable	$\geq 10^5$

TABLE 3. Number of valid samples in each inspection-rating category (A-F)

Inspection Rating	Inspection Frequency	Number of samples (%)
A	6 months	409 (7.5)
B	12 months	1,462 (26.7)
C	18 months	2,800 (51.1)
D	24 months	356 (6.5)
E	36 months	150 (2.7)
F	60 months	300 (5.5)
Total		5,477 (100)

samples for analysis or examination. Sampling for microbiological examination is not an absolute requirement for inspections, and it is left to the discretion of the inspecting officer to make an assessment as to whether to take samples (2).

Local authorities use the criteria listed within the Code of Practice No. 9, which includes food type, method of processing, confidence in management, and compliance to hygiene practices to produce a

score for the premises (Table 1). Using the matrix within the Code of Practice, authorities use this score to determine an inspection rating (A–F) for the premises, and this rating in turn determines the frequency of inspection. A high score would result in an A rating (high risk), meaning an inspection at least every six months, and a low score would result in an F rating (low risk), requiring an inspection at least every 5 years, partially reflecting the

relatively high confidence that the local authority had in the management, staff and practices in the premises inspected and the relatively low-risk foods offered for sale.

This study compared the inspection rating and associated inspection frequency with the unsatisfactory or unacceptable rates for various microbial parameters from samples of ready-to-eat foods collected across Wales over nine years (1995–2003). The objective was to ascertain the relationship between the inspection rating of retail and catering premises and the microbiological quality and safety of ready-to-eat products sampled from those premises.

MATERIALS AND METHODS

Collection of microbiological data

Data were collected over nine years (1995–2003) by local authority environmental health departments participating in the all-Wales shopping-basket ready-to-eat food-sampling program (5). Samples were collected by local authority authorized officers and were transported from the premises to the laboratories in insulated cold boxes. Examination

TABLE 4. Summary of percentage unsatisfactory/unacceptable rates and statistical significance (P-value) for all microbial parameters

Parameter	Category	Inspection Rating						P-value
		A	B	C	D	E	F	
ACC	% unsatisfactory rate	16.14	16.21	16.25	14.04	10.00	12.33	0.157
<i>E. coli</i>	% unsatisfactory rate	3.66	1.57	1.78	2.81	1.33	2.00	0.09
<i>Listeria</i> spp.	% unsatisfactory rate	0.00	0.07	0.18	0.00	0.00	0.33	0.679
<i>Salmonella</i>	% unacceptable rate	0.00	0.07	0.00	0.00	0.00	0.00	0.739
<i>Campylobacter</i>	% unacceptable rate	0.00	0.00	0.00	0.00	0.00	0.00	N/A
<i>L. monocytogenes</i>	% unacceptable rate	0.00	0.07	0.07	0.28	0.67	0.00	0.174
<i>S. aureus</i>	% unsatisfactory rate	0.24	0.75	0.32	0.00	0.00	0.00	0.117
<i>S. aureus</i>	% unacceptable rate	0.00	0.14	0.00	0.00	0.00	0.00	0.358
<i>C. perfringens</i>	% unsatisfactory rate	0.00	0.41	0.07	0.00	0.00	0.00	0.08
<i>C. perfringens</i>	% unacceptable rate	0.00	0.00	0.00	0.00	0.00	0.00	N/A
<i>B. cereus</i>	% unsatisfactory rate	0.00	0.00	0.00	0.00	0.00	0.00	N/A
<i>B. cereus</i>	% unacceptable rate	0.00	0.14	0.00	0.00	0.00	0.00	0.358

of samples was carried out by the four food and water laboratories of the Infectious and Communicable Disease Service of the National Public Health Service for Wales (formerly the Public Health Laboratory Service in Wales). Samples were examined on the day that they were submitted to the laboratory. The laboratories carried out identical bacterial examinations on the foods: aerobic colony count, *Escherichia coli*, *Listeria* spp., *Salmonella*, *Bacillus cereus*, *Staphylococcus aureus*, *Campylobacter*, *Clostridium perfringens* and *Listeria monocytogenes*. The methods used were based upon methods published by the International Standards Organization (4) and distributed within the UK to all public health laboratories by the Public Health Laboratory Service. Methods were subject to internal and external quality control, validation within each laboratory, and external accreditation. Demographic and microbiological results data were inputted onto Epi Info by local authority staff and regularly submitted to the Communicable Disease Surveillance Centre, Wales, for collation and analysis.

Determination of inspection rating

Inspection rating was determined by local authority environmental health officers during premises inspections. The criteria used were as detailed in the Food

Safety Act (1990) Code of Practice No. 9: Food Hygiene Inspections: (Second Revision October 2000) (2). Criteria used for the determination of the inspection rating are shown in Table 1.

Comparison of microbiological data and inspection rating

Unsatisfactory and unacceptable rates for the microbiological data were determined by comparison against current guidelines published by the Public Health Laboratory Service (PHLS). Guideline categories and limits are detailed in Table 2. These guidelines are used across the UK by local authorities and public health laboratories for the evaluation of ready-to-eat foods at the point of sale (3). Microbiological parameters considered for this study were unsatisfactory or unacceptable rates of aerobic colony count, *Escherichia coli*, *Listeria* spp., *Salmonella*, *Listeria monocytogenes*, *Clostridium perfringens*, *Staphylococcus aureus*, *Campylobacter* and *Bacillus cereus*. These unsatisfactory and unacceptable rates were grouped into inspection ratings (A–F) and subjected to a χ^2 hypothesis test to determine P-values and significance of differences between ratings. The α significance threshold level was set at 0.05. The statistical calculator function of Epi Info was used for these calculations (1).

RESULTS AND DISCUSSION

The food types used in the data analysis were all ready-to-eat foods taken from premises between 1995 and 2003. Samples could be included in the comparison of risk groups only if they were either produced or handled on the premises to which the risk rating referred. Retail premises that simply sold pre-packed products supplied by the producer were excluded. The types of premises included in the study were hotels, delicatessens, restaurants, canteens, bakeries and butcher shops producing cooked meats. Supermarkets were excluded, unless the food sampled was clearly produced, cooked or unpacked for retail sale on site or was prepared and sold from restaurants within the supermarket. Food types sampled included sliced meats (beef, ham, chicken), cakes with and without dairy cream, sandwiches with a variety of fillings, fresh fruit and vegetables, a variety of ready-to-eat meals, cooked poultry, desserts and ice cream.

A breakdown of number of results by inspection rating and frequency is shown in Table 3. The majority of premises in the study were rated category C (51.1%), with the smallest proportion having category E (2.7%). The unsatisfactory rates for aerobic colony count and indicator organisms and the unsatisfactory and

unacceptable rates for pathogens are listed in Table 4. When the unsatisfactory rates were analyzed statistically, it was found that there were no significant differences between ratings for any of the microbial parameters under consideration (Table 4). There was a non-significant downward trend in the ACC unsatisfactory rates between rating A and F, with the highest percentage of unsatisfactory counts associated with the A rating (highest premises risk rating). For the indicator and pathogen results, no clear conclusion could be drawn because the unsatisfactory and unacceptable rates were relatively low and there were no clear trends between inspection ratings. The study reported by Tebbutt and Southwell (6) concluded that there was poor agreement between microbiological results and inspection rating, based upon inspections of manufacturing facilities. The current results agree with this study, although the current study focused predominantly on retail and catering premises rather than on manufacturers, and the previous study was published prior to the publication and implementation of the current Food Safety Act and the Codes of Practice.

In summary, there was no significant relationship between unsatisfactory counts

of ACC, indicators or pathogens and inspection rating; these results indicate that the inspection rating assigned by environmental health officers is not significantly related to the microbiological quality of food sampled from these premises.

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IAFP University Speaker Program Frank Yiannas Speaks at Iowa State University

Frank Yiannas, President-Elect of IAFP and Director of Safety and Health at Walt Disney World presented "Food Safety is Magical, But It Doesn't Magically Happen" during the ISU Department of Food Science and Human Nutrition's Seminar Series on September 7, 2005.



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Origin of the 60-day Minimum Holding Period Requirement for United States Cheeses Made from Sub- or Unpasteurized Milk

KATHRYN J. BOOR

Department of Food Science, 413 Stocking Hall, Cornell University, Ithaca, NY 14853, USA

SUMMARY

The 60-day minimum holding period requirement for cheeses manufactured from sub- or unpasteurized milk in the United States is intended to reduce the likelihood of consumer exposure to pathogenic microbes that may be present in the cheese milk.

The efficacy of the 60-day holding period for pathogen reduction has come under scrutiny for multiple reasons, including, foodborne illness outbreaks associated with cheese consumption, scientific research suggesting that some pathogenic bacteria survive for longer than 60 days in cheeses, and a recognized need for science-based decision making for establishment of food safety regulations. The origin of the 60-day holding rule for unpasteurized cheeses is presented, within the context of current food safety concerns regarding the safety of raw milk cheeses.

INTRODUCTION

Anecdotal observations that linked consumption of milk and milk products with the spread of disease spurred scientists and physicians around the world to undertake targeted public health research to investigate the role of milk consumption in foodborne disease as early as the turn of the twentieth century. Consumption of unpasteurized milk was found to be associated with many serious diseases, including diphtheria, typhoid, tuberculosis, and brucellosis (11). Gastrointestinal disease outbreaks associated with milk consumption were first summarized in 1925 by the United States Public Health Service. To control milkborne diseases, these early reports recommended application of sanitation measures at all points in the food system, from the farm to the consumer (6). The need for technical research to determine bacterial destruction efficacies of food processing treatments for pathogenic microbes likely to be present in raw milk also was highlighted (4, 7). The results of many scientific studies, in combination with testimony by dairy product experts, led to development

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*Author for correspondence: 607.255.3111 ; Fax: 607.255.7619
E-mail: kjb4@cornell.edu

of specific recommendations for pasteurization and other intervention strategies intended to reduce public exposure to hazardous microorganisms that may be present in raw milk.

The microbiological safety of cheese made from heat-treated milk was previously covered in an extensive three-part review by Johnson et al. (10, 11, 12). The objective of the present article is to describe the scientific origins of the current 60-day holding rule for cheese manufactured from sub-pasteurized milk within the context of emerging information on currently recognized milkborne pathogens.

DEVELOPMENT OF MILK PASTEURIZATION REQUIREMENTS

The public health objective of milk pasteurization, as defined in the 2003 United States Pasteurized Milk Ordinance (PMO), is to eliminate all non-spore-forming pathogens commonly associated with milk. Pasteurization, as first adopted in the US, was defined in the 1939 Milk Ordinance and Code as "the process of heating every particle of milk to at least 143°F (61.7°C) and holding at such temperature for at least 30 minutes, or to at least 160°F (71.1°C) and holding at such temperature for at least 15 seconds, in approved and properly operated equipment" (14). These heat treatments were referred to, respectively, as the "holding method" or vat/batch pasteurization and the "flash method," or high-temperature short-time pasteurization. To address recognized gaps in knowledge regarding the microbes associated with milkborne disease, extensive research was conducted to determine the heat treatment required to kill *Mycobacterium tuberculosis*, which, at the time, was considered to be the most heat resistant pathogen associated with milk (9). This work led to the widespread recognition of the public health significance of thermal milk processing and formed the basis for modern pasteurization processes (9). In 1956, minimum pasteurization conditions were increased to assure destruction of *Coxiella burnetii*, the organism associated with Q-fever, which was found to be more heat resistant than *M. tuberculosis* (4). The conditions prescribed in 1956 remain in effect today; minimal pasteurization requirements specify that milk must be heated to 145°F (63°C) and held for at least 30 minutes, or to at least 161°F (72°C) and held for at

least 15 seconds, or to a scientifically determined thermal equivalent (6).

CHEESE SAFETY

Modern dairy products made in the United States are rarely associated with outbreaks of foodborne illness (< 1% of reported outbreaks) despite the possible presence of pathogenic microbes in raw milk (1). However, in 1938, fully 25% of illnesses due to contaminated food consumption were traced back to dairy products (6). Cheese products were linked to 59 disease outbreaks in the United States between 1883 and 1946, and resulted in 2,904 illnesses and 117 deaths, with 40 outbreaks occurring between 1935 and 1945 (5). Seventeen of these outbreaks were traced to Cheddar cheese consumption, with much of the implicated cheese aged for less than 30 days (18). Typhoid fever epidemics linked to cheese consumption in 1944 (18) caught the attention of the Surgeon General of the United States (10), who recommended in a letter to state health officials dated June 16, 1944 that "all cheese be either adequately ripened (e.g., cured) or made from pasteurized milk". The 1944 outbreaks were largely attributed to war-time conditions during World War II, including food rationing and shortages, and the lack of qualified cheesemakers and appropriately manufactured cheesemaking equipment (10, 18). Several states enacted legislation promptly in response to the Surgeon General's letter. In early 1946, the Food and Drug Administration published proposed standards for several cheeses (10).

The 60-day holding period recommendation, which was first published in the August 24, 1950 Final Rule (15 FR 5653), was established following expert testimony from hearings conducted in development of cheese Standards of Identity in April 1947 (10). Statements from this 1947 hearing included the observation that no disease outbreaks had been associated with cheeses held more than 60 days, although the specific length necessary for a "safe" holding period was "uncertain" (10). It was also deemed "unreasonable" to require holding cheese for a period that would ensure death of all pathogens (10).

The scientific underpinnings of the 60-day holding period recommendation are obscure, but were derived at least partially from a study that investigated survival of *Brucella abortus* in Cheddar cheese (7). This study reported that *Brucella abortus* survived for up to 6 months

in cheeses that had been inoculated at levels of approximately 1,000 CFU/ml and held at 4.4°C. *B. abortus* was not recovered from commercial Limburger cheeses that had been held for 57 days, although the cheese milk used to manufacture two of the cheeses had tested positive for *B. abortus*. Test Cheddar cheese made from milk that naturally bore 700–800 CFU/ml were positive for culturable *B. abortus* for three months. Viable *B. abortus* were recovered from some, but not all, of these test cheeses at 6 months. Cheeses made from milk collected from herds positive for *B. abortus* were negative after storage for at least 41 days at temperatures ranging from 1.1°C to 2.7°C. In the discussion of the manuscript, authors stated that Cheddar cheese had not been proven as a vector for human brucellosis (undulant fever) and that typhoid fever epidemics had not been attributed to cheeses cured for more than 63 days, and they therefore believed that epidemiological evidence suggesting a lack of association between cheese consumption and disease provided strong support for an aging period of approximately 2 months for commercial cheeses. The final stated conclusion was that "an aging period of 60 days is reasonable assurance against the presence of viable *Brucella abortus* organisms in Cheddar cheese" (7).

Even prior to publication as a Final Rule (15 FR 5653), the 60-day holding period for sub-pasteurized cheese was recognized as "not infallible" for pathogen destruction (7, 18). Viable *M. tuberculosis* were recovered from Cheddar cheese after 100 days; hemolytic streptococci were recovered after 160 days and *S. serotype Typhi* was recovered after up to 10 months, depending on cheese storage temperature (18). Ultimately, however, the 60-day holding period was deemed to offer some level of protection from pathogenic organisms present in freshly manufactured cheese (18).

Current United States cheese regulations

The Food and Drug Administration's Division of Dairy and Egg Safety, Office of Plant and Dairy Foods and Beverages, is currently responsible for development and implementation of regulations to protect the safety of cheese and other dairy foods that enter interstate commerce. According to the US Code of Federal Regulations (CFR) 21 CFR part 1240.61, no milk or milk products in final package form

intended for direct human consumption can enter interstate commerce unless it is manufactured from pasteurized milk or pasteurized milk ingredients, except where alternative procedures are provided for by regulation, such as in 21 CFR 133, which contains regulations for cheeses and related cheese products.

As described in 21 CFR 133, Standards of Identity have been established for most natural cheeses, process cheeses, cheese foods, and cheese spreads. All cheeses belonging to a given variety must comply with the published standard and must be labeled with the name prescribed in the standard. In general, standards specify a maximum permissible moisture content and minimum milk fat content. A few natural cheeses are required to be made from pasteurized milk (e.g., Monterey Jack, cream cheese, mozzarella cheese); however, most, including many soft ripened cheeses (21 CFR 133.182) and semisoft cheeses (21 CFR 133.187), may be made from either raw or pasteurized milk. The Code of Federal Regulations (7 CFR sec. 58.439) states "if cheese is labeled as 'heat treated' 'unpasteurized' 'raw milk' or 'for manufacturing' the milk may be raw or heated at temperatures below pasteurization. Cheese made from unpasteurized milk shall be cured for a period of 60 days at a temperature not less than 35°F. If the milk to be used for cheese-making is held more than 2 hours between time of receipt or heat treatment and setting, it shall be cooled to 45°F or lower until time of setting" (3). Standards of identity may stipulate a holding period longer than 60 days if further aging is required to develop the characteristics of the cheese variety.

Why is the 60-day holding period under scrutiny now? Evidence of the ability of bacterial pathogens to survive throughout a 60-day holding period and to cause human disease has arisen from investigations of outbreaks of foodborne illnesses that have been traced back to aged cheeses as well as from additional scientific research. Specifically, three outbreaks of salmonellosis following consumption of Cheddar cheese, two in Canada and one in the United States, suggest that various *Salmonella* strains can survive for extended periods in cheese products.

In the first outbreak, which was traced to Cheddar cheese manufactured in Kansas in 1976, raw milk had been held unrefrigerated in the processing plant for 1–3 days prior to pasteurization and cheese manufacture. While it is not known for certain, total bacterial numbers in the pre-pasteurized raw milk could have ex-

ceeded the thermal destruction capacity of the pasteurizer. Microbiological analyses revealed the presence of *Salmonella* serotype Heidelberg at very low levels (0.36–1.8/100 grams of cheese) in the aged cheeses. The average pH of cheese batches bearing *Salmonella* was 5.6 vs. 5.4 for uncontaminated product; thus it is possible that slow acid production by starter cultures could have contributed to *Salmonella* survival, as well. This outbreak resulted from numerous lapses in good manufacturing practices and cannot be attributed solely to inadequacy of a 60-day holding period for microbial destruction (11).

The second incident consisted of a series of *Salmonella* outbreaks that occurred in Ontario, Canada, from 1980 to 1982. In these cases, *S.* serotype Muenster was isolated from raw milk Cheddar cheese even after 125 days of curing at 41°F.

In the third outbreak, which affected over 2,700 people in Canada in 1984, *S.* serotype Typhimurium was isolated at very low levels from Cheddar cheese (0.39–9.3/100 grams of cheese) that may have been prepared from a mix of raw and pasteurized milk. *S.* Typhimurium was found to persist in this cheese for 8 months at 41°F (11).

Research at the University of Wisconsin (16) and at South Dakota State University (15) demonstrated survival of *Listeria monocytogenes* and *Escherichia coli* O157:H7, respectively, for more than 60 days in Cheddar cheese. To illustrate, Ryser and Marth showed that *Listeria monocytogenes* could persist for up to 434 days post-processing in artificially contaminated Cheddar cheese (16).

CONCLUSIONS

Together with outbreak information, laboratory research demonstrates that various foodborne pathogens can survive current raw milk Cheddar cheese manufacturing practices under some circumstances. It is possible that illnesses associated with cheese consumption have been historically underestimated. Underestimation of illness associations could occur for many reasons, including a lack of appropriate detection tools for very low numbers of pathogens that may be present in cheese products (11), the overall under-reporting of illnesses due to food consumption (13), and the fact that most foodborne illnesses are not successfully traced back to source. Additional research is critically needed to enable accurate at-

tribution of foodborne illnesses back to specific foods (17). Current information needs include comprehensive outbreak data on illnesses traced back to originating foods and an enhanced capacity to assess illness risks based on evolving food contamination and consumption data. Additional research is also required on the persistence of pathogens during cheese manufacture and ripening, with a particular need to focus on survival of pathogens recognized as human hazards since 1950 (e.g., *L. monocytogenes*, *E. coli* O157:H7). It will be particularly important to understand and accurately quantify illness risks associated with low levels of pathogens that may be present in fermented foods.

Development and application of molecular subtyping-based surveillance methods has dramatically improved our ability to identify foods associated with illness outbreaks (8). Recent advances in tracking bacterial pathogens back to source (2) ultimately will allow more accurate assessment and quantification of foodborne illness risks associated with specific foods, including dairy products. Evaluation of data from multiple sectors, including public health, dairy science, and food science, and epidemiology, are essential for ensuring that food safety regulations reflect the best available scientific knowledge to protect consumers from foodborne illnesses.

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 - (c) essential results, including statistical significance when applicable; and
 - (d) conclusions and/or significant implications.
2. Abstracts must report the results of original research pertinent to the subject matter. Papers should report the results of new, applied research on: safety and microbial quality of foods (dairy, meat and poultry, seafood, produce, water); foodborne viruses and parasites, retail food safety, epidemiology and public health; non-microbiology food safety issues (food toxicology; allergens; chemical contaminants); advances in sanitation, laboratory methods, quality assurance, and food safety systems. Papers may also report subject matter of an educational and/or non-technical 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.
5. Results should be summarized. Do not use tables or graphs.

Rejection Reasons

1. Abstract was not prepared according to the "Instructions for Preparing Abstracts."
2. Abstract does not contain essential elements as described in "Selection Criteria 1a-1d."

3. Abstract reports inappropriate or unacceptable subject matter.
4. Abstract is not based on accepted scientific practices, the quality of the research or scientific approach is inadequate, data does not support conclusions, or potential for 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 are reported). Indication that data will be presented is not acceptable.
6. Abstract was poorly written or prepared. This includes spelling and grammatical errors.
7. Results have been presented/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 without justification of relevance and originality will be given low priority for acceptance.

Projected Deadlines/Notification

Abstract Submission Deadline: February 8, 2006.
Submission Confirmations: On or before February 9, 2006. Acceptance/Rejection Notification: March 10, 2006.

Contact Information

Questions regarding abstract submission can be directed to Bev Brannen, 515.276.3344 or 800.369.6337; E-mail: bbrannen@foodprotection.org.

Program Chairperson

Vickie Lewandowski
Kraft Foods
801 Waukegan Road
Glenview, IL 60025
Phone: 847.646.6798; Fax: 847.646.3426
E-mail: vlewandowski@kraft.com



Abstract Form

DEADLINE: Must be Received
by February 8, 2006

- (1) Title of Paper _____

(2) Authors _____

(3) Full Name and Title of Presenter _____

(4) Institution and Address of Presenter _____

(5) Phone Number _____
(6) Fax Number _____
(7) E-mail _____

(8) Format preferred: Oral Poster No Preference

The Program Committee will make the final decision on presentation format.

- (9) Category: Produce Meat and Poultry Seafood Dairy and Other Food Commodities
 Risk Assessment and Epidemiology Education/ Other Non-Technical General Microbiology and Sanitation
 Pathogens and Antimicrobials Advances in Applied Laboratory Methods
 Food Toxicology/Non-Microbial Food Safety

(10) Developing Scientist Awards Competition Yes Graduation date _____
 Full-time student Part-time student

Major Professor/Department Head approval (signature and date) _____

(11) TYPE abstract, DOUBLE-SPACED, in the space provided or on a separate sheet of paper, using a 12-point font size. Use no more than 300 words.

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 May 29, 2006.
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 signature and date is required from the major professor or department head.
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 May 29, 2006. Only competition finalists will be judged at the Annual Meeting and will be eligible for the awards.

All other entrants with accepted abstracts will be expected to be present as part of the regular Annual Meeting. Their presentations will not be judged and they will not 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 awards winners will be announced and recognized.

Awards

First Place – \$500 and an engraved plaque
Second Place – \$300 and a framed certificate
Third Place – \$100 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 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.

Call for Nominations 2006 Secretary

A representative from industry will be elected in March of 2006 to serve as IAFP Secretary for the year 2006–2007.

Send letters of nomination along with a biographical sketch to the Nominations Chairperson:

Margaret D. Hardin
Smithfield Packing Company
501 N. Church St.
Smithfield, VA 23430
Phone: 757.365.3546
Fax: 757.365.3541
E-mail: margarethardin@smithfield.com

The Secretary-Elect is determined by a majority of votes cast through a vote taken in March of 2006. Official Secretary duties begin at the conclusion of IAFP 2006. The elected Secretary serves as a Member of the Executive Board for a total of five years, succeeding to President, then serving as Past President.

For information regarding requirements of the position, contact David Tharp, Executive Director, at 800.369.6337 or 515.276.3344; Fax: 515.276.8655; E-mail: dtharp@foodprotection.org.

Nominations close November 1, 2005.



International Association for
Food Protection®



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. To request nomination criteria, contact:

International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2864
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
Web site: www.foodprotection.org
E-mail: info@foodprotection.org

Nominations deadline is March 13, 2006. You may make multiple nominations. All nominations must be received at the IAFP office by **March 13, 2006.**

- ◆ Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members. FPA 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 2006 – the Association's 93rd Annual Meeting in Calgary, Alberta, Canada on August 16, 2006.



Nominations will be accepted for the following Awards:

Black Pearl Award — Award Showcasing the Black Pearl

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

Sponsored by Wilbur Feagan and F&H Food Equipment Company

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 \$1,000 Honorarium

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

Sponsored by Zep Manufacturing Co.

Harold Barnum Industry Award — Plaque and \$1,000 Honorarium

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

Sponsored by Nasco International, Inc.

Educator Award — Plaque and \$1,000 Honorarium

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

Sponsored by Nelson-Jameson, Inc.

Sanitarian Award — Plaque and \$1,000 Honorarium

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

Sponsored by Ecolab, Inc., Food and Beverage Division

Maurice Weber Laboratorian Award — Plaque and \$1,500 Honorarium

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.

Sponsored by Weber Scientific

International Leadership Award — Plaque, \$1,000 Honorarium and Reimbursement to attend IAFP 2006

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.

Sponsored by Cargill, Inc.

Food Safety Innovation Award — Plaque and \$2,500 Honorarium

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.

Sponsored by 3M Microbiology

FPA Food Safety Award — Plaque and \$3,000 Honorarium

This Award alternates between individuals and groups or organizations. In 2006, 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.

Sponsored by Food Products Association



NEW MEMBERS

AUSTRALIA

Julian M. Cox
The University of New South Wales
Sydney, New South Wales

BRAZIL

Eduardo Abecia
Madasa
São Paulo

Natalia Rubia De Souza Lima
Det Norsk Veritas
Rio De Janeiro

Janine P.L. Silva
Universidade De São Paulo
São Paulo

CANADA

Margaret A. Brady
Maple Leaf Fresh Foods
Burlington, Ontario

Susan L. Burkman
GMP Securities Ltd.
Montreal, Ontario

Frederick M. Jamieson
Canadian Food Inspection Agency
Ottawa, Ontario

Carole C. Tranchant
University of Moncton
Moncton, New Brunswick

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3M Microbiology
Shanghai

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bioMérieux
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Pierre Louis Thiney
bioMérieux
Marcy L'Etoile

Pascal Vallejo
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Baroda, Gujarat

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Institute for Food Microbiology
Nesher

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Naoko Horikoshi
Prima Meat Packers, Ltd.
Tsuchiura-shi, Ibaraki-ken

Kazuko Takeshita
Prima Meat Packers, Ltd.
Tsuchiura-shi, Ibaraki-ken

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Green Oasis for Agriculture
Contracting Est.
Safat

MEXICO

Maria Teresa Jimenez Castro
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Hanny University—Korea
Daegu

Ji Hyun Lee
Yonsei University
Seoul

Jin Woon Yang
Daegu University
Daegu

UNITED KINGDOM

Colin Green
Universal Sensors Ltd.
Ickleton, Cambridge

David C. Lloyd
University of Wales Institute—Cardiff
Cardiff, South Wales

Adrian C. Peters
University of Wales Institute—Cardiff
Cardiff, South Wales

Duncan Purvis
Universal Sensors Ltd.
Ickleton, Cambridge

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Tucson

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Ecolab
Searcy

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University of Arkansas
Fayetteville

Yue Ma
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University of Arkansas
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NEW MEMBERS

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Kansas State University
Junction City

MARYLAND

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Detroit

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3M Microbiology
St. Paul

Steven J. Brennecke
Malt-O-Meal Co.
Northfield

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3M Microbiology
St. Paul

Alessandra Chiareli
3M Microbiology
St. Paul

David W. Harlan
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Minneapolis

Mark Hunter
3M Microbiology
St. Paul

Sam Mitra
3M Microbiology
St. Paul

Perianan Periakaruppan
University of Minnesota
Plymouth

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3M Microbiology
St. Paul

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T & P Testing Service
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Unilever NA
Englewood Cliffs

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Gourmet Dining
South Orange

Janice McFarland
EduNeering
Princeton

James P. Peters
Alpharma
Fort Lee

J. David Weidner
EHA Consulting Group, Inc.
Hamilton Square

Joseph Zindulis
Hamilton Square



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Las Cruces

Frederick Gentry
New Mexico Dept. of Health
Albuquerque

Chitra Wendakoon
New Mexico State University
Las Cruces

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NYS Dept. of Agriculture & Markets
Albany

Kyle Sasahara
FreshDirect
Elmhurst

Roslyn Stone
Corporate Wellness, Inc.
Pound Ridge

Kennedy Wilson
NYS DAM
Bethany

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Syngenta Crop Protection, Inc.
Greensboro

NORTH DAKOTA

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North Dakota State University
Fargo

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Solon

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Stephanie Smith
Ohio State University
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Knoxville

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WISCONSIN

Nancy A. Kexel
Cherney Microbiological Services
Fish Creek

UPDATES

Fisher Appointed New Executive Director of ILSI North America

Robert W. Fisher, Ph.D., has been appointed executive director of the North American branch of the International Life Sciences (ILSI North America). In this capacity, Dr. Fisher will work closely with ILSI North America members, trustees, science advisors, and staff to enhance the organization's programs and the impact of its scientific output.

Dr. Fisher, who joined the ILSI North America on August 15, brings a strong combination of scientific expertise and business skills to his position. Most recently, he spent four years at John I. Haas, Inc., where he served as a corporate officer, senior vice president of new business development and technology, and president of BetaTec Products, Inc.

Previously, Dr. Fisher spent 19 years at Campbell Soup Company where he began his career in product and technology development. He ultimately moved up to vice president of research and development and became part of the executive management team and Campbell's senior leadership team. Dr. Fisher has led teams and businesses in Australia, Canada, Germany, Hong Kong, and the United Kingdom and so brings important insights on the international environment to the role of executive director.

In addition to Dr. Fisher's industry experience, he has been a visiting lecturer at both Rutgers and Temple Universities and he continues to hold an adjunct faculty position at Camden County College, Blackwood, NJ, where he lectures on nutrition. He received a Ph.D., M. Phil., and M.S. in food science from Rutgers University and a B.S. in biology from

Ursinus College. Dr. Fisher is a professional member of the Institute of Food Technologists and a member of Sigma Xi.

Jenny Scott Named Vice President of Food Safety Programs for Food Products Association

Jenny Scott has been named vice president of food safety programs for the Food Products Association (FPA). In her new position, she will direct the Association's food safety activities on issues including food inspections, HACCP and crisis management. "This appointment will strengthen our ability to provide optimum support for our members while enhancing our position as the premier science-based food trade association," said Dr. Craig Henry, FPA's senior vice president of scientific and regulatory affairs and chief science officer. Since she joined FPA's staff in 1980, Ms. Scott has been actively involved in the Association's food safety activities on issues including microbiology, food inspections, HACCP and crisis management.

Ms. Scott previously served as FPA's senior director of food safety programs. She is a member of the National Advisory Committee on Microbiological Criteria for Food, where she was recently re-appointed to a second term. She has published numerous research papers and book chapters in the areas of microbial food safety and food processing. She also is active in professional associations such as the American Society for Microbiology, the Institute of Food Technologists and the International Association for Food Protection, where she was president in 2000-2001.

Jeffery Lucas Joins Corporate Technical Services Division of Silliker, Inc.

Silliker, Inc. has announced the appointment of Jeffery L. Lucas as a technical director at its corporate headquarters in Homewood, IL. In his new role, Mr. Lucas will provide auditing, consulting and training services to clients of the food testing and consulting company.

A member of the Silliker organization since 1997, Mr. Lucas most recently served as laboratory director of its Grand Prairie, TX testing facility. A graduate of Auburn University with a bachelor's degree in animal and dairy science, Mr. Lucas possesses over two decades of diverse experience in the meat, poultry, and food testing industries. He is currently pursuing a master's degree in agriculture from Texas A&M University.

Judy Black Named Technical Director of The Steritech Group, Inc.

Judy Black, a pest management expert with nearly 20 years of experience, has been named technical director of the pest prevention division of The Steritech Group, Inc. An 11-year veteran of the company, Ms. Black has long been a proponent of Steritech's innovative EcoSensitive® pest prevention system and is a well-known advocate for the structural pest management industry.

Ms. Black will provide direction and oversight for the company's technical committee, which plays a critical role in the research, development and implementation of new technologies in the company. She will also continue to represent Steritech in the industry through her work with various committees and associations.

UPDATES

Ms. Black began her career in pest management with Terminix International before joining Steritech in 1994. She swiftly moved through the service ranks in Steritech to become the regional technical manager for the Mid-Atlantic region in 1995. In the spring of 2000, Ms. Black relocated to Colorado where she served a dual role as regional technical manager for the firm's Pacific region and operations manager for its Pacific Northwest branch. She was promoted to general manager a year later.

A board-certified entomologist and member of Pi Chi Omega, the national fraternal pest management organization, Ms. Black earned a master's of science degree in entomology and a bachelor's degree in agriculture with an emphasis in environmental protection, both from West Virginia University. In addition, she is credentialed by NEHA as a certified food safety professional.

Johanns Announces Appointment of Dr. Curt Mann as Deputy Under Secretary for Food Safety

Agriculture Secretary Mike Johanns has announced the appointment of Dr. Curt J. Mann to serve as Deputy Under Secretary for Food Safety. "Curt Mann brings a wealth of experience, knowledge and dedication to food security, food safety and bio-defense that will assist our efforts to protect the public health from contamination of meat, poultry and egg products," said Johanns. "We are glad to welcome him back to USDA to serve in this important role and continue our commitment to safeguarding the public health."

Dr. Mann began his new duties at USDA August 22nd. Previously he served with the biological and chemical defense policy directorate of the White House Homeland

Security Council as the director of food, agriculture, and water security. In this role, he was responsible for planning, developing, formulating, evaluating, and advising presidential-led programs related to bio-defense of agriculture, food and water systems. Dr. Mann was instrumental in the development and drafting of Homeland Security Presidential Directive-9 "Defense of United States Agriculture and Food" signed by the President in January of 2004.

Prior to his White House service, Dr. Mann was a special assistant to the Secretary of Agriculture where he focused on coordinating the Department's role in Homeland Security following the events of September 11th. Dr. Mann has also practiced as a clinical veterinarian, served as a professional staff member to the US House of Representatives Committee on Agriculture and as executive director of the Association of American Veterinary Medical Colleges.

Dr. Mann studied microbiology at Montana State University and the University of Wyoming. He received his veterinarian degree from Kansas State University and has practiced as a large and small animal clinical veterinarian.

Key Technology Hires John Boutsikaris as Senior Vice President of Sales and Marketing

Key Technology, Inc. announces the appointment of John Boutsikaris as senior vice president of sales and marketing. Mr. Boutsikaris is responsible for leading sales and marketing activities for Key's automated inspection, specialized conveying and product preparation systems.

Mr. Boutsikaris brings more than 30 years of sales and marketing experience to his position at Key. Most recently, he was executive vice president of worldwide sales and

marketing for Pemstar Corporation. Previously, he spent 27 years with Agilent Technologies/Hewlett-Packard in a variety of sales and channel management roles.

FKI Logistex® Appoints Ed Zahler as Director of Projects and Gary Savarese as Project Manager

FKI Logistex® has appointed Ed Zahler as director of projects for its Atlanta regional office. He will now manage the project team responsible for integrated system sales featuring FKI Logistex hybrid aisle-changing cranes.

A company veteran with 30 years of material handling automation experience at FKI Logistex, Mr. Zahler has held a variety of engineering and project management staff and management positions with the company since his hire in 1974. He brings a broad range of systems integration expertise to his new post, which is effective immediately. Mr. Zahler holds a bachelor of aerospace engineering from the Georgia Institute of Technology.

Gary Savarese was also appointed as project manager in the Northeast regional office. An industry veteran with 25 years of material handling and packaging experience, Mr. Savarese will specialize in palletizing and conveyor systems for the food and beverage industry.

Mr. Savarese's professional experience includes several years as a material handling consultant and as a project engineer for Mott's, as well as 19 years as a senior engineer for Best Foods, now a part of Unilever. He holds a bachelor of engineering, mechanical engineering from the Stevens Institute of Technology and a master's in business administration in marketing from Fairleigh Dickinson University.

USDA, FDA, DHS and FBI Join States and Private Industry to Protect Nation's Food and Agriculture Supply from Agroterrorism

The US Department of Agriculture (USDA), Department of Health and Human Services' Food and Drug Administration (FDA), Department of Homeland Security (DHS) and the Federal Bureau of Investigation (FBI) have announced a new collaboration with states and private industry to protect the nation's food supply from terrorist threats. "Ensuring the safety of our nation's food supply is a top priority for President Bush and USDA," said Agriculture Secretary Mike Johanns. "This partnership demonstrates our commitment as government and the private sector work together to protect our agricultural commodities from terrorism. We look forward to working with our partners."

The Strategic Partnership Program Agroterrorism (SPPA) Initiative supports President Bush's requirements directing the government to work closely with states and industry to secure the nation's food supply. Announced at the Food and Agriculture Sector Coordinating Council meeting, four pilot visits will be conducted in September and October. The purpose of these visits is to assess and identify vulnerabilities in the agriculture and food sectors.

"As one of the lead federal agencies charged with protecting our nation's food supply, the FDA fully supports this initiative encour-

aging a closer working relationship with our partners in federal and state government, as well as the private sector to make the nation's food even safer," said FDA Commissioner Dr. Lester Crawford. "This partnership brings together all of the organizations that have the best knowledge and abilities in safeguarding the food we eat starting from the farm all the way to our kitchen tables."

Over the next year, teams of federal and state officials will travel to all 50 states to meet with all sectors of the food chain. Together, the federal, state and private industry partners will discuss security issues from farm-to-table and consider ways to better protect our food supply. "We are pleased to participate in this important initiative to enhance the overall security of our nation's food and agricultural infrastructure," said Robert Stephan, assistant secretary for infrastructure protection, US Department of Homeland Security. "The health of our citizens and our economy depend on our ability to conduct assessments, validate field information and provide guidance that can be shared with our federal, state and local, tribal as well as private sector partners."

These visits will help the federal partners better consider how states and industry can protect the food supply, gain more information about the food industry's protection needs and assist government and private industry in refining its efforts including research and development goals. This effort is the second major joint initiative for the federal partners. In May 2005, FBI, with the support of DHS, USDA and FDA hosted the first ever International

Symposium for Agrosecurity in Kansas City, MO. Additional information about agrosecurity can be found on USDA's Web site at <http://www.usda.gov/homelandsecurity>; the FDA Web site at www.fda.gov/oc/opacom/hottopics/bioterrorism.html; and the DHS Web site at www.dhs.gov/dhspublic/display?theme=43&content=3802.

Study Reveals a Way Disease Bacteria Sense Antimicrobials and Initiate a Counter-Defense

Many living things, from fruit flies to people, naturally produce disease-fighting chemicals, called antimicrobial peptides, to kill harmful bacteria. In a counter move, some disease-causing bacteria have evolved microbial detectors. The bacteria sense the presence of antimicrobial peptides as a warning signal. The alarm sets off a reaction inside the bacteria to avoid destruction.

University of Washington (UW) and McGill researchers have revealed a molecular mechanism whereby bacteria can recognize tiny antimicrobial peptide molecules, then respond by becoming more virulent. Their studies were done on the bacterium *Salmonella Typhimurium*. The findings were published in the Aug. 12 edition of the journal *Cell*.

Salmonella Typhimurium can contaminate meats such as beef, pork, and chicken, as well as cereals and other foods, and cause severe intestinal illness. Certain strains of the bacteria are difficult to treat, and are behind the increase of salmonellosis in people. Some food science



institutes anticipate that virulent strains of *Salmonella* will become more common throughout the food chain. Learning how this sometimes deadly organism fights back against the immune system may lead to treatments that get around bacterial resistance. Work in this area may also suggest ways other disease-causing gram-negative bacteria maintain a stronghold in the midst of the body's attempts to get rid of them.

Strangely enough, the same molecules that the body sends out to help destroy *Salmonella* inadvertently launch bacterial defenses. It is as if missiles armed, rather than demolished, the target. The body's antimicrobial peptides bind to an enzyme, PhoQ, which acts as a watchtower and interceptor near the surface of bacterial cell membranes. The peptide binding activates PhoQ, which sets off a cascade of signals. The signals turn on a large set of bacterial genes. Some of the genes are responsible for products that fortify the bacterial cell surface and protect the bacteria from being killed.

The research was done in the UW laboratory of Dr. Samuel Miller, professor of microbiology and of medicine, Division of Infectious Diseases. The Miller Lab explores the molecular aspects of bacteria-induced illness, and how disease-causing bacteria interact with cells in the host they have infected, and adapt to environments inside the body, such as the airway.

The lead author of the Aug. 12 *Cell* article was Dr. Martin Bader, a UW senior fellow in microbiology and genome sciences. The research team, under the direction of Miller, included Dr. Sarah Sanowar of the Department of Microbiology and Immunology at McGill University; Dr. Margaret Daley, a UW senior fellow in biochemistry; Anna

Schneider, a UW undergraduate majoring in mathematics and biochemistry; Uhn Soo Cho, a graduate student in biological structure; Dr. Wenqing Xu, assistant professor of biological structure; Dr. Rachel Klevit, professor of biochemistry; and Dr. Herve Le Moual on the McGill Faculty of Dentistry. Grants from the National Institute of Allergy and Infectious Diseases and from the Canadian Institutes of Health Research funded the study.

Study Reveals Good Level of Food Hygiene Knowledge and Practices in Restaurants: But Cautions with Room for Improvement

The results of a new study titled, "Food Safety Knowledge, Microbiology and Refrigeration Temperatures in Restaurant Kitchens in the Island of Ireland" found that, in general, food handling practices in the restaurants were good. The research was commissioned by safefood, the Food Safety Promotion Board, and conducted in 2002 by Teagasc and the University of Ulster. It involved a total of 200 restaurants throughout the island of Ireland. In general, food handling practices in the restaurants were good. There were some deficiencies observed and areas where improvements could be made were identified. The most frequent shortcomings were the potential for cross contamination with dishcloths, inadequate systems for inspection of deliveries and some structural and physical hygiene deficiencies.

Almost all of the establishments surveyed (99%) had a designated handwashing sink(s) with hot water and soap. Among kitchen managers there was a high level of knowledge

of correct hot holding procedures for food. 92% knew that the current minimum temperature recommendation for food held in the bain marie was 63°C and 74% checked the temperature of food. The majority of kitchen managers (97%) knew the recommended chill storage temperature and 92% reported having a thermometer in the refrigerator. A temperature survey of refrigerators showed that they were operating within the recommended temperature range. Food delivery inspection systems varied considerably, however. Only 42% of kitchen managers reported that every delivery was checked. Food delivery inspections should be comprehensive and include inspection of vehicles, personnel, "best before" and "use by" dates, packaging and temperature of the product.

Visual inspection and experience was used in the majority of restaurants to check that meat was adequately cooked. Less than half of restaurants (40%) reported using a temperature probe. The use of a temperature probe should be used in restaurants for checking that specific meats and poultry are properly cooked.

The study indicates that restaurants are implementing systems for the provision of safe food. The study highlighted that there is a good level of knowledge of food safety issues among restaurant staff and good practices generally prevail. The findings will enable proprietors, trainers and inspectors to target their resources at areas where practice still needs to be improved.

Thomas Quigley, director science and technical, safefood said, "In a recent population-based study, over 70% of respondents suspected food consumed from restaurants, cafés, takeaways, canteens and pubs



as the reason for their illness, so we would urge the catering industry to be vigilant about food safety in the kitchen and comply with the relevant legislation. Practical measures like the use of disposable dishcloths and the implementation of HACCP systems will go a long way to alleviate the burden of acute gastroenteritis in Ireland."

Declan Bolton, senior research officer, Teagasc said, "In analyzing the findings, we have compiled a number of key recommendations which, if followed, will lead to considerable improvements in food safety knowledge and practices in restaurant kitchens. These recommendations have been set out as a guideline to the food service sector and are available from Teagasc."

A second report which was undertaken to examine the level of knowledge about food safety and food hygiene amongst over 1,000 householders on the island of Ireland was also officially released. Interestingly, this study revealed that householders who claimed that they, or a member of their family had suffered food poisoning in the previous 12 months, had higher bacterial counts and incidence of pathogens in their refrigerators.

Full copies of both reports are available on www.safefoodonline.com.

FDA Launches New Education Campaign: Food Safety for Moms-to-Be

As part of the US Food and Drug Administration's (FDA's) ongoing commitment to educate expectant mothers about the potential risks of foodborne illness, the agency is launching a new bi-lingual public health education campaign entitled Food Safety for Moms-to-Be. This broad educat-

ion campaign in English and Spanish features a new comprehensive Web site (<http://www.cfsan.fda.gov/pregnancy.html>) and an educator's kit for healthcare professionals designed to educate pregnant and soon-to-be pregnant women about the food safety risks of *Listeria monocytogenes*, methylmercury, and toxoplasma.

The easily-navigated Web site offers food safety information for women before, during, and after pregnancy, including timely, seasonal articles on food safety and health tips. The site also offers women's health educators and medical professionals an educational online tool kit with: Downloadable Educator's Resource Guide; Downloadable PowerPoint presentation; Downloadable and printable handouts, poster, and flyer, and Video Links to other FDA and CDC sites on folic acid, food safety, baby food preparation and storage, etc. In addition to addressing the food safety risks of *Listeria*, methylmercury, and toxoplasma, the kits also provide information for expecting mothers on basic preventive steps known as: Clean, Separate, Cook, and Chill, to reduce the spread of potentially harmful germs. This approach is based on the premise that educating pregnant and soon-to-be pregnant women about safe food selection, storage, preparation, and cleanliness can reduce the opportunity for foodborne illness to occur.

JIFSAN Announces New Initiative for Training Food Safety in Exporting Nations

The Joint Institute for Food Safety and Applied Nutrition (JIFSAN) of the University of Maryland has unveiled a new food safety training program designed to improve the quality of

food entering the United States. The program will be implemented by the new JohnsonDiversey International Food Safety Initiative announced at the annual conference of the International Association for Food Protection. "Even though food safety awareness has increased around the world, we continue to hear news of disease outbreaks and contaminated food," said Dr. Robert E. Brackett, director of the US Food and Drug Administration's Center for Food Safety and Applied Nutrition (CFSAN). "Producers and manufacturers recognize that food safety is a crucial issue and critical to promoting international trade as food export, particularly to the US, has dramatically increased. We must do all we can to ensure food safety."

The US imports more than 12 percent or \$58 billion in food from outside its borders. More than 85 percent of all fresh and frozen seafood consumed in the US is imported and will rise to more than 90 percent in 2005. South and Central America exports to the US more than 8 million tons, about 20 percent of all fruits and vegetables. "With food exportation occurring around the globe, improving food safety from the beginning of the supply chain is critical," said Dr. David Lineback, director of JIFSAN. "The most effective way to protect food and avoid importation of contaminated food is to educate food providers about the best practices for safe-food handling right in their own countries."

By establishing the Johnson-Diversey International Food Safety Initiative, JIFSAN will expand its current food-safety training program in countries exporting food to the US. Training sessions will target trainers who will in turn train food producers, exporters and regulators, as well as academics and educators. A ground-breaking



training program is being developed for the seafood industry and will be held in Asia next year. "This initiative will create a linkage between JIFSAN and the food industry promoting best practices in food safety in participating foreign countries," said Serban Teodoresco, director of JohnsonDiversey Consulting. "The result will be better coordination and more effective food safety practices in exporting countries."

JDIFSI is designed to identify and train local trainers in the food industry in exporting countries. Using the knowledge and materials provided in food protection and safe handling, trainers will go on to train agricultural and aquacultural workers, food processors, exporters, regulators, educators and more.

JDIFSI brings together three key components of the food-safety equation – science, regulation, and application. Science and regulation are represented by JIFSAN (a partnership between the University of Maryland and the US Food and Drug Administration).

ISU Seeks to Head Off *Salmonella's* Multiple Resistance

If it wasn't already enough that pork producers must contend with *Salmonella* contamination, it turns out that the problem is a bit deeper. Antibiotics can be useful in fighting the prevalence of *Salmonella* in swine, but the microorganism can find ways to resist. That's the situation when *Salmonella* congregates in clusters known as genomic islands that become resistant to multiple drugs. Food Safety Consortium researchers at Iowa State University are exploring ways to detect the problem so it can be removed.

"If resistance is tied to this genomic island in an organism, there's a greater chance it will be passed to other organisms," said D.L. (Hank) Harris, an ISU animal science professor. "Detecting it in pigs has been a concern in various countries." Harris and assistant scientist Stephen Gaul are zeroing in on DT-104, a serotype of *Salmonella* known to have a particular genomic island that contains the gene clusters that are resistant to antibiotics. Harris and Gaul want to know if other *Salmonella* serotypes – groups of closely related microorganisms – have that same genomic island. "Thus far, we're finding that they don't," Harris said. "So it all goes back to the issue of drugs in animal feeds. The growing dogma is that by using drugs in animal feeds, we're going to increase the chances of having DT-104-type organisms with this genomic island. That's one theory, but there hasn't been much substantiation of that." Gaul has gene probes set up to investigate whether the troublesome genomic island is present in *Salmonella* isolates that are resistant to multiple drugs. One angle to beware, Harris noted, is that there are other microorganisms that appear to match DT-104's level of resistance to antibiotics, "but we just don't know if they have this nasty genomic island in them or not."

DT-104 is a problem in its own right. The Centers for Disease Control said it has emerged during the last decade as a global health problem because of its association with animal and human disease. Multidrug-resistant strains of DT-104 were first identified in exotic birds and have since spread to poultry, pigs and sheep.

If the genomic island is found in other serotypes during ISU's research, testing will need to determine if its spread to more

serotypes would be likely. In that event, Gaul said, careful eradication of *Salmonella* and removal of pressure from antibiotics for awhile should remove the multidrug-resistant bacteria.

A longer-term phase of the research would compare the swine herds that use antibiotics in their animal feed against those not using the antibiotics and test them to see if any genomic islands are present among *Salmonella*. Studies would also aim to determine what limits there should be on using antibiotics in animal feed as a growth promoter. "As an example, if the cost of using antibiotics in feed is more than the additional price of the weight gain from the antibiotics, antibiotics should not be used, sort of an economic threshold," Gaul said.

New Bacteria Screening Technique May Aid Food Safety

Work that has implications for the food safety industry, scientists, and environmental and public health agencies, University of Massachusetts Amherst researchers have developed a molecular-based method that distinguishes live bacterial cells from dead ones. The study was published online June 1 in the *Journal of Microbiological Methods*.

Developed by microbiologist Robert Levin, food science, and doctoral student Shishan Wang, the new method adds a level of specificity to DNA detection and could be applied to a suite of pathogens, perhaps preventing massive recalls of meat carrying *E. coli*, or enhancing tests that check for contaminants in drinking water.

"You aren't only protecting the consumer with such tests, you could save thousands of dollars," says Levin. The research is supported by



a special seafood safety grant from the US Department of Agriculture.

The new method takes advantage of a technique called polymerase chain reaction (PCR), which scientists use to make lots of copies of a small, specific stretch of DNA. PCR generates large quantities of DNA from tiny samples, and is used widely by scientists studying everything from birds to humans to bacteria.

Levin and Wang have used PCR to screen seafood for the DNA of *Vibrio vulnificus*, a disease-causing bacterium from the same family as those that cause cholera. But PCR just copies the designated DNA, it doesn't indicate whether the DNA came from a cell that was dead or alive, critical information when testing food or water for organisms that make people sick. The first step of PCR is heating the sample that contains the DNA of interest. At the right temperature, the two strands that make up a DNA molecule separate, and only then can they be copied. But Levin and Wang weren't interested in copying all the *V. vulnificus* DNA in their sample, just the DNA from bacteria that were alive.

So the researchers treated their bacteria samples with ethidium bromide monoazide (EMA), a chemical that winds its way in between the strands and building blocks of a DNA molecule. EMA will insert itself into any DNA it finds, but it can't get through the cell membranes of healthy, living bacteria. However, EMA can easily get to the DNA of a dead or dying bacterium with a damaged cell membrane.

After dosing the bacteria with EMA, the researchers zapped their samples with high-intensity visible light causing the EMA to form strong, cross-linking bonds with the DNA it's tangled up in. These bonds prevent the DNA molecules from separating, so they can't be copied

during PCR. Only DNA from live cells will be copied, alerting the testers to the presence of living bacteria.

"Once you've determined the optimum concentrations of EMA you can completely inhibit amplification of DNA from dead cells," says Levin. The scientists have worked out the protocols for testing for *V. vulnificus*, and with minor adjustments the method could be applied to other disease-causing critters. "This could take PCR one giant step forward," says Levin.

Secrets of Successful Pathogen Revealed

Two groups of scientists have uncovered key secrets of success of a major pathogen responsible for recent food poisoning outbreaks. The ability of *Salmonella* bacteria to act quickly, both on an evolutionary timescale and during the early minutes of infection, has been investigated in detail for the first time. This month more than 1,700 cases of *Salmonella* food poisoning from chicken were reported in Spain and earlier outbreaks in Europe have been linked to lettuce and eggs. "For bacteria to do well, they have to react very fast, and we have shown *Salmonella* to be remarkably dynamic," says Professor Jay Hinton of the UK's Institute of Food Research (IFR).

In a study published by IFR and Sweden's Uppsala University, scientists found that *Salmonella* can evolve at a surprisingly rapid rate by jettisoning superfluous DNA.

One-hundred million years ago *Salmonella* evolved from *E. coli* bacteria that lived freely in the environment. *Salmonella* developed the ability to parasitize animals by losing many genes and gaining new ones from other bacteria.

Using DNA microarrays to analyze the results of "experimental evolution," the scientists tracked *Salmonella* in real time over 6,750 generations to make the first estimation of the rate of gene loss for any bacterium. Project leader Professor Dan Andersson says, "Nearly one quarter of the bacteria's genes could be lost in only 50,000 years. This was a surprise to us as it had been thought this process would take many millions of years."

In separate research, Professor Hinton of IFR and Professor John Ladbury of UCL (University College London) investigated the response of *Salmonella* to body temperature. This had not been studied before.

"Bacteria are efficient organisms," says Professor Hinton. "We found that at low temperatures *Salmonella* switches off genes required for infection and switches them on once inside a warm animal body. It does not want to expend energy needlessly when waiting to be eaten on a lettuce leaf." The team discovered the thermal switch, a protein called H-NS, and found that it allows 532 genes to be activated within minutes. These genes code for functions essential for infection such as the ability to swim and to infect gut cells. Professor Ladbury believes that as the temperature rises, the protein structure which compacts *Salmonella* DNA changes shape, allowing gene expression to start.

"These findings help to explain the success of this pathogen in infecting so many different species of animals and reptiles, as well as man," says Professor Hinton. *Salmonella* kills about 1 million people worldwide every year, and now kills more people in the West than any other foodborne pathogen.



Study Highlights Effectiveness of Alcohol Gel Sanitizers

Handwashing research recently completed in the Department of Food Science and Human Nutrition at Colorado State University surveyed public beliefs about available hand cleansers and their effectiveness in reducing bacteria from hands. In addition, a hand-washing experiment was conducted to determine the effectiveness of three different hand cleansers commonly used in the home.

Consumer Behavior Study: A 6-item behavioral questionnaire was presented to 100 participants to determine the rationale and knowledge consumers use when selecting specific hand soaps for the home. Consumer responses showed an overwhelming endorsement for the use of antibacterial soaps in the home with little awareness or understanding of the value of alcohol gel hand sanitizers as anti-

microbial agents. Most participants believed regular hand soaps were not as effective as antibacterial soaps in reducing bacteria on hands. Researchers also found that regular liquid hand soaps currently have little shelf space on supermarket shelves.

Hand-washing Experiment: Liquid hand soap, antibacterial liquid hand soap and an alcohol-gel sanitizer were evaluated for their effectiveness in reducing live bacteria on hands using a 20-second hand-washing procedure. Participants (n= 90) were given step-by-step instructions on how to wash their hands in the study. To better illustrate differences between the three hand agents used, participants were instructed to pat-dry their hands with a paper towel rather than use a rubbing action which might cause further mechanical loosening of bacteria. The alcohol gel stations were set up in a similar manner as the hand soap stations, but water was not used to wet or rinse hands. Participants were told to put the alcohol gel on their

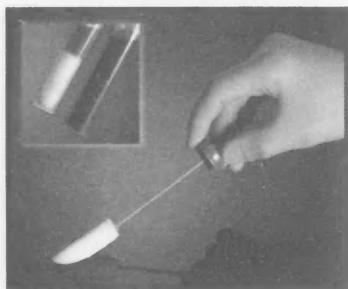
hands, then rub them together for 20 seconds to disperse the alcohol gel evenly on the hands and wrists and to allow the alcohol gel to dry.

While bacterial reductions were seen using all three hand cleansers, significantly greater reductions ($P<0.05$) were seen using the alcohol sanitizing gel than the two liquid hand soaps. The liquid hand soap and antibacterial hand soap did not differ in their effectiveness in reducing bacterial counts ($P>0.05$).

Consumers are not well informed about the use and efficacy of hand soaps and are not aware that they may be able to reduce hand bacteria as effectively with plain soap and water as with antibacterial soap. Under the conditions of this study, the alcohol gel was more effective than either the antibacterial or regular hand cleansers in destroying bacteria; however, this product must be used on debris-free hands. All three products used in this study reduced live bacteria on hands, which is the goal of a successful hand hygiene regime.

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Hardy Diagnostics

PDX-LIB *Listeria*: The Easiest *Listeria* Test Available from Hardy Diagnostics

Presumptive results are available for the most common *Listeria* spp. within 30 hours. *Listeria* Indicator Broth (PDX-LIB) is intended to be used in the food processing environment on food contact surfaces to detect the presence of *Listeria* species. Simply swab the surface, add the *Listeria* Indicator Broth to the sample and incubate. No complicated sub-culturing, or specimen transfers required, thus reducing any chance of cross contamination.

A color change from yellow to brown or black is considered presumptive positive. The *Listeria* Indicator Broth contains a patented formula of antibiotics, growth enhancers and color-changing compounds. The antibiotics function synergistically to inhibit most non-*Listeria* microorganisms. Growth enhancers provide recovery nutrients to support the growth of sublethally injured *Listeria*. Indicator compounds will turn the broth from yellow to black by utilizing the β -glucosidase enzyme pro-

duced by *Listeria* species. A brown or black color after 30 hours at 37°C indicates a presumptive positive test for *Listeria* spp. The PDX-LIB media has recently earned AOAC approval.

Compared to UVM and BLEB, the new PDB-LIB provides equivalent or superior recovery and faster detection as low as 10–50 heat injured *Listeria monocytogenes* organisms per mL within 24 to 30 hours of incubation. This testing method is 98% sensitive and 99% specific, and provides comparable results to the USDA methods. The PDX-LIB can be used as an economical pre-screen for environmental *Listeria* instead of performing expensive PCR or other more complicated assays on every sample.

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Santa Maria, CA
www.hardydiagnostics.com

DuPont Qualicon New BAX System Assay Helps Reduce Public Health Risk Associated with *Campylobacter*

DuPont Qualicon has released a new BAX® system assay for poultry rinses that detects both *Campylobacter jejuni* and *Campylobacter coli*, the strains most frequently implicated in human illness. Traditional methods for detecting *Campylobacter* in meat and poultry are labor intensive, requiring about five days to determine results. By contrast, the automated BAX® system can detect as few as 10 cells of *Campylobacter* in a 30 ml sample after just 24 hours enrichment.

“BAX® systems are already at work in labs around the globe, providing the best science-based tool for detecting microbial threats to the food supply,” said Kevin Huttman, president of DuPont Qualicon. “As the international community strives to reduce *Campylobacter* all along the food chain, the BAX® system will be an integral part of the solution.” *Campylobacter* are commonly found in the intestinal tracts of animals and some humans without causing symptoms of disease. Infection occurs when people eat under-cooked meat or poultry, raw milk or untreated water containing the live bacteria. Consuming as few as 500 *Campylobacter* cells can cause illness.

A leading cause of gastroenteritis in many countries, *Campylobacter* are the most frequently isolated bacteria from persons with diarrhea. An estimated 2.4 million cases of food-borne infection from these bacteria occur annually in the United States. Although fatalities are rare, serious complications of *Campylobacteriosis* can include reactive arthritis and Guillan-Barré syndrome, an unusual type of paralysis. Food processing companies around the world rely on the BAX® system to detect pathogens or other organisms in raw ingredients, finished products and environmental samples. The automated system uses leading-edge technology, including polymerase chain reaction (PCR) assays, tableted reagents and optimized media, to detect *Salmonella*, *Listeria monocytogenes*, *Listeria* species, *E. coli* O157:H7 and *Enterobacter sakazakii*. With certifications and regulatory approvals in the Americas, Asia and Europe, the BAX® system is recog-

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

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MicroPhage Demonstrates Its New Platform for Rapid Detection of *Salmonella* sp.

MicroPhage, Inc. announces its *Salmonella* sp. demonstration platform. The company's technology of bacteriophage amplification which allows for reduced incubation times to achieve high concentrations of surrogate signal, reducing the amount of time required for sample incubation.

The *Salmonella* assay has to date been demonstrated to detect 10 CFU/25 g food samples in 6 hours using a simple immunoassay detector, implying absolute detection (1 CFU/25 g) in less than 10 hours. These bacteriophage, which drive specificity of the assay, have been shown to cover over 96% of the *Salmonella* strains tested to date. Its current cross-reactivity is "in the single digits" reported MicroPhage scientist Jon C. Rees, Ph.D.

"Eighty-three percent of surveyed food plants have cited faster time to results as the improvement most desired. This plays well to MicroPhage's delivering an amplified signal to partners' detection platforms. We believe this could halve the current time to results required by molecular and immunoassay methods, without incurring additional training or end user effort," said marketing manager Scott Conlin.

The company is currently involved in further improving its assay while entertaining partnership licensing offers from food protection indus-

try leaders. Other products in development include *Staphylococcus aureus* and *Escherichia coli*.

MicroPhage, Inc.
303.339.1410
Longmont, CO
www.microphage.com

Ecolab Launches Eco-Wipe™ FCS Single Use, Sanitizing Wipe for Food Contact Surfaces

Ecolab Inc. has announced the availability of Eco-Wipe™ FCS, an EPA-registered, pre-moistened, single use, sanitizing wipe for use on hard, non-porous food contact surfaces in the dairy, food and beverage processing industries.

Eco-Wipe FCS has proven 99.999% effective against *Staphylococcus aureus* (ATCC #6538), *Escherichia coli* (ATCC #11229), and *Shigella boydi* (ATCC #9207) in 60 s with a consistent 175 ppm sanitizing solution. This product is an excellent choice for sanitizing dry areas and areas of food processing facilities where water use is limited. It is moisture-controlled and quick drying.

Eco-Wipe FCS is applicable to a wide range of uses, from food processing equipment surfaces, work stations and labs, to environmental surfaces. It is an excellent choice for spot sanitizing of hard surface areas throughout food processing plants.

"Eco-Wipe FCS represents a new line of defense in the Ecolab food safety intervention program offered to dairy, food and beverage processors. A ready-to-use sanitizing wipe for food contact surfaces provides our customers with a versatile tool that has a broad range of applications," says Tom Arata, vice president of marketing and antimicrobial development.

Eco-Wipe FCS is cost effective, convenient and easy to use – only pennies per use, and no mixing, measuring or rinsing is required.

Ecolab Inc.
651.293.2549
St. Paul, MN
www.ecolab.com

Grace Vydac's Venture™ Line: New Silica-based Immunoaffinity Columns for Selective Sample Preparation of Food Samples Prior to Analysis of Food Quality

Sample preparation procedures for the analysis of minor contaminants in extracts from food samples are generally laborious and often involve several steps prior to analysis. For this reason, sample preparation by immunoaffinity chromatography is recommended. Immunoaffinity chromatography is recognized as a powerful technique to quickly and selectively isolate and concentrate minor analytes from complex mixtures. Its selectivity is derived from the use of a suitable antibody immobilized on a solid phase support.

When immunoaffinity chromatography is combined with HPLC, the selectivity of the analytical method is enhanced, while run-time and use of disposables are reduced. By using wide-pore silica gel treated with Grace's surface passivation technology as a support for the immobilization of the antibody, an immunoaffinity column was derived that can be coupled in-line with an analytical column. As a result, fully automated sample preparation and analysis is feasible leading to an increase in reproducibility, sensitivity and sample-throughout.

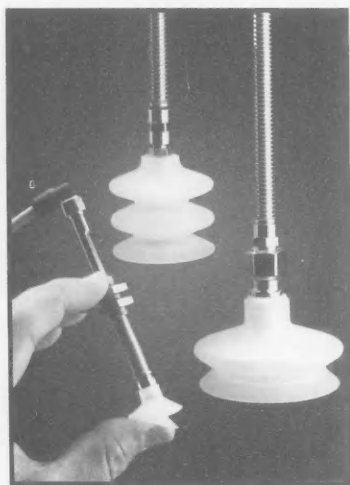
Based on this principle, several immunoaffinity columns have been

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INDUSTRY PRODUCTS

produced and evaluated for rapid screening of food quality. The Venture™ line includes columns for the analysis of aflatoxins (B₁, B₂, G₁ and G₂), chlorophenoxy acetic acid herbicides, phenylurea herbicides, organophosphorus pesticides and vinclozolin fungicide in food matrices. In addition to general performance characteristics, these immunoaffinity columns have been validated for stability and can be utilized for as many as 200 analyses.

Grace Vydac
760.244.6107
Hesperia, CA
www.vydac.com



Anver Corporation

Anver Corp. Vacuum Cup Suspensions Gentle Touch Protects Delicate Loads

A full line of vacuum cup suspensions and bellows-style suction cups that are designed for "soft touch handling" in pick-and-place automation systems are available from Anver Corporation.

Anver soft-touch vacuum-cup suspensions feature spring suspensions made from stainless steel and a wide variety of bellows-style vacuum suction cups for gently handling delicate loads with minimal force. Compensating for variations in object height, these spring-loaded suspensions cups absorb shock and provide constant pickup pressure for optimum load control.

Available in 10 sizes from 1.14" H to 6.61" L with 0.20" to 2.8" travel, Anver soft-touch vacuum cup suspensions can be supplied in non-rotating versions for handling loads that must retain their orientation. Suitable for a wide range of automation systems and packaging machinery, they can be equipped with snap-on fittings and round or rectangular suction cups.

Anver Corporation
800.654.3500
Hudson, MA
www.anver.com

Bell Laboratories' New Protecta Sidekick Gives Technicians an Economical Alternative to Non-Tamper-resistant Bait Stations

Bell Laboratories' new Protecta Sidekick Bait Station provides the security of a tamper-resistant bait station with the economy of a Rodent Baiter. It is an economical way to upgrade from a non-tamper-resistant to a more durable tamper-resistant bait station.

Sidekick functions as both a bait station and monitoring station. Its vertical bait security rods hold Bell's

Blox bait securely in the station, reducing the risk of accidental bait exposure to children, pets and non-target animals. As a monitoring station, it holds Trapper T-Rex Rat Snap Trap which captures rats as they enter the station.

Equipped with many features of Bell's Protecta bait station line, easy-to-use Sidekick opens to the side for fast, convenient servicing, even when the station is secured. Its interior corners are rounded for easy cleaning. And, a build-in card slot holds the Protecta service card.

As added security, Sidekick was designed with multiple options for securing the station: a textured base lets technicians glue the station to a patio block or floor with construction adhesive; two pre-drilled holes along the runway wall accommodate a chain, U-bolt or other locking device to anchor the station to a pole, fencepost, or pipe; and a depressed circular indent on the floor of the station makes it easy to stake it to the ground.

Sidekick locks when closed and unlocks with the same two-prong key that unlocks Bell's other Protecta tamper-resistant bait stations. On big jobs that require servicing many bait stations, this can be a real time saver.

Sidekick is constructed from an impact-resistant, injection-molded plastic that withstands temperature extremes. It measures 9 1/2 x 8 3/4 inches with a height of 4 1/2 inches, ideal for fitting into tight baiting locations. Yet, Sidekick can hold up to two pounds of bait, making it the perfect replacement to non-tamper-resistant bait stations in the field.

Bell Laboratories, Inc.
608.241.0202
Madison, WI
www.belllaboratories.com

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

High-efficiency Non-metallic True Volute Mag Drive Pumps Handle Tough Applications

Iwaki America Inc. MX Pumps have been engineered to meet the most severe applications of the industrial market. MX pumps are the first injected molded resin magnet drive pump which uses a split volute pump casing forming a vortex chamber. The volute design limits the hydraulic loss in the pump casing increasing overall pump efficiencies.

MX is also designed for tough applications. MX front casings incorporate reinforcement ribs extending from the periphery of the casing to the suction nozzle reducing potential for deflection of front casing from piping misalignment. Ribs are also used on the rear casing resulting in enhanced pressure retaining capability.

MX pumps are highly recommended for use in various production processes such as filtering, spraying, washing, plating, etching and scrubber applications.

Iwaki America Corporation
508.429.1440
Holliston, MA
www.iwakiamerica.com

ALKAR Introduces the New Cyclone™ Linear Belt Oven

The New Cyclone Linear Belt Oven is an innovative engineering approach that combines the high-performance cooking and browning of conventional linear ovens with the high-volume capacity of spiral ovens.

ALKAR engineers designed a cyclonic air circulation system to uniformly sweep air across the conveyor

belt, resulting in superior cross-belt cooking conformity. This patented air handling design lets the Cyclone go beyond the standard 40 inch belt limit. It's available in higher volume widths of 60", 80" and up to 100".

The ALKAR Cyclone is not limited by the conventional design of impingement ovens – narrow belt widths, low throughput and uneven temperatures. Cyclone also offers advantages over spiral ovens, too, such as lower maintenance costs and better browning/color development and similar production rates.

The simple design makes the ALKAR Cyclone easier to clean. No plenums or duct work above or below the belt to remove for cleaning. A built-in belt washer and CIP system make cleaning fast and trouble-free.

Alkar-RapidPak, Inc.
608.592.3211
Lodi, WI
www.rapidpak.com

Warnex Launches Two Novel Tests for *Campylobacter* and 24-hour *Listeria*

Warnex Inc. announced it is launching two new tests for use with the Warnex™ Rapid Pathogen Detection System. The first test detects *Campylobacter jejuni*, *C. coli* and *C. lari* in poultry rinses, and the second is a one-step 24-hour test for *Listeria* species in environmental samples. The distribution of these tests will begin in September. "As *Campylobacter* continues to emerge as a serious pathogen threatening the safety of food, particularly poultry, and water, more companies are beginning to screen for it as part of their regular quality assurance practices," said Mark

Busgang, president and CEO of Warnex. "Adding new tests to our portfolio is an important aspect of our growth strategy as it allows us to both leverage our existing installed base to drive additional reagent revenue as well as attract new customers with a more comprehensive food safety solution."

Warnex's *Campylobacter* test detects three species of this pathogen, which account for 99% of reported *Campylobacter* illness cases. Contrary to traditional testing methods for *Campylobacter* that require 5 to 7 days, this test determines the presence of this pathogen within 48 hours. Warnex is currently completing the development of a quantitative test that will determine the amount of *Campylobacter* present in a sample. The company intends to start commercializing this test during the first quarter of 2006, making it the first quantitative PCR test on the food testing market.

Warnex's new 24-hour *Listeria* spp. test for environmental samples has three innovations: (1) it is a test for environmental swabs, (2) it has a single enrichment step, thus simplifying the procedure, and (3) it provides results within 24 hours instead of 48 hours. A significant proportion of pathogen testing is used to monitor the environmental conditions of a food processing plant, by collecting swab samples from processing equipment, as well as from the walls, ceilings and floors of the plant. For example, in the dairy industry, 75% of pathogens tests are performed on environmental samples.

Warnex Diagnostics Inc.
888.988.1888
Laval, Quebec, Canada
www.warnex.ca

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

COMING EVENTS

OCTOBER

- **31–Nov. 1, ICMSF Symposium on Relating Microbiological Testing and Microbiological Criteria to Public Health Goals**, Gallaudet University, Kellogg Conference Center, Washington, D.C. For more information, contact the ILSI Meetings Department at 202.659.0074 or go to www.ilsi.org under "Events".

NOVEMBER

- **1–4, Food Safety/Sanitation & HACCP Workshop**, Toronto, Ontario, Canada. For more information, call AIB at 785.537.4750 or go to www.aibonline.org.
- **1–4, ProcessScan**, Eden Prairie, MN. For more information, call 952.974.9892; E-mail: info@fossnorth-america.com.
- **3–4, Food Risk & Security**, St. Louis, MO. For more information, contact Jeanette Hugé at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **8, British Columbia Food Protection Association Annual Meeting**, Sheraton Guildford Hotel, Surrey, British Columbia. For more information, contact Terry Peters at 604.666.1080; E-mail: terry_peters@telus.net.
- **9–11, Dairy Practices Council 2005 Annual Conference**, Radisson Lackawanna Station Hotel, Scranton, PA. For more information, call 732.203.1947; E-mail: dairypc@dairypc.org.
- **10–11, 2nd Symposium on Milk Genomics & Human Health**, COPIA Center for Wine, Food and the Arts, Napa, CA. For more information, contact Jennifer Giambrovi at 415.254.4549; E-mail: info@cdrf.org.
- **11–12, Mexico Association for Food Protection Annual Meeting**, Guadalajara, Jal., Mexico. For more information, contact Alejandro Castillo at 979.845.3565; E-mail: a-castillo@tamu.edu.
- **16, Ontario Food Protection Association Annual Fall Meeting**, Mississauga, Ontario. For more information, contact Gail Evans at 519.463.5674; E-mail: seed@golden.net.

- **23, Communicating Food Safety: Literacy, Language & Numeracy Issues**, Guelph Food Technology, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **25, HACCP: A Management Summary**, GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.

DECEMBER

- **1–2, The Essentials of Food Safety for Hotel Commercial Kitchens, Banquet Centers, Restaurants, and Lounges**, Las Vegas, NV. For more information, contact Jeanette Hugé at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **5–7, Microbiology and Engineering of Sterilization Processes**, University of Minnesota, in King of Prussia, PA. For more information, contact Ms. Ann Rath at 612.626.1278.
- **9, Agro-Food Technologies: Opportunities and Barriers to Improving Health**, Feringapark Hotel, Munich, Germany. For more information, E-mail lipgene@nutrition.org.uk.
- **10–14, American Public Health Association 133rd Annual Meeting**, Philadelphia, PA. For more information, contact Lynn Schoen at 202.777.2479; E-mail: lynn.schoen@apha.org.
- **12–14, Microbiology III: Foodborne Pathogens**, GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **13–14, Infratec 1255/1265**, Eden Prairie, MN. For more information, call 952.974.9892; E-mail: info@foss-northamerica.com.

JANUARY

- **10–11, Milk Pasteurization & Process Control School**, University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Scott Rankin at 608.263.2008 or go to www.cdr.wisc.edu.
- **16–18, Principles of Microbiological Troubleshooting in Your Factory: Real Problems/Real Answers**,

San Diego, CA. For more information, call Robert Behling at 608.772.2992; E-mail: rbehling@msn.com.

- **25–27, 2006 International Poultry Expo**, Georgia World Congress Center, Atlanta, GA. For more information, call 770.493.9401 or go to www.ipe06.org.

FEBRUARY

- **8–9, Quality Milk Conference**, University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Scott Rankin at 608.263.2008 or go to www.cdr.wisc.edu.
- **20–23, 2nd International Conference on Microbial Risk Assessment: Foodborne Hazards**, The Sofitel Wentworth Hotel, Sydney, Australia. For more information, call 61.2.8399.3996; E-mail: aifst@aifst.asn.au.
- **26–March 3, International Meeting on Radiation Processing**, Hilton Kuala Lumpur, Malaysia. For more information, go to www.imrp2006.com.

MARCH

- **16–18, International Conference on Women and Infectious Diseases: Progress in Science and Action**, Atlanta Marriott Marquis Hotel, Atlanta, GA. For more information, contact Sakina Jaffer at 404.371.5308; E-mail: smj1@cdc.com.

IAFP UPCOMING MEETINGS

AUGUST 13-16, 2006
Calgary, Alberta, Canada

JULY 8-11, 2007
Lake Buena Vista, Florida

AUGUST 3-6, 2008
Columbus, Ohio

CAREER SERVICES SECTION

Senior Quality Systems Auditor

Position Description and Responsibilities:

Responsible for assuring Mead Johnson processes in Manufacturing, Quality Assurance Control, Research & Development, Procurement, Information Management, Warehousing and Distribution, and other regulated activities are compliant with applicable regulations. Involves auditing Mead Johnson processes sites, material suppliers, third party manufacturers and service providers. Position serves as key contact for regulatory compliance at the Zeeland, MI site including regulatory escort for FDA, Orthodox Union and other inspections. Serve as a member of a global team which assures consistency of programs globally and continually assesses the external environment to assure Mead Johnson has the highest quality processes and is in full compliance with emerging regulations.

Position Requirements:

BS or MS in Microbiology, Food Science or Science related degree with food manufacturing experience. Experience with milk or milk powders and HACCP a must. Spray drying experience is strongly desired. Experience conducting supplier and/or third party audits and interacting with FDA or similar international regulatory agency is required. International audit or work experience preferred. Familiarity with Part 11 Electronic Records regulations preferred. Candidates must possess strong interpersonal skills including the abilities to understand multiple points of view, manage conflict, influence others, and hold self and others accountable for achieving results. Requires excellent oral and written communication skills. Domestic and international travel required approximately 40-50% of the time. Salary will be commensurate with experience.

Please apply online at: www.bms.com/careers; then select Manufacturing/Operations, then choose Consultant.

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M/F/V/D

Post-Doc

A post-doctoral position is available immediately to conduct a coordinated collaborative study to validate an immuno-based protocol for detection of selected bacteria and toxins in defined food matrices employing electro-chemical chemiluminescence technology. The individual will have an excellent opportunity to evaluate state-of-the-art bacterial and toxin detection technology. The successful candidate must demonstrate excellent research skills, technical communication abilities and experience with toxins, bacteriology, and immunoassay detection methods. This is a one-year term appointment with a highly competitive salary, and includes a complete benefits package. Interested individuals should submit their applications, verification of employment status if a foreign national, and three letters of reference to Dr. Richard D. Oberst, Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine/Pathobiology, Kansas State University, Manhattan, KS 66506; Ph.: (785) 532-4411; Fax: (785) 532-4039; E-mail to: oberst@vet.ksu.edu.

Applications and supporting materials must be received by September 20, 2006. Kansas State University is an equal opportunity employer and minorities and women are encouraged to apply. Paid for by KSU.

CAREER SERVICES SECTION



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For nearly 150 years, Swift & Company has been providing quality beef and pork products under superior brand names to consumers nationwide. Today, Swift & Company is an industry leader in fresh ideas, products and technology. Swift & Company is the third largest beef and pork processor in the United States and the largest beef processor in Australia.

Swift & Company is an equal opportunity employer (EEO) encouraging diversity in the workplace. Swift & Company actively supports the growth and development of all employees. Relocation assistance is available.

We are looking for a Director of Microbial Technology and Process Validation at our Headquarters in Greeley, Colorado.

The Director of Microbial Technology and Process Validation oversees all microbial technology and validation of plant processes.

Specific Responsibilities:

- Leads, coordinates, and manages overall activities associated with microbial technology and validations.
- Helps establish vision and direction for corporate and plant personnel.
- Responsible for coordinating the development, implementation, and maintenance of microbial management systems, regulatory programs, and food safety programs for the company.
- Works closely with Operations and other departments as well as plant management personnel to assure efficient and profitable company/plant operations and successful program implementation.
- Works with plant and corporate Engineering departments to assure proper facility and equipment design, layout, and upkeep to meet company and regulatory requirements for "microbial clean" process.
- Responsible for coordinating and/or developing company written policies and standard testing procedures. Evaluates compliance to same. Monitor expense of micro test.
- Works with USDA-FSIS personnel at all levels as well as industry trade groups to assure accurate, timely, and efficient implementation of regulatory programs associated with microbial performance.
- Helps assure just application of regulations by FSIS personnel.
- Assists plant management in problem solving relative to facilities, sanitation, shelf-life, regulatory, etc. issues.

Qualifications:

- Masters degree in Associated Food/Microbial Science with a Doctorate preferred.
- Minimum 5 years of related experience.
- Thorough knowledge in microbiology, statistics, food safety, and slaughter/fabrication procedures

recruiter@swiftbrands.com

TECHNICAL SALES MANAGER

We are seeking a Technical Sales Manager. Requires Bachelor of Science in Microbiology and 2 years experience in job offered. Individual will coordinate sales distribution by establishing territories, quotas and goals; analyze sales statistics to determine sales potential and inventory requirements; utilize understanding of microbiological food safety issues to visit customer sites in order to ensure compliance with all quality, food safety and regulatory standards and requirements; recommend appropriate products to address food safety and food manufacturing hazards. Job to be based out of Fort Collins, Colorado area. Send resume to Kim Beckett, Human Resources Department, Johnson-Diversey, Inc., P. O. Box 902, Sturtevant, WI 53177.

Research Food Scientist

The California Department of Health Services, Food and Drug Branch (FDB) is seeking a doctoral level food scientist to join a team of public health professionals who provide expertise in responding to incidents of food product contamination and provide scientific input into food safety and food defense regulatory policies. Opportunities also exist to participate in applied scientific research into the causes and prevention of microbial and chemical contamination of food products from the farm to the table. FDB is an internationally recognized state public health protection program that is responsible for regulating the manufacture, distribution, and sale of safe foods in California. Salary is commensurate with experience, which ranges from \$6,228.00 - \$7,569.00 per month for a Research Scientist IV (Food & Drug Sciences) and \$6,850.00 to \$8,327.00 per month for a Research Scientist V (Food & Drug Sciences).

Interested individuals who meet the minimum qualifications are invited to submit an examination package. The examination package must include a completed state application and responses to the supplemental items.

Research Scientist IV (Food & Drug Sciences):
www.dhs.ca.gov/jobs/html/rs/leveldef.htm#rsiv

Research Scientist V (Food & Drug Sciences):
www.dhs.ca.gov/jobs/html/rs/leveldef.htm#rsv

For questions, contact FDB Personnel Liaison at (916) 650-6500.

ADVERTISING INDEX

Charm Sciences Inc.	771
Food Processors Institute	770
NicePak	747
Quality Management, Inc.	745
Strategic Diagnostics	Inside Front Cover

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Vol. 68 September 2005 No. 9

Influence of <i>Salmonella</i> in Pigs Preharvest and during Pork Processing on Human Health Costs and Risk from Pork Gay Y. Miller,* Xuanli Liu, Paul E. McNamara, and David A. Barber.....	1788
Evaluation of a Capillary Immunoassay System for Detection of <i>Salmonella</i> Typhimurium in Poultry Products Byungchul Kim, Xiao-Li Su, and Yanbin Li*.....	1799
Magnetic Nanoparticle-Antibody Conjugates for the Separation of <i>Escherichia coli</i> O157:H7 in Ground Beef Madhukar Varshney, Liju Yang, Xiao-Li Su, and Yanbin Li*.....	1804
Genotypic and Phenotypic Characteristics of <i>Yersinia enterocolitica</i> Isolated from the Surface of Chicken Eggs Shells Obtained in Argentina Gabriela I. Favier,* María E. Escudero, and Ana María S. de Guzmán.....	1812
Comparison of the Chlorine Inactivation of <i>Yersinia enterocolitica</i> in Chlorine Demand and Demand-Free Systems R. Virto, D. Sanz, I. Álvarez, S. Condon, and J. Raso*.....	1816
Antimicrobial Activity of Cetylpyridinium Chloride against <i>Listeria monocytogenes</i> on Frankfurters and Subsequent Effect on Quality Attributes M. Singh, V. S. Gill, H. Thippareddi, R. K. Phebus,* J. L. Marsden, T. J. Herald, and A. L. Nutsch.....	1823
Validation of Bacon Processing Conditions To Verify Control of <i>Clostridium parfringens</i> and <i>Staphylococcus aureus</i> Peter J. Taormina* and Gene W. Bartholomew.....	1831
A Field Study of the Microbiological Quality of Fresh Produce Lynette M. Johnston, Lee-Ann Jaykus,* Deborah Moll, Martha C. Martínez, Juan Anciso, Brenda Mora, and Christine L. Moe.....	1840
Nationwide Microbiological Baseline Data Collected by Sponge Sampling during 1997 and 1998 for Cattle, Swine, Turkeys, and Geese D. R. Eblen, P. Levine,* B. E. Rose, P. Saini, R. Mageau, and W. E. Hill.....	1848
Year-Round Screening of Noncommercial and Commercial Oysters for the Presence of Human Pathogenic Viruses F. Lodder-Verschoor, A. M. de Roda Husman,* H. H. J. L. van den Berg, A. Stein, H. M. L. van Pelt-Heerschap, and W. H. M. van der Poel.....	1853
Development of Immunoassay for Detection of Meat and Bone Meal in Animal Feed Shin-Hee Kim,* Tung-Shi Huang, Thomas A. Seymour, Cheng-i Wei, Stephen C. Kempf, C. Roger Bridgman, Dragan Momcilovic, Roger A. Clemens, and Haejung An.....	1860
Detection of Crustacean DNA and Species Identification Using a PCR-Restriction Fragment Length Polymorphism Method Jennifer L. Brzezinski*.....	1866
Educational Intervention Enhances Consumers' Readiness To Adopt Food Thermometer Use When Cooking Small Cuts of Meat: An Application of the Transtheoretical Model Masami T. Takeuchi, Miriam Edlefsen,* Sandra M. McCurdy, and Virginia N. Hillers.....	1874
Consumer Food Safety Knowledge, Practices, and Demographic Differences: Findings from a Meta-Analysis Sumeet R. Patil,* Sheryl Cates, and Roberta Morales.....	1884

Research Notes

Antibacterial Effect of Monocaprylin on <i>Escherichia coli</i> O157:H7 in Apple Juice Manoj Kumar Mohan Nair, Hanem Abouelezz, Thomas Hoagland, and Kumar Venkitanarayanan*.....	1895
Survival of <i>Enterobacter sakazakii</i> in a Dehydrated Powdered Infant Formula Sharon G. Edelson-Mammel, Mary K. Porteous, and Robert L. Buchanan*.....	1900
Occurrence of <i>Campylobacter</i> and <i>Listeria monocytogenes</i> in a Poultry Processing Plant Mercedes G. R. Reiter, Camila M. M. Bueno, Carmen López, and R. Jordano*.....	1903
Multiplex PCR Assay Simplifies Serotyping and Sequence Typing of <i>Listeria monocytogenes</i> Associated with Human Outbreaks Wei Zhang* and Stephen J. Knabel.....	1907
Fate of <i>Staphylococcus aureus</i> on Vacuum-Packaged Ready-to-Eat Meat Products Stored at 21°C Steven C. Ingham,* Rebecca A. Engel, Melody A. Fanslau, Erica L. Schoeller, Gina Searls, Dennis R. Buege, and Jun Zhu.....	1911
Acquisition of Bile Salt Resistance Promotes Antibiotic Susceptibility Changes in <i>Billdobacterium</i> Luis Noriega, Clara G. de los Reyes-Gavilán, and Abelardo Margolles*.....	1916
Two-Dimensional Thin-Layer Chromatographic Method for the Analysis of Ochratoxin A in Green Coffee Meribell Ventura,* Ivan Anaya, Francisc Broto-Puig, Montserrat Agut, and Lluís Comellas.....	1920
A Centrifugation-Based Method for Extraction of Norovirus from Raspberries A. Rzeżutka, M. Alotaibi, M. D'Agostino, and N. Cook*.....	1923

General Interest

Molecular Surveillance of Shiga Toxinogenic <i>Escherichia coli</i> O157 by PulseNet USA Peter Gerner-Smidt,* Jennifer Kincaid, Kristy Kubota, Kelley Hise, Susan B. Hunter, Mary-Ann Fair, Dawn Norton, Ann Woo-Ming, Terry Kurzynski, Mark J. Sotir, Marcus Head, Kristin Holt, and Bala Swaminathan.....	1926
--	------

Supplement

Achieving Continuous Improvement in Reductions in Foodborne Listeriosis—A Risk-Based Approach ILSI Research Foundation/Risk Science Institute, Expert Panel on <i>Listeria monocytogenes</i> in Foods*.....	1932
--	------

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 - D1120 Milk Processing Plant Inspection Procedures
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 - D1130 Pasteurizer: Design and Regulation
 - D1140 Pasteurizer: Operation
 - D1150 Processing Fluid Milk
 - D1160 Safe Milk Hauling - You're the Key
 - D1170 3-A Symbol Council
 - D1180 10 Points to Dairy Quality

- ENVIRONMENTAL**
- E3010 The ABC's of Clean - A Handwashing and Cleanliness Program for Early Childhood Programs
 - E3020 Acceptable Risks?
 - E3030 Air Pollution: Indoor
 - E3031 Allergy Beware
 - E3040 Asbestos Awareness
 - E3050 Better TEDs for Better Fisheries
 - E3055 Effective Handwashing - Preventing Cross-Contamination in the Food Service Industry
 - E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
 - E3070 EPA Test Methods for Freshwater Toxicity Tests (Using Fathead Minnow Larva)
 - E3075 EPA: This is Super Fund
 - E3080 Fit to Drink
 - E3090 Food-Service Disposable: Should I Feel Guilty
 - E3110 Garbage: The Movie
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


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

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The International Association for Food Protection (IAFP) Foundation Fund was established in the 1970s to support the mission of IAFP – "To provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

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We live in a global economy and the way food is grown, processed, and handled can impact people around the world. From a public health perspective, it often provides unique challenges to food safety professionals. Combine these issues with the complexity of protecting the food supply from food security threats and the challenges seem overwhelming. However, with your support the Foundation can make an impact on these issues. Funds from the Foundation help to sponsor travel for deserving scientists from developing countries to our Annual Meeting, sponsor international workshops, and support the future of food science through scholarships for students or funding for students to attend IAFP Annual Meetings.

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