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PERIODICALS
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FOOD PROTECTION TRENDS

SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

JANUARY 2006

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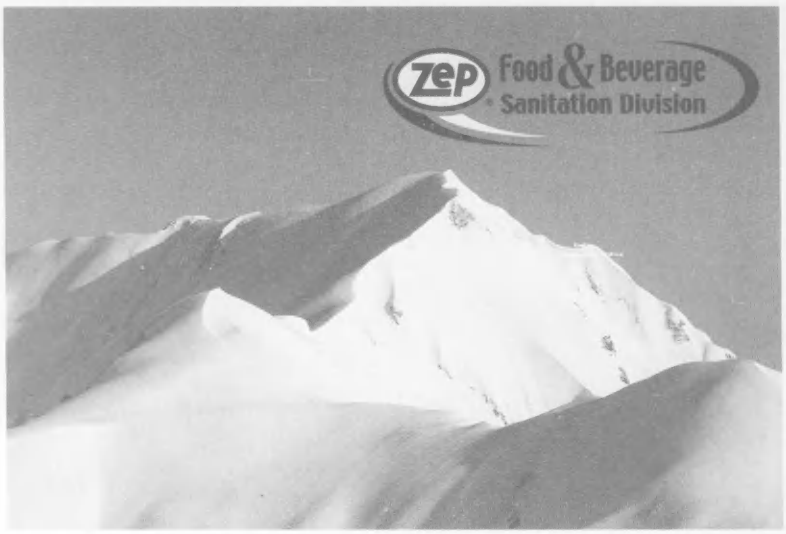

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The International Association for Food Protection (IAFP) Foundation Fund was established in the 1970s to support the mission of IAFP – "To provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

IAFP FOUNDATION

Advancing Food Safety Worldwide®

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 scientists through scholarships for students or funding for students to attend IAFP Annual Meetings.

The Foundation is currently funded through contributions from corporations and individuals. A large portion of the support is provided from the Sustaining Members of IAFP. The Sustaining Membership program is a unique way for organizations to partner with the Association. Contact the Association office if you are interested in this program.

Support from individuals is also crucial in the growth of the Foundation Fund. Contributions of any size make an impact on the programs supported by the IAFP Foundation. Programs currently supported by the Foundation include the following:

- Student Travel Scholarships
- Ivan Parkin Lecture
- John H. Silliker Lecture
  (Funded through a comtribution from Silliker, Inc.)
- Travel support for exceptional speakers at the Annual Meeting
- Audiovisual Library
- Developing Scientist Competition
- Shipment of volumes of surplus *JFP* and *FPT* journals to developing countries through FAO in Rome

Donate Today!

It is the goal of the Association to grow the Foundation to a self-sustaining level of greater than $1.0 million by 2010. This will allow the Foundation to provide additional programs in pursuit of our goal of *Advancing Food Safety Worldwide*®!

International Association for Food Protection

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International Association for Food Protection

FOOD PROTECTION TRENDS

VOLUME 26, NO. 1

ARTICLES

ASSOCIATION NEWS

DEPARTMENTS

EXTRAS

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

EDMUND A. ZOTTOLA

I have been editor of *Food Protection Trends* for a little over 18 months. It has been a most interesting experience. This journal is designed to be the primary source of information for the members of the International Association for Food Protection. As such it provides up-to-date information for all the members of the Association. It is the intent of the *FPT* Journal Management Committee to provide this material to the members to assist them with their daily activities. Included in the journal are: peer-reviewed research manuscripts, scientific news, association news, proceedings of symposia, industry products, career opportunities, updates, new members and other items that should be useful to the members.

As of the date of the writing of this note, there have been forty-three manuscripts submitted for possible publication in *FPT*. Twenty-five have been accepted for publication, seven are still in review and five are in the revision process. Three papers were withdrawn and three were rejected. The topics of the papers have varied from the use of thermometers in the home for cooking of meats to treatments for removing microorganisms for carcasses to personnel concerns about personal cleanliness. Resulting in a broad range of topics that challenge the editor and the reviewers.

The Editorial Board is made up of 50 dedicated members of the association that are willing to take the time to review manuscripts to assure that the quality of the publications meet IAFP and *FPT* standards. It takes time to review these manuscripts as three members of the editorial board review each. A thorough reading and evaluation is required which takes time. I developed some interesting numbers related to the time it takes for reviewers to return manuscripts. It ranged from 3 to 30 days, with several never returned. It is a challenge to the scientific editor to keep these manuscripts moving to publication. It gets done!

If you are interested in serving on the Editorial Board, please let me know. If you have any ideas on changes for *FPT* to make it better serve the members, please E-mail me at lansibay@cpinternet.com.

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FOOD PROTECTION TRENDS
SCIENCE AND NEWS
FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

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News Releases, Updates, Coming Events and Cover Photos: Correspondence for these materials should be sent to Donna A. Bahun, Production Editor, International Association for Food Protection.

"Instructions for Authors" may be obtained from our Web site at www.foodprotection.org or from Donna A. Bahun, Production Editor, International Association for Food Protection.

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Membership Dues: Membership in the Association is available to individuals. Dues include a 12-month subscription to ***Food Protection Trends*** at a rate of $100.00 US, $115.00 Canada/Mexico, and $130.00 International. Dues including ***Food Protection Trends*** and the ***Journal of Food Protection*** are $185.00 US, $220.00 Canada/Mexico, and $265.00 International. Student memberships are available with verification of student status. Student rates are $50.00 US, $65.00 Canada/Mexico, and $80.00 International for ***Food Protection Trends***; $50.00 US, $70.00 Canada/Mexico, and $100.00 International for ***Journal of Food Protection***; and $92.50 US, $127.50 Canada/Mexico, and $172.50 International for ***Food Protection Trends*** and ***Journal of Food Protection.*** All membership dues include shipping and handling. No cancellations accepted. Correspondence regarding changes of address and dues must be sent to Julie A. Cattanach, Membership Services, International Association for Food Protection.

Sustaining Membership: Three levels of sustaining membership are available to organizations. For more information, contact Julie A. Cattanach, Membership Services, International Association for Food Protection.

Subscription Rates: ***Food Protection Trends*** is available by subscription for $227.00 US, $242.00 Canada/Mexico, and $257.00 International. Single issues are available for $26.00 US and $35.00 all other countries. All rates include shipping and handling. No cancellations accepted. For more information contact Julie A. Cattanach, Membership Services, International Association for Food Protection.

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SUSTAINING MEMBERSHIP

Membership in the International Association for Food Protection will put you in charge of your career. From quick access to cutting-edge technical and scientific information, becoming a Member is your link to the food safety industry and a clearinghouse of resources. Increase the knowledge and ideas you can implement in your work environment.

Is your organization in pursuit of "Advancing Food Safety Worldwide®"? As a Sustaining Member of the International Association for Food Protection, your organization can help to ensure the safety of the world's food supply.

Sustaining Membership

Sustaining Membership provides organizations and corporations the opportunity to ally themselves with the International Association for Food Protection in pursuit of *Advancing Food Safety Worldwide®*. This partnership entitles companies to become Members of the leading food safety organization in the world while supporting various educational programs through the IAFP Foundation that might not otherwise be possible.

Organizations who lead the way in new technology and development join IAFP as Sustaining Members. Sustaining Members receive all the benefits of IAFP Membership, plus:

- Monthly listing of your organization in *Food Protection Trends* and *Journal of Food Protection*
- Discount on advertising
- Exhibit space discount at the Annual Meeting
- Organization name listed on the Association's Web site
- Link to your organization's Web site from the Association's Web site
- Alliance with the International Association for Food Protection

Gold Sustaining Membership $5,000

- Designation of three individuals from within the organization to receive Memberships with full benefits
- $750 exhibit booth discount at the IAFP Annual Meeting
- $2,000 dedicated to speaker support for educational sessions at the Annual Meeting
- Company profile printed annually in *Food Protection Trends*

Silver Sustaining Membership $2,500

- Designation of two individuals from within the organization to receive Memberships with full benefits
- $500 exhibit booth discount at the IAFP Annual Meeting
- $1,000 dedicated to speaker support for educational sessions at the Annual Meeting

Sustaining Membership $750

- Designation of an individual from within the organization to receive a Membership with full benefits
- $300 exhibit booth discount at the IAFP Annual Meeting

International Association for Food Protection

FUTURE ANNUAL MEETINGS

IAFP 2006

AUGUST 13-16

Telus Convention Centre
Calgary, Alberta, Canada

IAFP 2007

JULY 8-11

Disney's Contemporary Resort
Lake Buena Vista, Florida

IAFP 2008

AUGUST 3-6

Hyatt Regency Columbus
Columbus, Ohio

International Association for Food Protection

FOOD PROTECTION TRENDS

"The mission of the Association is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

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Sustaining Membership provides organizations the opportunity to ally themselves with IAFP in pursuit of *Advancing Food Safety Worldwide*. This partnership entitles companies to become Members of the leading food safety organization in the world while supporting various educational programs that might not otherwise be possible.

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"PERSPECTIVES FROM NORTH OF THE 49TH"

By **JEFFREY FARBER**
PRESIDENT

"I hope that you all had a great holiday season"

IAFP is in the action and news again! Hello everyone! I hope you are enjoying the early winter season! I just wanted to let you know that your President and Executive Board, as well as the IAFP staff have been busy as beavers (all American ones!) this past month. I told you last month about our co-sponsorship of the ICMSF meeting that was held in Washington at the beginning of November. The meeting was excellent and attracted a diverse audience of over 125 people. IAFP was mentioned numerous times and we had very good support from IAFP Members, including Past Presidents such as Bob Brackett, Anna Lammerding, Mike Doyle, Paul Hall, Jim Dickson and Jenny Scott. The subject matter in the field of public health goals can sometimes be complicated and dry, but ICMSF and other presenters really made an effort to make the material understandable and interesting. It will be more and more important as we move into the future to make the link between tools like performance and food safety objectives, and public health goals. Assessing the performance of what governments around the world do will be key. It is not enough now, and certainly will not be in the future, to just state you have put a public health policy into place without using indicators to observe how effective that policy really is. For example, has it led to a change in consumer behavior which has led to a decrease in foodborne illness, or has it led to changes in the way food is processed or handled at the foodservice or processing levels, so that consumer exposure to contaminated foods is decreased, thus again potentially leading to decreased illness. Extended abstracts of all the talks given in Washington will be published in one of our IAFP Journals. In addition, copies of the talks will be posted on both the IAFP and ICMSF Web sites.

Another great "action" that we have taken is the writing of a document entitled, "Perspectives on Avian Influenza Risk Management for Food Safety Professionals". For those of you who have not seen this as of yet, it is an excellent document which is available on our Web site and begins on page 32. With all the new developments in this area of late, we felt that it was very important to get something out to our members in a timely manner in this subject area that could supplement the material that has been developed by industry and government. We will be doing more of these types of things in the future, i.e., keeping our members abreast of the latest "hot topics". We feel that this is "value-added" for our membership and, as well, positions IAFP as the true leader in food safety.

We are also continuing the momentum we had with our successful one-day meeting in Prague and are planning another symposium next year, somewhere in Europe. I would love to hear from you in terms of what topics you may like to hear in a specific one or one-and-a-half day symposium and which venue in Europe you think may be a good one!

Many of you know how important our Affiliates are to IAFP. I had the great fortune of being able to visit and give two talks at the Wisconsin Association for Food Protection (WAFP), an association that has been around since 1943! I really enjoyed meeting with everyone and hearing some interesting talks. Special thanks to the whole WAFP executive board and especially Randy Daggs, who really took good care of me and had to pitch in to help with many miscellaneous issues, as some members had to miss the meeting for one reason or another. We are hoping to have a number of new international affiliates up and running in the next few years. Stay tuned for the exciting news!

On the membership front, we also have good news as we are now consistently running above the 3,000 mark. We would like to bump this up even higher, and are looking for creative ways to grow our membership base. One idea that has been discussed is having every member who brings in a new member get a discount on his or her fees for the year. Again, we would love to hear from you on this and any other ideas you may have.

I would like to take this opportunity to wish IAFP Members and staff, as well as their families and friends, the very best for a happy and healthy New Year. The world today is so much more hectic and pressure-filled. We all need to take a break and spend quality time with families, friends, neighbors, etc.! I hope that you all had a great holiday season and have come back refreshed and energized for the New Year. I know that it is going to be a great one for IAFP!

As always, I can be reached by E-mail at jeff_farber@hc-sc.gc.ca and would love to hear from you!

Have a great month.

Quote of the month:

For last year's words belong to last year's language.

And next year's words await another voice.

And to make an end is to make a beginning.

T. S. Eliot

Student Travel Scholarship Program

Sponsored by IAFP FOUNDATION

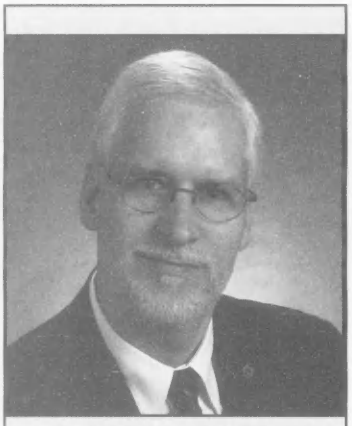
The Student Travel Scholarships will provide travel funds to enable selected students to travel to IAFP 2006 in Calgary, Alberta, Canada.

For 2006, four scholarships will be awarded. As the IAFP Foundation grows, additional scholarships will be added to this program.

Full details of the scholarship program are available on the IAFP Web site at www.foodprotection.org.

Application deadline is March 13, 2006.

"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR



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

"Let's review many of the exciting plans and goals that IAFP projects for the coming year"

As we begin the year of 2006, I can tell you IAFP has a full agenda of programs and activities. This month, let's review many of the exciting plans and goals that IAFP projects for the coming year.

First off, as of the first of the year, the *Journal of Food Protection* has implemented an online review system for submitted manuscripts. This system will enable authors, reviewers, scientific editors and staff to more easily see the progress of submitted papers. It will assist our scientific editors and staff in managing the review process along with allowing faster transfer of papers to editorial board reviewers. The system also allows any user to access the system from any computer linked to the Internet. We hope the convenience of the new, online review system will permit quicker processing of submitted manuscripts as we progress through the year.

Are you are making plans to be with us at IAFP 2006 in Calgary, Alberta, Canada next August? Having just been to Calgary in November to set our planning process in motion, I can tell you Calgary will be a fantastic location for our Annual Meeting! At the base of the Canadian Rocky Mountains, the city is inviting, friendly and easy to explore. If time allows, a side trip to Banff and Lake Louise is strongly encouraged. This is one of the most picturesque areas in the entire world — don't miss seeing it while you have the opportunity!

Our meeting will take place at the Telus Convention Centre and we will use three hotel properties (two attached to the Convention Centre). Just outside the doors is the Stephen Avenue Mall where restaurants, shopping and nightspots line the historic avenue. Oh what fun!

There are a few items worth noting about IAFP 2006. I mentioned we have reserved rooms at three hotels in Calgary. Hotel reservations can be made online through our Web site (click IAFP 2006 under "Meetings and Education") and by mail or fax (hotel reservation form will be printed in *FPT* starting in February). We also have revisions to the schedule of activities for 2006 as we attempt to accommodate more and more special events during the time we have to spend together.

One item that exhibitors and attendees have requested for many years is to have lunch available in the Exhibit Hall. We are pleased to be able to satisfy these requests at IAFP 2006! On Monday and Tuesday, a lunch will be provided in the Exhibit Hall for attendees and exhibitors. We are looking forward to this added social time for all attendees.

You may have noticed that abstracts for IAFP 2006 are due one month later than in previous years. The deadline for submission is now February 8. This will allow for additional completion of research or subject matter for your abstracts that were sometimes rushed because the due date was shortly after the holiday season. So if you were thinking of making a submission and thought you were out of time, you can now reconsider and submit your abstract prior to February 8 for consideration by the Program Committee.

There are three more projects that I want to make you aware of which we will be working on in the upcoming months. They include preparing for a second European Symposium on Food Safety to be held in October or November of 2006, implementing a Member dues restructure in January of 2007 and joining the Partnership for Food Safety Education. Many IAFP Members already participate with the Partnership so the IAFP Executive Board felt it was natural for the Association to support this effort. We look forward to working with the Partnership in carrying their message to our Members who can

in turn, carry the message to consumers!

The Member dues restructure will allow Members an "a la carte" system to pick and choose what they want from IAFP. A base level of dues will entitle Members to a periodic "E-newsletter" from IAFP. Quarterly or monthly newsletters are currently being considered. From there, a Member can choose to receive *Food Protection Trends*, the *Journal of Food Protection* or *JFP* Online individually or they may choose any combination of the three. So the new dues structure makes Membership affordable and much more versatile to our current Members and should help in attracting new Members!

The last item to review with you is the next European Symposium on Food Safety. The Executive Board saw advantages to building on the success of our first European Symposium held last October in Prague. It was felt our experience in Prague was beneficial to the Association in that it attracted a number of people who were not IAFP Members. By bringing together those nonmembers with IAFP Members, the nonmembers were able to learn about IAFP and all that we offer. Our Members are the best sales force for the Association! We look forward to the opportunity to plan our next event for Europe. Please continue to watch this column and *FPT* for more information on this Symposium as details become available.

So, as you can see, just from this short list of programs and activities, IAFP will have a very busy year. In addition, the Executive Board and staff will hold a long-range, goal setting session in April to map out longer-range plans for IAFP. If you have thoughts or suggestions on IAFP programs and activities, feel free to contact any of the Executive Board Members or me to provide your input.

We thank you for your past support of IAFP and look forward to your continued support. We also hope that you are proud of IAFP and its accomplishments! Best wishes for a happy and prosperous New Year.

Is Your Program Crumbine Material? Put it to the Test!

The Samuel J. Crumbine Consumer Protection Award for Excellence in Food Protection at the Local Level is seeking submissions for its 2006 program. The Crumbine Award is given for excellence and continual improvement in a comprehensive program of food protection at the local level. Achievement is measured by:

- Sustained improvements and excellence over the preceding four to six years;
- Innovative and effective use of program methods and problem solving to identify and reduce risk factors that are known to cause foodborne illness;
- Demonstrated improvements in planning, managing, and evaluating a comprehensive program; and
- Providing targeted outreach; forming partnerships; and fostering communication and information exchange among regulators, industry and consumer representatives.

All local environmental health jurisdictions in the U.S. and Canada are encouraged to apply, regardless of size, whether "small," "medium" or "large."

The Award is sponsored by the Conference for Food Protection, in cooperation with the American Academy of Sanitarians, American Public Health Association, Association of Food and Drug Officials, Foodservice & Packaging Institute, Inc., International Association for Food Protection, International Food Safety Council, National Association of County & City Health Officials, National Environmental Health Association, NSF International, and Underwriters Laboratories, Inc.

For more information on the Crumbine Award program, and to download the 2006 criteria and previous winning entries, please go to www.fpi.org or call the Foodservice & Packaging Institute at (703) 538-2800. **Deadline for entries is March 15, 2006.**

ARTICLES

Food Protection Trends, Vol. 26, No. 1, Pages 14–19

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

International Association for Food Protection

Evaluation of Hand Mixing of Ground Beef and Poultry Samples as an Alternative to Stomaching for the Detection of *Salmonella*

NEELAM NARANG[1]* and WILLIAM C. CRAY, Jr.[2]

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SUMMARY

This study compared hand mixing with pummeling in a Stomacher for preparing raw ground beef and poultry samples for the detection of *Salmonella*. A total of 800 ground beef samples, and 400 each of ground chicken and turkey, were analyzed. Ten *Salmonella* isolates were studied in ground beef and five each in ground chicken and turkey. Each package of raw ground meat was divided into eight (25 g each) samples. Six of these samples were inoculated (0.04–0.25 CFU/g) with one of the ten *Salmonella* isolates; three of the six samples were hand mixed briefly until clumps were dispersed, whereas the other three were pummeled in a Stomacher for two minutes. The remaining two samples served as uninoculated controls. The samples were processed for detection and identification of *Salmonella* according to methods described in the Food Safety and Inspection Service (FSIS) Microbiological Laboratory guidebook. Statistical analysis, using analysis of variance and student's *t*-test, showed no significant ($P < 0.05$) difference in CFU/ml and MPN/g between the two treatments for any of the ground beef and turkey samples inoculated with *Salmonella*. In ground chicken samples, there appeared to be no consistent sample handling effect across the five isolates studied; when tested as a group, no treatment effect was seen in the detection of *Salmonella*. The results show that all of the *Salmonella* isolates tested could be detected by both treatment methods in the three meat matrices.

A peer-reviewed article

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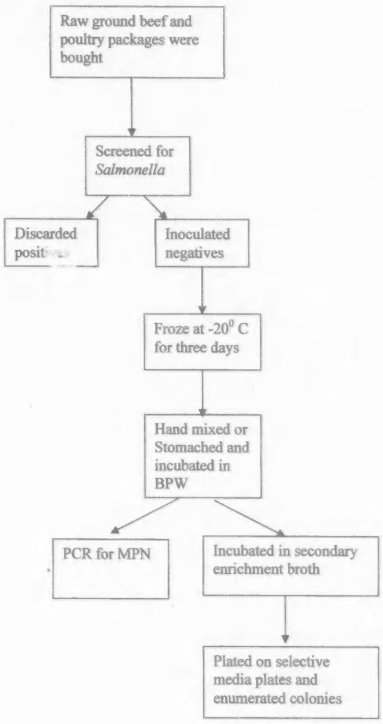
FIGURE 1. Flow chart showing the sequences of inoculating and processing samples for *Salmonella* detection



INTRODUCTION

Several methods have been described for homogenizing different types of food samples (raw, cooked, and processed) to be tested to detect microorganisms. The most common methods are use of the Ato-mix blender (for prawns and other cooked foods), simple mixing (raw meats, powdered egg and milk), use of a pestle and mortar (cheese), mixing with beads, pummeling in a Stomacher, and processing in a Pulsifier. The Stomacher, first introduced to homogenize food samples for microbial analyses by Sharpe & Jackson *(11)*, has been used routinely in microbiological laboratories. Many studies have been performed to compare its use with that of blenders, shaking, and other homogenizing techniques *(1, 2–4, 6–8, 9–14, 18)*.

In microbiological laboratories of regulatory agencies, large numbers of samples are processed daily for various analyses. In the Food Safety and Inspection Service (FSIS) microbiological laboratories, the Stomacher is routinely used in place of blenders or grinders to homogenize ground beef, poultry, and cooked meats. The samples are placed in Stomacher filter bags with the enrichment broth, the bags are placed in the Stomacher, the machine is closed, and the sample is pummeled for two minutes before the detection procedures are performed. In laboratories in which numerous samples are to be processed each day, the total number of analyses can be reduced if only a small number of Stomachers are available.

The present study was undertaken to: (1) determine whether hand mixing of ground beef and poultry samples is as effective for the detection of *Salmonella* as pummeling for two minutes in a Stomacher, (2) examine if there is difference in the level of *Salmonella* recovered between the two treatments using ten isolates and three meat matrices (ground beef, chicken and turkey, and (3) determine if hand mixing can be used as an alternative method in the homogenization of raw ground beef and poultry samples for the detection of *Salmonella*. Results of this study can help reduce time, cost, effort, and use of equipment when processing hundreds of samples on a daily basis.

MATERIALS AND METHODS

Sample collection

During a period of one year, 44 raw ground beef, 34 chicken, and 52 turkey packages were purchased from local grocery stores. The fat content ranged from 7–35% in ground beef, 1–11% in chicken, and 1–15% in turkey samples. Figure 1 shows an illustrative scheme of inoculating and processing samples for the detection of *Salmonella*. Each package was opened using sterile scissors and the food was mixed and divided into eight (25 ± 2.5 g each) samples for each of the *Salmonella* isolates tested. The ten isolates inoculated into ground beef were *S.* Typhimurium, *S.* Typhimurium var Copen, *S.* Enteritidis, *S.* Newport, *S.* Kentucky, *S.* Montevideo, *S.* Mbandaka, *S.* Senftenberg, *S.* Heidelsberg and *S.* Dublin. The isolates chosen for poultry were *S.* Typhimurium, *S.* Enteritidis, *S.* Kentucky, *S.* Heidelsberg and *S.* Hadar. In order to test if the samples were free of *Salmonella*, the contents of each package were mixed and a 25-g sample was tested, using the PCR-based *Salmonella* BAX screening system (DuPont Qualicon Inc., Wilmington, DE) according to the method described in MLG 4C.01 *(15)*. Only the *Salmonella*-negative packages were used for further study.

Culture preparation and maintenance of *Salmonella* isolates

S. Typhimurium was obtained from the American Type Culture Collection (ATCC 14028), Rockville, MD. The other ten *Salmonella* isolates were obtained from the FSIS Eastern Laboratory culture collection (Athens, GA). The isolates were stored on cryogenic beads in a -20°C freezer. A bead containing each isolate was removed and plated on trypticase soy agar with 5% Sheep Blood Agar plate (Becton Dickinson Diagnostics Systems, Sparks, MD) and incubated for 18–24 hours at 35 ± 1°C. Isolates were then transferred to nutrient agar slants (Becton Dickinson Diagnostics Systems, Sparks, MD) and incubated for 24 hours at 35 ± 1°C. The nutrient slants were stored at 2–4°C.

The colonies from blood plates were inoculated onto VITEK cards (bioMérieux Vitek Inc. Hazelwood, MO), an automated

FIGURE 2. Comparison of log_{10} CFU/ml obtained from samples that were hand mixed or pummeled with a Stomacher for ten *Salmonella* isolates inoculated in raw ground beef samples

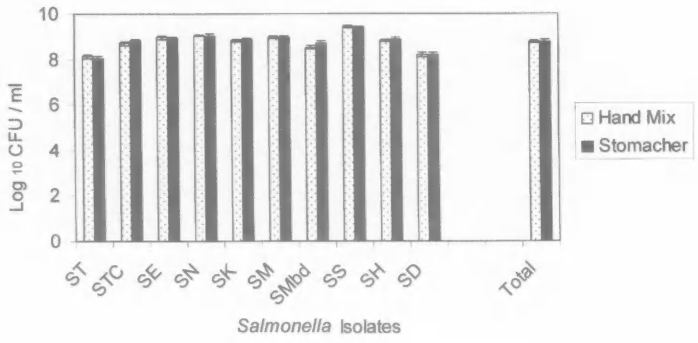
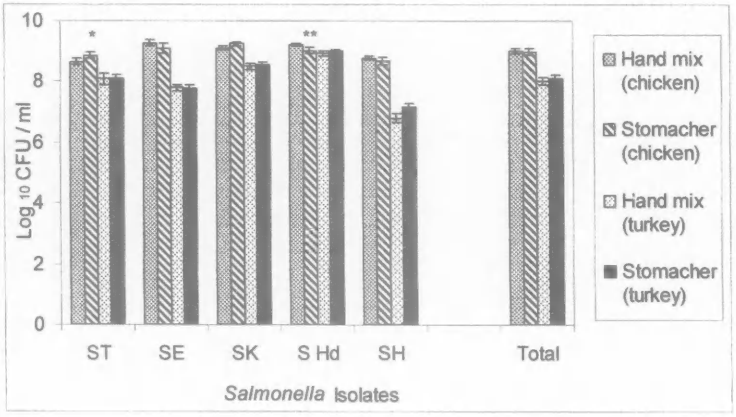


FIGURE 3. Comparison of log_{10} CFU/ml obtained from samples that were hand mixed or pummeled with a Stomacher using five *Salmonella* isolates in raw ground chicken and turkey



biochemical test, to confirm that they were *Salmonella*. All isolates were transferred to fresh Sheep Blood Agar plates and nutrient agar slants every 30 days, and colonies from the blood plates were again confirmed by using VITEK.

Inoculation of samples

Six samples from each package were inoculated with one of the ten *Salmonella* isolates studied for beef or one of the five *Salmonella* isolates studied for poultry. A stock suspension of each culture (maintained at 4°C on agar slants) was prepared in saline (0.45%), which was equivalent in turbidity to a McFarland 0.5 standard, as determined using a Dade MicroScan Turbidity meter (Dade International Inc, West Sacramento, CA). The stock solution was then diluted with saline to obtain 10^1 to 10^8 dilutions. The CFU/ml was determined by plating the various dilutions on DMLIA agar plates, which were incubated for 18–24 hours at 35 ± 1°C, and then counting colonies. The desired amount of inoculum was then injected into each 25 (± 2.5) g ground beef or poultry sample. Triplicate samples of the inoculum were plated on DMLIA plates to estimate the number of colonies inoculated/g of beef or poultry sample. The inoculum dose varied from 0.04 to 0.25 CFU/g. Two samples from each group were not inoculated and served as controls. All of the meat samples were then stored in freezers at -20 ± 2°C for 3 days before processing. A total of 600 beef samples, and 300 each of chicken and turkey, were inoculated.

Sample processing and enrichment

Samples were removed from the freezer and thawed completely (for 2 hours) before processing. The samples were analyzed for *Salmonella* by following the procedure specified in the USDA/FSIS Microbiological Laboratory Guidebook (MLG), Chapter 4.2 *(15)*. Each sample was diluted 1:10 (w/w) with buffered peptone water (BPW). One group of samples (n = 3) were briefly hand mixed (until clumps were dispersed) and the other group (n = 3) pummeled for two minutes in a Stomacher 3500 (Dynatech Laboratories, Inc, Alexandria, VA). The uninoculated control samples were also subjected to either hand mixing or two minutes of stomaching. In addition, one negative medium control (BPW) and two positive control (H_2S + and H_2S- *Salmonella*) meat matrix samples were processed along with other samples in each experiment. These positive controls were prepared by inoculating dehydrated chuck chicken (Henningsen Foods, Omaha, NE) with the known *Salmonella* inoculum, and were kept frozen for up to six weeks before use.

Three-tube MPN tests were performed by making 10-fold serial dilutions (1, 0.1 and 0.01g) from each 1:10 sample (BPW homogenate enrichment, after hand mixing or stomaching). All of the tubes and Stomacher bags with samples were incubated simultaneously at 35 ± 1°C for 20–24 h according to the FSIS Microbiology Laboratory Guidebook, chapter 4.03 *(15)*. The presumptive presence of *Salmonella* for each tube was determined by a BAX screening system with a PCR assay kit (DuPont Qualicon Inc, Wilmington, DE), according to the method described in MLG 4 C.01 *(15)*. The number of positive/negative tubes from serial dilution of the samples was determined. The MPN/g of ground beef was calculated from a three-tube MPN table found in the USDA/FSIS MLG 4.02 section 4.5.10, appendix 2 *(15, 16)*.

Aliquots of 0.5 and 0.1 ml of incubated BPW pre-enrichments were transferred to 10 ml of tetrathionate broth, Hajna (TT) and modified Rappaport-Vasilladis broth (mRV) *(5, 15, 17)* and incubated at 42 ± 0.5°C for 22–24 hours. The enrichment samples were plated in duplicate onto both double modified lysine iron agar (DMLIA) and brilliant green sulfa

FIGURE 4. Comparison of MPN/g obtained from samples that were hand mixed or pummeled with a Stomacher for ten *Salmonella* isolates in raw ground beef

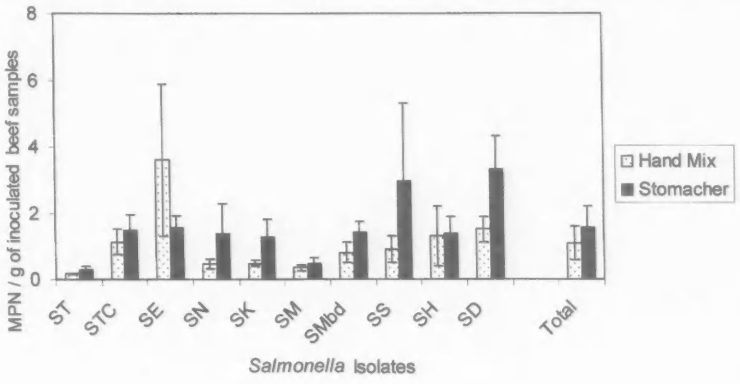
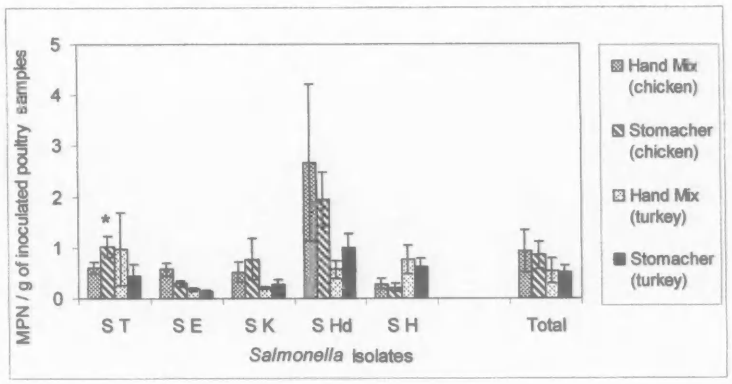


FIGURE 5. Comparison of MPN/g obtained from samples that were hand mixed or pummeled with a Stomacher in five *Salmonella* isolates inoculated in raw ground chicken and turkey samples



(BGS) agar plates. The plates were incubated at 35 ± 1°C and examined for typical colonies at 48 h. The samples from TT broth were diluted with 0.85% saline to 10^{-3} and 10^{-4} dilutions and plated on DMLIA plates. Following incubation at 35°C for 48 h, typical *Salmonella* colonies were counted and log colony-forming units (CFU) per ml calculated for each sample.

Serogroup of isolates

The *Salmonella* serogroups were confirmed from samples with highest sample dilution as described in MLG 4.02 section 4.8 *(15)*. Three typical colonies from each plate were picked and inoculated on TSI and LIA slants (Becton-Dickinson Diagnostics Systems, Sparks, MD), which were incubated at 35 ± 1°C for 24 hours. Colors of butts and slants were observed for typical *Salmonella* growth. Serological tests were performed to determine serogroups of isolates by use of *Salmonella* latex test kit (Oxoid Inc., Ogdensburg, NY) and grouping antiserums (Difco, Becton-Dickinson, Mansfield, MA) as described in MLG 4.02 *(15)*.

Statistical analyses

The CFU/ml was calculated from the colony counts of ten isolates inoculated in ground beef and five isolates in chicken and turkey samples. The MPN/g of ground beef or turkey samples were calculated by use of a three-tube MPN table *(15, 16)*. The mean, standard deviation and coefficient of variance were obtained from the mean counts for each experiment. The data were transformed into logarithms (base 10) and subjected to analysis of variance (ANOVA) randomized complete block design by use of SAS (Statistical Analysis Systems Institute, Cary, NC) to determine the effect of treatment on bacterial counts. A difference in results was considered statistically significant if the P value was < 0.05. The MPN/g values were analyzed by performing paired t-tests.

RESULTS AND DISCUSSION

There was no difference in qualitative (presence/absence) results between the two treatments (hand mixing and Stomacher) with all ten *Salmonella* isolates inoculated in ground beef and with the five isolates in chicken and turkey. Two measures, MPN/g and CFU/ml, were used to quantify *Salmonella* recovery in the two treatments. The *Salmonella* colony counts after inoculation of 0.04–0.25 CFU/g of the isolates in ground beef samples varied from 8.0 to 9.42 log for the ten isolates examined (Fig. 2) and from 8.0 to 9.7 in chicken and from 8.0 to 9.8 in turkey samples with the five isolates examined (Fig. 3). All of the recovered *Salmonella* isolates were identified as identical to those that had been inoculated into the beef and poultry samples. Two of the inoculated chicken samples (one with *S.* Enteritidis and one with *S.* Heidelberg) and thirteen of the turkey samples (nine with *S.* Heidelberg, three with *S.* Enteritidis and one with *S.* Typhimurium) tested PCR negative, and no typical *Salmonella* colonies were detected. The limit of detection with this method has been determined to be less than 1 CFU/g of sample *(15)*. It is possible that some of these samples were not inoculated because of a very low dose or a technical error.

The data of $\log_{10}$ CFU/ml for each isolate were subjected to analysis of variance by use of a randomized complete block design, with samples as the blocking term. All isolates inoculated in ground beef showed no significant ($P < 0.05$) difference between hand-mixing and Stomacher use, except for *S.* Typhimurium var COP (Fig. 2). This isolate showed lower populations in hand-mixed than in Stomacher mixed samples, with a low level of statistical significance ($P = 0.049$). However, when the sub-sampling component was merged with the treatment-by-block term, the difference vanished. The control samples from both treatments yielded no typical *Salmonella* colonies.

No significant differences were observed between the two treatments in the average $\log_{10}$ CFU/ml with five isolates inoculated into turkey samples (Fig. 3). However, there was a significantly ($P = 0.036$) higher average CFU/ml for the Stomacher treatment*, than for hand-

mixing in *S.* Typhimurium-inoculated chicken samples (Fig. 3). Conversely, there was a significantly lower value in CFU/ml with Stomacher use** than with hand mixing for *S.* Hadar ($P = 0.010$).

There was no significant difference in MPN/g between the two treatments with the isolates investigated in ground beef (Fig. 4) and turkey samples (Fig. 5). However, the average MPN value in *S.* Typhimurium-inoculated chicken samples was significantly higher for the Stomacher method than for hand mixing ($P = 0.037$) (Fig. 5).

The Stomacher has been compared to various types of mixers that are commonly used in food microbiology analyses *(1, 3, 4, 6-8, 9-14, 18).* No differences between Stomacher and Ato-mix blenders were observed when bacterial population of various food samples samples were compared *(1, 9–11, 13).* Significantly lower populations ($P < 0.05$) were observed in the products with high fat content, such as beef cuts (95% fat), pastry and dairy cream, when the Stomacher was used *(11).* Tuttlebee *(14)* also compared the use of the Stomacher against various other homogenization methods, and observed that counts on prawns and cooked food were significantly higher with Stomacher use. Diebel and Banwart *(2)* compared the Stomacher with other homogenizing methods (shaking, shaking with beads, and mixing in blenders) for breaking clumps and chains in enumerating various bacteria. The aerobic plate counts of *Bacillus cereus, Staphylococcus aureus and S. faecalis* were significantly higher after mixing with a Waring blender than after mixing with a Stomacher or shaking with beads. However, no significant difference was observed in plate counts with *Yersinia enterocolitica.* Sharp and Harshman *(12)* compared the recovery of *Clostridium perfringens, Staphylococcus aureus,* and molds after a Stomacher and a blender had been used and observed similiar populations with both methods for most foods, but lower cell populations with the Stomacher in foods with high fat content. Recently, a new sample processor, the Pulsifier, was used to prepare food suspensions *(18)* for microbiological analyses of 30 different vegetables; no differences in viable cell populations were observe compared to use of a Stomacher. Kang & Dougherty *(8)* compared the detachment of bacteria from lean meat tissues with use of a Pulsifier and a Stomacher and found no significant difference in total aerobic counts.

A major concern associated with evaluation of food homogenization procedures is their ability to represent total bacterial flora, because of the heterogeneous distribution of such floral, which. can vary with the nature of bacteria as well as with the type of food (cooked vs. raw). A recent study by Ingham et al. *(7)* compared mechanical stomaching to manual shaking in preparing ground meats for enumeration of presumptive *E. coli.* Their study indicated that a greater number of presumptive *E. coli* in ground beef and poultry were detected with stomaching than with shaking. However, the samples were not compressed manually after diluents were added, and lack of manual compression can increase the number of *E. coli* cells recovered.

In our experiments, the samples were hand-mixed briefly (until clumps were dispersed), after the diluents were added to samples which helps to detach the cells from the ground meat. No significant difference in the recoveries of *Salmonella* was observed between the two treatments with all ten isolates studied in ground beef and all five isolates in turkey samples. Moreover, there was no statistical difference between the two groups with respect to MPN/g in the *Salmonella*-inoculated ground beef and turkey samples studied. Chicken samples did not show any consistent method effect across the various isolates. One isolate, *S.* Typhimurium, showed significantly higher CFU/ml as well as MPN/g when the Stomacher was used, whereas *S.* Hadar showed higher CFU/ml with hand-mixing than with stomaching. Similarly, the CFU/ml value was higher ($P = 0.061$) with *S.* Kentucky and lower ($P = 0.076$) with *S.* Enteritidis ($P = 0.010$) with the Stomacher compared to hand mixing. It cannot be concluded from the data with the chicken samples if one method is better than the other.

This is the first detailed study evaluating the technique currently used in FSIS laboratories for detecting *Salmonella,* to determine any difference between hand mixing and stomaching. None of the uninoculated samples (hand mixed or stomached) showed typical *Salmonella* colonies. However, 22% of ground turkey and 2% of chicken packages tested PCR positive for *Salmonella.* These packages were not used in the studies.

The results indicate that the lowest level of *Salmonella* (0.04–0.25 CFU/g) could be detected by hand mixing as well as with use of a Stomacher in all three food matrices inoculated with the ten *Salmonella* isolates. For qualitative results (presence/absence of *Salmonella*), beef and poultry samples can be processed for *Salmonella* detection after hand mixing the samples without compromising the results. The purpose of this study was to examine if time and labor can be saved by hand mixing the samples instead of stomaching a large number of samples every day. Most of the HACCP-inspection samples are ground beef samples, and hand mixing can save significant amounts of time, cost, and effort when large numbers of samples are processed. Thus it can be concluded that it may not be necessary for testing laboratories to use Stomachers for the preparation of raw ground beef and turkey samples to detect presence/absence of *Salmonella.*

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International Association for Food Protection

Virginia/West Virginia Dairy Practices Survey

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SUMMARY

A survey of dairy farmers in Virginia and West Virginia evaluated standard dairy farm practices to determine what producers perceive to be important economic and production issues. The survey covered milk quality and safety, and farm security. Most dairies reported somatic cell counts below 500,000 SCC/ml, which is well within the legal limit. However, respondents did not support decreasing the legal limit to 400,000 SCC/ml. Most producers (59%) checked milk for abnormalities before milking and 49% treated more than half of detected clinical mastitis cases with antibiotic therapy. Antibiotic residue testing was conducted on all cows prior to addition to the bulk tank by 44% of the respondents, whereas 29% reported that they never check. Antibiotic-treated cull animals were most often handled responsibly prior to selling, and the majority of respondents (52%) would not change their cull animal practices if a financial penalty was established for animals condemned at slaughter. Farm security protocols designed to minimize the possibility of bioterrorism were rarely in place. Most survey respondents (54%) were not willing to adopt a voluntary third-party quality assurance program comprised of written disease treatment protocols, training for all workers, treatment records, and on-farm bulk tank antibiotic residue testing.

INTRODUCTION

Agriculture producers play a primary role in the food safety chain, yet typically they have little training and assistance in implementing food safety programs. Attention to agricultural and retail food handling practices can reduce foodborne illness and outbreaks of food poisoning.

In 2001, the USDA's Integrated Research, Education, and Extension Competitive Grants Program and Food Safety Initiative awarded a grant to Virginia Tech to analyze on-farm dairy practices and to ascertain producers' attitudes toward milk quality, quantity, and safety. The research objective was to obtain information useful for development of programs that will improve efficiency and profitability of specific production practices. Processors, regulators, and co-operative liaisons would benefit from this information. Ultimately, programs developed based on survey information will promote higher income for Virginia and West Virginia dairy producers.

This research project responds to a number of needs. International trade regulations, increased consumer demand for high-quality fresh foods, the emergence of new pathogens, and resistance to antimicrobials have increased concerns about safety and quality assurance at the farm level. Globalization of the world's food supply and the emergence of resistant foodborne pathogens give risk managers the responsibility of providing safe high-quality foods without increasing production costs or imposing more restrictions

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on international trade. This must be addressed at each phase of the production cycle. The food service industry is a common location of isolated incidents of foodborne illness, but outbreaks resulting from problems at the food processing level tend to be more widespread and involve more cases.

Frequently, safety and quality problems occurring in food animal commodities can be minimized at the farm level. For example, improved on-farm waste management would keep animals cleaner and less likely to carry *Escherichia coli* O157:H7 into processing facilities. Concerns over antibiotic residues in meat and milk have also raised public questions. Good record keeping and identification of antibiotic-treated animals would help keep them and their milk out of the food supply during the suggested withholding periods.

Retail operators face their own unique challenges with regard to food safety. Increasingly, consumers are demanding the freshest food from retailers, who, in turn are dealing only with processors and primary producers who can prove that they have safety and quality measures in place. The trend towards minimally processed and "fresh" foods has given retailers an added incentive to supply only the safest products.

Food safety issues occurring at the farm level are not the only problem facing producers. The term "emerging pathogens" can be used to describe a microorganism when it is first linked to a human disease. For example, *Mycobacterium avium* subspecies *paratuberculosis*, the causative agent for the cattle illness called Johne's Disease, has been linked to Crohn's Disease in humans *(7)*. The term "emerging pathogens" could also be used when sickness from a known pathogen suddenly becomes more severe or more frequent (such as the norovirus outbreaks on cruise ships), or when a known pathogen becomes prevalent again after a long absence, such as *Vibrio cholera* in raw seafood *(5)*.

In 1924, with collaboration between processors and regulators, the Public Health Service devised a series of voluntary recommendations called the *Standard Milk Ordinance* in an attempt to limit the outbreak of milk borne diseases *(3)*. This milk safety model has been updated to incorporate new technologies and is now called the Grade "A" Pasteurized Milk Ordinance (PMO). It encompasses all aspects of the dairy industry, including animal health, on-farm and processing facilities, good management practices and safe handling procedures *(3)*.

The Food and Drug Administration (FDA) and United States Department of Agriculture (USDA) also have developed on-farm guidelines in the form of Good Agriculture Practices (GAPs) and Good Management Practice (GMPs) to assist farmers with on-farm quality assurance programs *(2)*. The focus of these programs is to provide information on agricultural waste and water management, proper pesticide and chemical use, and sanitation.

Since its introduction at the 1971 National Conference on Food Protection, Hazard Analysis Critical Control Point (HACCP) has become one of the most successful programs internationally because of its simple concepts, which build upon pre-existing programs. This process management system is designed to identify hazard origins in the food production cycle. It outlines measures intended to prevent problems before they occur and to apply corrective action as soon as deviations are detected *(6)*.

In 1996, President Clinton announced a Food Safety Initiative that mandated implementation of HACCP programs for the meat and poultry industry *(6, 8)*. HACCP was originally developed to control or minimize hazards in processing plants and manufacturing environments, but recently the principles have extended to include the farm-to-table continuum. The first step in establishing a HACCP plan is to make a list of potential hazards. Producers need to realize that if any type of contamination (e.g., illegal drug residues) becomes apparent during slaughter in a meat processing plant, incoming materials, such as beef cattle or cull dairy cows, would be the most likely source to investigate *(1, 10)*. Producers who provide written information on the background of cull cows increase their stock's marketability because the packer will be able to ensure the safety of the end product for sale to domestic and foreign markets *(10)*. Several countries have developed identification systems that track animals from farm to slaughter, which provides export customers with documentation that assures product safety *(10)*.

New HACCP-based quality and safety programs are being developed to address the increased demand for dairy farmers to produce raw milk that is of the highest quality. The PMO sets the guidelines that satisfy the safety requirements of the regulators, but will these guidelines be enough to meet the quality standards set by consumers and processors? Do farmers feel that milk quantity is more important than quality? How do farmers and processors feel about these shifts in practices, and what type of on-farm programs are already in place to meet these new "standards"? We designed this study to answer these questions.

MATERIALS AND METHODS

The Dairy Foods Research Group and the College of Veterinary Medicine at Virginia Tech and the Department of Political Science at West Virginia State University collaborated to develop the survey instrument. Questions addressed demographics, mastitis and antibiotic usage protocols, handling of cull and replacement animals, farm safety procedures, and security measures.

The survey was administered to the 949 Grade 'A' Milk Producers registered in the states of Virginia and West Virginia. The US Postal Service returned six surveys; 344 dairy producers completed and returned the survey instrument. The survey instrument consisted of 45 closed-ended questions. To maximize the number of respondents, a notice was sent out prior to the survey to inform the recipients that Virginia Tech food scientists were conducting the survey and that the producers' responses would contribute to the economic, quality and safety interests of dairy farmers. The cover letter sent with the survey reiterated these points and promised anonymity to the respondents. Response rate was targeted to be between 20 and 60%; this survey had a response rate of 36.2%. Aggregate data from the 45 survey questions were used to create 75 variables that described the demographic characteristics of the dairy operations and the variation in dairy practices.

RESULTS AND DISCUSSION

Demographics

The majority of those who completed the survey were the owner/managers (64%) of the lactating herd. Thirty percent were the owners exclusively, and 6% were the herd managers. Most dairies (67%) had been in business for more than 16 years and 26% had been operating for 10 years or less. Sixty-five percent of the farming operations relied solely on dairy and associated cropping business for income.

Over the next 5 years, 59% of respondents intend to maintain their herd size and 24% intend to increase their herd. On the down side, 5% plan to decrease herd size and 12% plan to quit the business. Almost all of the milk produced in

TABLE 1. Somatic Cell Counts (SCC/ml of milk)

	< 150,000	150,000–250,000	250,000–500,000	> 500,000
July–Sept 2003	7%	36%	49%	8%
April–Jun 2003	7%	39%	47%	7%
Jan–Mar 2003	5%	27%	57%	11%
Oct–Dec 2002	5%	31%	55%	9%

TABLE 2. Percentage of producers using various practices for antibiotic treatment

Practice	Percentage
Use separate vacuum line to milk treated cows	21
Check milk from all treated cows	44
Dilute milk from treated cows with bulk tank milk	13
Do NOT check bulk tank for residues	56
Written protocol for accidental milking of treated animal into bulk tank	12
Keep reference sample from each tank in case of processor questions	8
Decision to treat is influenced by withholding requirements	40
Check milk before withdrawal period ends	31
Keep residue test results for 1 month	22

2003 (97%) was sold to processors. Only 2% of those responding processed their own milk. Total weight of milk shipped in 2002 ranged from 225 to 3,800,000 hundredweight (CWT) and averaged 23,866, with a standard deviation of 41,605 CWT.

In 2002, the average herd (dry and lactating cows) had 109 cows, with a range of 12 to 800 head. The predominant breed was Holstein (94%), followed by Jersey (4%) and Guernsey (1%). Almost all of the producers who responded to the survey (98%) uniquely identified their herd animals. A variety of animal identification practices are used, and some dairies use more than one method. Dairies most commonly identified cows with ear tags (80%). Visual recognition (37%) and neck chains (29%) were also common methods.

Mastitis and antibiotics

Microbial resistance to antibiotics is an increasing source of concern for producers. Resistance occurs when pathogens exposed to sub-lethal stresses develop new traits and characteristics that make them more resistant to antibiotic treatment *(5)*. Antibiotic resistance to several classes of antimicrobials has been documented in *Staphylococcus aureus* strains, which makes *S. aureus*-caused mastitis difficult to treat *(9)*.

Somatic cell counts were reported by survey respondents for the last quarter of 2002 through the third quarter of 2003 and are presented in Table 1. The legal limit is 750,000 SCC/ml of milk *(3)*. Counts higher than 200,000 to 300,000 SCC/ml are considered to be above the level expected in a healthy herd. Premiums are often paid for milk with counts less than 200,000 SCC/ml *(4)*; however, when survey respondents were asked if they thought it was a good idea to reduce the legal SCC limit to 400,000 SCC/ml, 70% said "no". More than half of those responding (59%) examine (forestrip) each cow's milk for abnormalities before attaching the milking unit.

Several survey questions addressed antibiotic treatment and testing practices (Table 2). Respondents typically (79%) milk antibiotic-treated cows using the same vacuum line as that used for untreated cows. Forty-four percent of those polled tested milk from all antibiotic-treated cows for residues before adding it to the bulk tank; twenty-nine percent never checked and 27% checked milk from selected treated cows. Producers typically (87%) do not dilute milk from treated cows with milk from the bulk tank before it is tested for antibiotic residues. Most producers (56%) never test the bulk tank for antibiotic residues, although 41% of those polled say they do under some circumstances. Only 2% test the bulk tank for residues before each pickup, and 1% after each milking. Eighty-eight percent of producers surveyed have no written protocol to follow if an antibiotic-treated cow is accidentally milked into the bulk tank, and very few producers (8%) keep a sample from each bulk tank shipment to use as a reference in case the processing plant detects residue or other problems. More than half of producers surveyed (53%) said that withholding requirements (such as the requirement that milk from treated animals be withheld from the bulk tank) do not influence their deci-

FIGURE 1. How do you decide which antibiotic test kit to use?

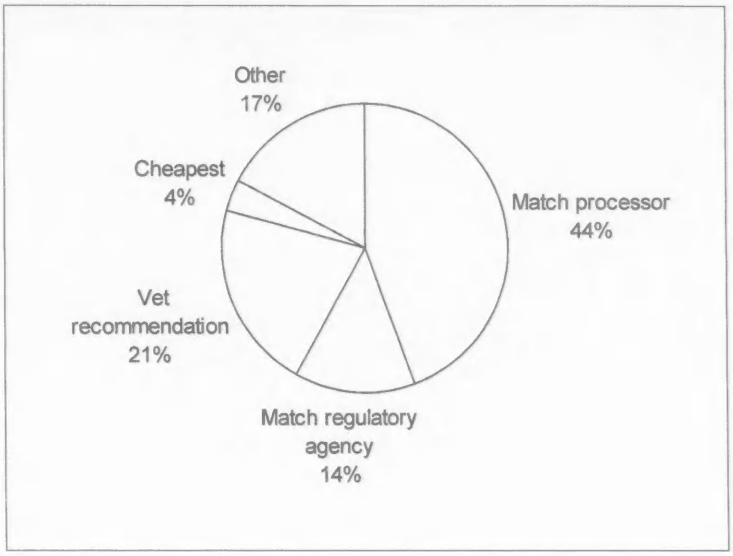
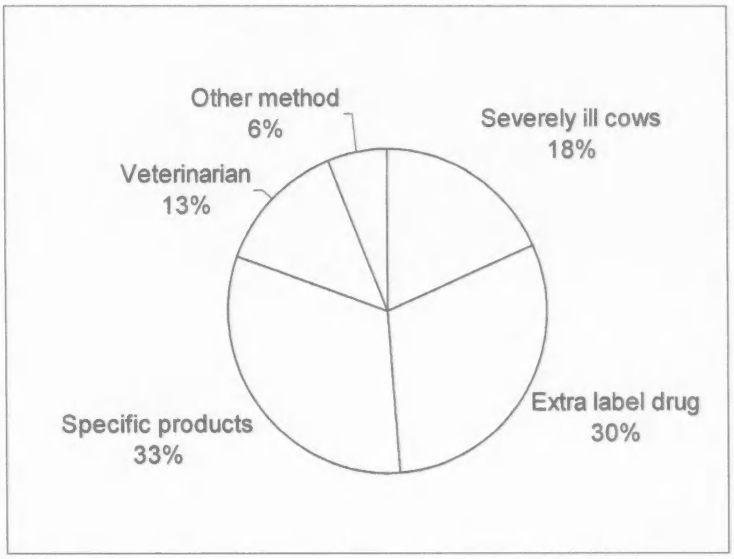


FIGURE 2. Selection methods for testing milk from antibiotic treated cows



sion to treat mastitis with antibiotics. Seven percent use antibiotics that have no withholding requirement. However, 31% of those surveyed have tested the milk from treated cows before the end of the antibiotic withdrawal period, so that milk that tests negative could be added to the bulk tank.

Most often, respondents (44%) tried to match the antibiotic residue test kit that is used by the processor (Fig. 1). Some producers used kits recommended by their veterinarian (21%), and some matched those used by the regulatory agency (14%). It is interesting to note that only 4% of respondents use the cheapest testing kit available. Results of residue tests are seldom kept for one month — only 22% of those surveyed follow this record keeping practice.

Those who checked milk from selected medicated cows were asked what influenced their decision to choose particular animals (Fig. 2). Most often, animals that were treated with specific products (33%) or those treated by extra label drug use — use of a drug in a manner for wich it was not approved (30%) were preferred for selective milk exams, and only 18% of those who checked milk from selected cows choose the severely ill ones to test. It is interesting to note that veterinarians seldom selected the cows chosen for antibiotic residue testing (13%).

Producers followed quite a wide range of procedures in treating clinical mastitis cases with antibiotics. The largest portion of the producers (35%) treat less than one-fourth of detected mastitis cases, while some producers (38%) treat between 26 and 75% of mastitis cases, only 27% of the dairies treat between 76 and 100% of the infected cows (Fig. 3). Nearly all producers surveyed (92%) allow only the herd manager or other designated employee to administer antibiotics. Six percent of those designated employees have never been trained to calculate dose and give antibiotics; most are trained by the herd manager (68%) or by a veterinarian (23%).

Table 3 describes popular methods producers use for identification of medicated lactating and dry cows. When cows are being treated with antibiotics, most producers use leg bands to identify them. Crayons or paint and chalk or white board are also commonly used to identify these animals. Computer records, parlor milk meters and neck bell chains are seldom used for identification of medicated animals. Lactating cows that are being treated with antibiotics are infrequently maintained separately from the milking herd (only 13% of producers responding do this). However, dry cows that are being treated are often separated from the rest of the herd (72%).

Cull and replacement cows

USDA's Animal and Plant Health Inspection Service has launched the National Animal Identification System (NAIS) that is designed to identify and track animals as they come into contact with animals other than herd mates from their premises of origin. In the event of a disease concern, this voluntary program offers a consistent, nationwide means of animal identification that will provide rapid tracing of a sick animal or a group of animals back to the premises that is the most likely source of infection. This system facilitates the traceability of potentially exposed animals that were moved from the herd

TABLE 3. Methods for identification of antibiotic treated, lactating and dry cows

Method	Percent of respondents using the method	
	Lactating cows	Dry cows
Computer records	9	14
Parlor milk meter	4	3
Neck bell chains	2	2
Crayons or paint	50	35
Chalk or whiteboard	41	17
Leg bands	72	46
Maintain separately from the rest of the herd	13	72

TABLE 4. Farm security, safety and quality control practices

Practice	Percentage answering "yes"
Locked gates for access control	4
Video surveillance system in place	2
Restricted access to antibiotic storage areas	14
Antibiotic foot baths/foot sprays	43
Separate storage areas for dry/lactating cow products	87
Automated temperature recorder on bulk tank	83
Supplier documentation for feed supplies	31
Keep delivery records of feed supply purchases	17
Depend on supplier reputation for supply compliance with restrictions	85
Producer tests for banned meat and bone meal	2
Lab analysis for drinking water quality	83
Written disease treatment protocols	27
Written vaccination protocol	37
Would adopt a volunteer QA program	46

or farm, such as cull dairy cows when they go to a livestock market or slaughter facility *(12)*.

Several survey questions focused on cull animals and antibiotics. The largest portion of survey respondents (58%) identified livestock markets for disposal of ambulatory cull animals. Thirty-five percent use cull cow buyers and only 7% send the animals directly to the slaughter house. For the most part, cull animals are not tested for antibiotic residue, but 82% of respondents wait the appropriate withholding period before selling animals that have been treated with antibiotics. When asked what they would do if a financial penalty were established for animals condemned at slaughter, more than half of respondents (52%) said they would not change their testing protocol for cull animals.

Figure 4 illustrates the practices commonly available to producers in order to make certain they purchase replacement animals that will produce safe quality milk. The majority (67%) of respondents do not buy replacement animals. However, 16% do, relying primarily on the seller's reputation to ensure that they purchase quality replacement animals. Cow checks for mastitis were cited as a distant third choice (6%) in ensuring quality replacement animals. Only 4% of those surveyed use no method at all to ensure the health of replacement animals.

Of those producers that purchase replacement animals, many used more than one means of assuring the health of the animals. When asked their second choice for checking animals prior to procuring, cow checks for mastitis (28%) and milk testing for antibiotic residue (28%) were cited, followed by examination of records documenting the cows' history (19%).

FIGURE 3. Mastitis cases treated with antibiotics

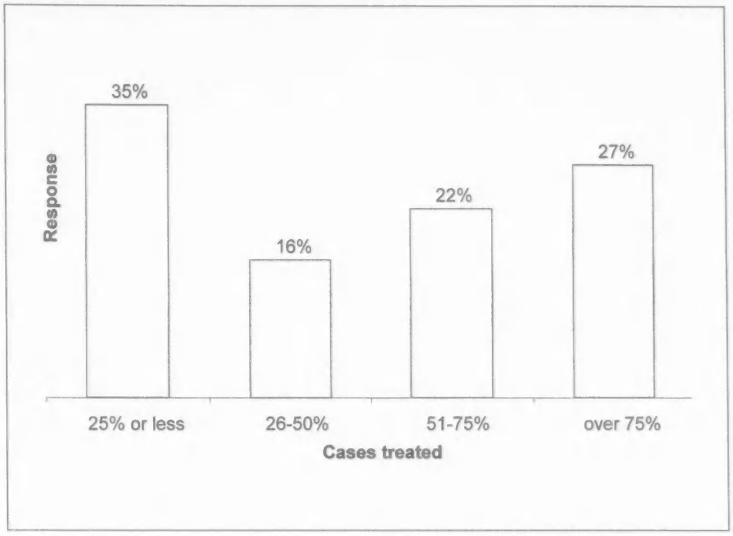
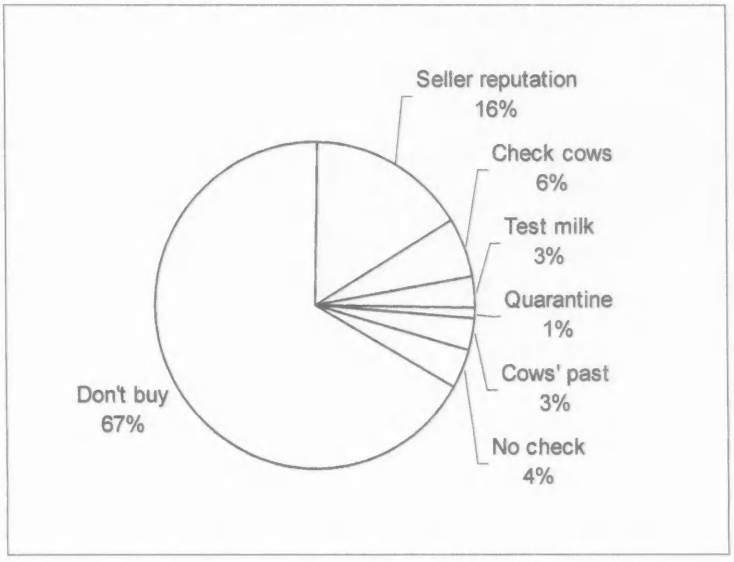


FIGURE 4. Practices followed to ensure quality milk from replacement animals



Farm safety and security

Certain control measures are encouraged at the farm level to improve security, increase quality and ensure safety of the milk supply. These measures were posed in question form in the survey. Results are presented in Table 4. Very few survey respondents (4%) control access to their farm with locked gates and even fewer (2%) had a video surveillance system in place at their dairy. The largest portion of those surveyed (86%) do not restrict access to antibiotic storage areas by lock and key or other methods. Most producers (57%) do not use antibiotic (lincomycin, streptomycin) footbaths or in-parlor foot spraying. Eighty-seven percent of survey respondents maintain separate storage areas for lactating and dry cow products, and 83% use an automated recording device for continuous monitoring of bulk tank temperature.

Sixty-nine percent of producers do not use documentation from suppliers to ensure that purchased feed supplies are in compliance with meat and bone meal restrictions, and 83% keep no delivery records of purchases to make sure that purchased feed supplies are in compliance. The majority (85%) of those surveyed rely on supplier reputation to make sure feed supplies are in compliance with these restrictions. Only 2% test for banned bone and meat themselves *(11)*.

Most producers (47%) have the bacterial quality of the drinking water for lactating cows checked by laboratory analysis once a year, 20% have it tested every 3 years, and 16% of those surveyed have the water checked more than once a year. However, 17% of those surveyed never have the drinking water checked.

The majority of those surveyed (73%) have no standard written treatment protocols in place for commonly occurring disease conditions, 20% have written protocols for some illnesses, and 7% have written treatment plans for all common disease); most (63%) have no standard written vaccination protocol/program. Producers were asked if they would be willing to adopt a voluntary third-party certified quality assurance program that required written treatment protocols, training for all workers, treatment records, and on-farm bulk tank antibiotic residue testing. The majority (54%) of respondents indicated that they would not participate in such a program. A strong majority (70%) of respondents opposed lowering the legal SCC limit from 700,000 to 400,000 SCC/ml. The data show that producers' attitudes about lowering the SCC limits have some influence on whether to participate in third-party audited safety systems. Those who opposed lowering the SCC limits are more apt to be uninterested in participation in audited safety systems. Of the 46% who said they would be willing to adopt a QA program, most (29%) were willing only if it resulted in a net return of at least 10 cents/CWT and only if there was minimal cost involved with the program's implementation.

CONCLUSION

The information gained by this survey is intended to help dairy farmers assess the overall efficiency of their dairy operation, to assist them in determining the profitability of the dairy, and to

design programs to protect the safety and wholesomeness of milk. Programs that are developed based on data from this survey may be used to promote better relationships between dairy producers and processors and may lead to development of a marketing program that will promote Virginia and West Virginia dairy products to retail consumers.

Survey results will be utilized in the development of integrated HACCP-based methodologies for the production arena and incorporation of these plans to create a functioning quality and safety system. There is particular need for control point identification and methodology in the areas of antibiotic residue testing and farm security.

ACKNOWLEDGMENTS

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The Virginia Tech Dairy Foods Research Group identifies and directs dairy product research and outreach of importance to the dairy industry within Virginia and the US Research includes projects in dairy food safety, quality, processing, packaging and food product development. For more information, call the Department of Food Science and Technology at 540.231.6806 or access our Web site at http://www.fst.vt.edu/.

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Understanding and Controlling Microbiological Contamination of Beverage Dispensers in University Foodservice Operations

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SUMMARY

We have previously observed that beverage dispenser tips often contain high total microbial counts and are among the most contaminated surfaces found in foodservice establishments. The objective of this research was to determine the cause of these high microbial populations and find a practical solution to the problem.

Experiments were conducted on beverage dispensers in use in university dining halls as well as on an identical but new beverage dispenser located in our laboratory. Orange juice was dispensed through the various dispensers and total plate counts from the dispenser tips were measured at appropriate time intervals. Sanitizing solutions containing 100 and 200 ppm chlorine were used on beverage dispensers in dining halls, and subsequent microbial counts were observed throughout the following day.

Microbial counts tended to be highest immediately after a beverage had been dispensed and then declined gradually over time. Microbial counts from the new laboratory-based dispenser were initially low, but increased over time. Sections of the inside of the dispenser tip were observed with a fluorescent microscope, and results suggested the formation of biofilms. High microbial counts obtained by swabbing the inside of the dispenser tips were also consistent with the presence of biofilms. Sanitizing with a 200-ppm chlorine solution resulted in a greater reduction in microbial counts than with a 100-ppm solution. These results suggest that using a higher concentration of sanitizer may help reduce microbial counts on beverage dispenser tips.

INTRODUCTION

Microorganisms are present on many surfaces in foodservice operations *(3, 7)* but juice dispenser tips are among those showing the highest total microbial counts *(3)*. Tips dispensing other beverages (e.g., acidic carbonated beverages such as cola) were less prone to contamination than were those dispensing fruit juices *(11)*. Although high total microbial counts alone do not indicate a food safety issue, they are an indicator of sanitation problems, and although all the juices served in Rutgers University dining halls are pasteurized and typically have bacterial counts of > 1,000 CFU/ml, unpasteurized juices have been the source of several foodborne illness outbreaks in the recent past *(10)*.

Proper surface sanitation in foodservice establishments is an important part of a food safety program. Sanitizer concentration and exposure time are two crucial factors in surface sanitation *(14)*. It is possible that microorganisms present on food contact surfaces have colonized those surfaces to form biofilms *(6, 13)*. Biofilms are a great concern in food processing *(9, 16)*, because cells in biofilms tend to have greater resistance to sanitizers than do planktonic cells *(12)*. Chlorine and chlorine compounds, commonly used as disinfectants in foodservice operations, are generally effective at controlling biofilms *(8, 9, 12)*. Increasing the

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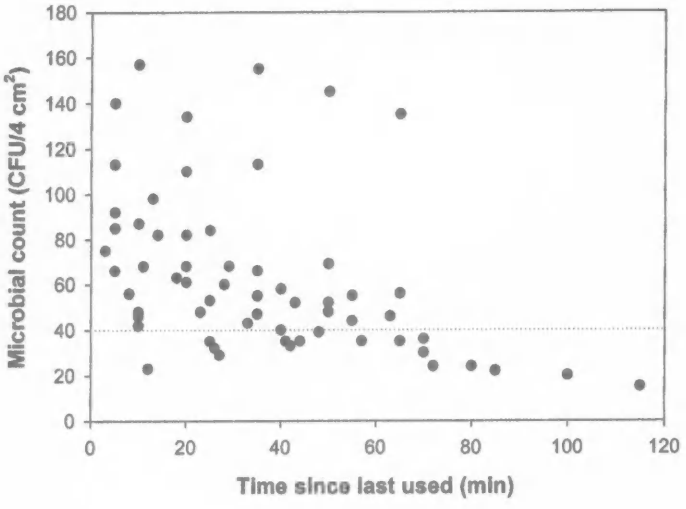
FIGURE 1. Relationship between time since the dispenser tip last used and microbial count observed in an orange juice-dispensing tip. The program guidelines for maximum contamination level for "in-use" surfaces (40 CFU/cm²) is shown by the dotted line.



chlorine concentration of a sanitizer generally helps to increase its biocidal effect on biofilms *(4)*.

Prior research in our lab has determined relative contamination levels for a variety of food contact surfaces in university dining halls *(11)*. Sanitary guidelines established for food contact surfaces in Rutgers University dining halls also dictate that total microbial counts for an "in-use" surface should fall below 40 CFU/4 cm² *(17)*. Because orange juice is the most widely consumed juice in the Rutgers University Dining Services system, and because prior research has shown that orange juice dispenser tips were among the dispenser tips showing the highest levels of contamination *(3)*, typically well above 40 CFU/4 cm², we chose to further investigate the causes of these high microbial populations as well as solutions for controlling this problem.

MATERIALS AND METHODS

Juice dispenser tip sampling

Each Escort III juice dispenser tip consists of three parts: the main housing and two small baffles which fit inside the housing. The two baffles fit together to form a cylinder, which slides into place inside the main housing. The baffles aid in mixing juice concentrate and water as the two fluids flow through the main housing. Only the lower end of the main housing is exposed to the environment, and it is this end which is sampled for the presence of microorganisms.

The sampling procedure followed protocols commonly used in our lab *(3)*. CON-TACT-IT® tape, a gamma-irradiated sterile tape commonly used in microbiological applications for surface transfer of bacteria and other microorganisms, was pressed onto the dispenser tip, and excess beverage liquid was shaken off. The tape was then pressed onto total plate count agar, and agar plates were incubated at 37°C for 24 hours prior to enumeration.

The dispenser tips were sampled for total microbial counts at predetermined time intervals (e.g., 5, 15, 30 minutes), while at the same time, use of the juice dispenser by dining hall patrons was also recorded. Experiments were typically conducted over an entire work day (~ 8 h).

Contamination in a new dispenser

A new, unused juice dispenser was provided by the Rutgers University Division of Dining Services for research purposes. This juice dispenser was used and cleaned on a daily or weekly basis. Data on the microbial contamination of this dispenser over time was collected in a manner identical to that previously indicated.

Microscopy

Representative colonies from agar plates were selected for microscopic observation. Colonies were transferred to glass slides and Gram stained. Slides were observed at 400× under oil immersion.

At the end of representative days of sampling, and before the juice dispensers were rinsed and sanitized, dispenser tips were removed from the dispensers and transported to the laboratory. The tips were then cut into small sections, stained with acridine orange and observed under epifluorescent microscopy, following the procedure of Hood and Zottola *(5)*.

Dispenser servicing

Beverage dispensers are typically serviced by non-university (vendor) technicians twice a year. During servicing, electrical connections are checked and dispenser tips are replaced, but internal tubing is not replaced. Data were collected on one juice dispenser on the day immediately before and on one on the day immediately after servicing, using the dispenser tip sampling technique already described.

Tip cleaning dispenser rinsing and sanitizing

The three pieces of juice dispenser tip, a mixing chamber that precedes the juice dispenser tip and an inlet tube that feeds the juice concentrate into the dispenser are the only parts of the juice dispenser that can be disassembled, scrubbed and cleaned with detergent. The other components of the dispenser, including all the internal tubing, must be "cleaned" without disassembling the unit. Dining hall personnel follow the manufacturer's directions to treat each unit. They use a sanitizing solution containing 100-ppm chlorine to sanitize beverage dispensers at the end of each service day. Prior to sanitizing, juice concentrate containers are removed from the juice dispenser and replaced with tap water. Tap water is used to flush residual juice concentrate out of internal tubing of the dispenser before sanitizing.

Experiments were conducted in which cleaning and/or rinsing and sanitizing the day before was conducted by dining hall personnel following typical practices and using the standard sanitizing solution containing 100-ppm chlorine. Additional experiments were conducted in which the juice dispensers and tips were cleaned and/or rinsed and sanitized by one of us (CL), using either the standard sanitizing solution containing 100-ppm of chlorine or a double strength sanitizing solution containing 200-ppm of chlorine.

FIGURE 2. Increase in microbial contamination over time on the tip of a new juice dispenser. The program guidelines for maximum contamination level for "in-use" surfaces (40 CFU/cm²) is shown by the dotted line.

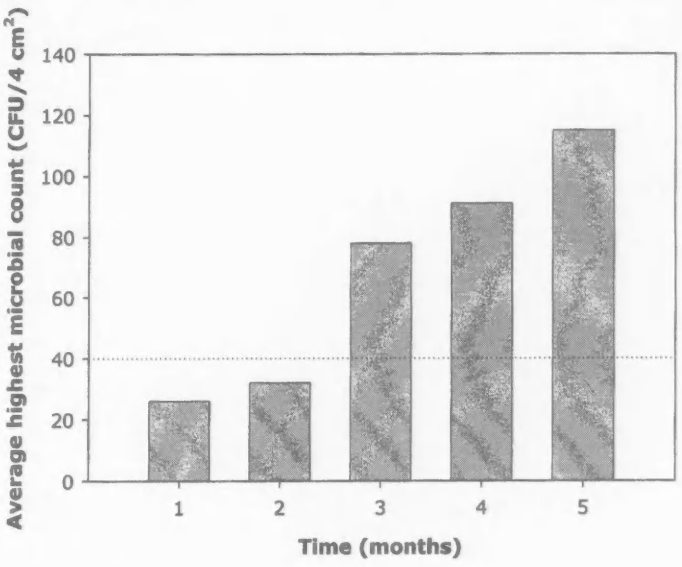
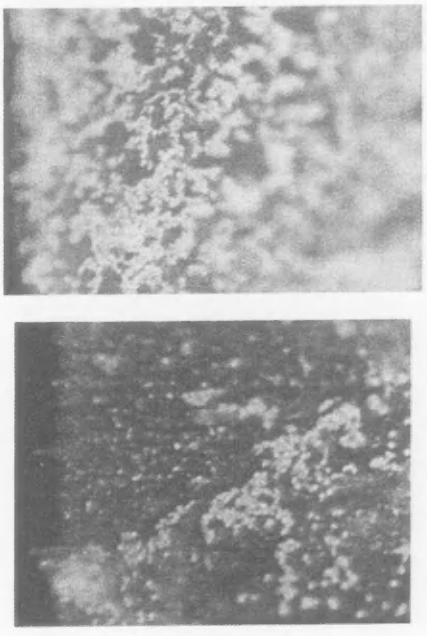


FIGURE 3. Acridine orange stained fluorescent microscopy images of the inner surfaces of an orange juice dispenser tip. Top panel: image from the inside of the dispenser housing. Bottom panel: image from an inner baffle.



RESULTS AND DISCUSSION

Dispenser tip contamination

Figure 1 shows the time since an orange juice dispensing tip was last used and the associated microbial counts during one typical day. As is evident, the microbial counts obtained throughout the day were regularly above the program guideline of 40 CFU/4 cm², shown by the dotted black line. It is also evident from Figure 1 that the microbial counts tend to be highest immediately after a beverage is dispensed, after which they decline over time.

Experiments done with different sampling time intervals, from 5 to 30 minutes, showed the same change in the rate of decline with time (data not shown). These data indicate that repeated sampling of the dispenser tip does not affect microbial counts obtained at later times.

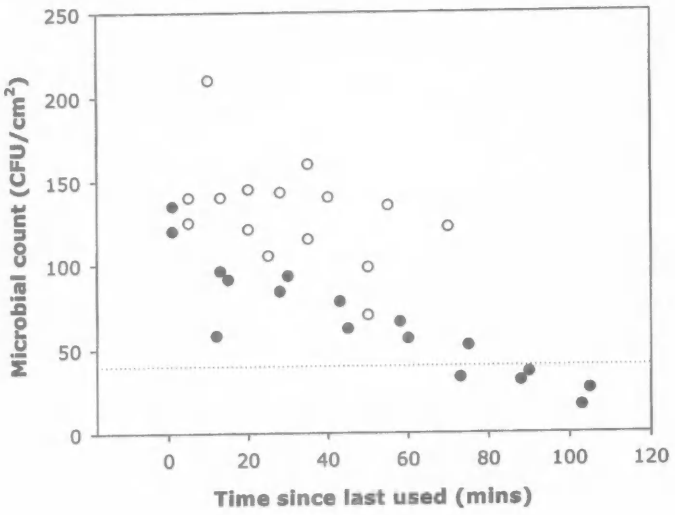
Immediately after a juice dispenser dispenses a beverage, a small portion of residual liquid remains on the tip. Because the dispenser tip is not refrigerated, an increase in microbial counts with time after each dispensing event might be expected, as the microbes present in the residual juice would begin to grow. Figure 1 shows that this is clearly not the case. It appears instead that, over time, the residual liquid starts to dry out. This may result in an inactivation of the organisms present or simply in a reduction in the likelihood of recovering those organisms because of the reduction in moisture content. It is known that the presence of moisture can facilitate microbial transfer between surfaces *(15)*.

The microbial count of Rutgers University dining hall orange juice, which is evaluated periodically *(11)*, averages less than 1,000 CFU/gm. The pH of orange juices dispensed in Rutgers University dining halls falls within the normal expected range of 3.3 to 4.1 Dispensing juice through a tip containing high microbial populations does not appear to significantly affect its microbial count. Estimates of the weight of juice remaining on a juice dispenser tip and weights of juice transferred to CON-TACT-IT® performed with an analytical balance indicate that virtually none of the CFU detected on a juice dispenser tip arise from the microbial concentrations found in juice concentrate.

Contamination in a new dispenser

Figure 2 shows a summary of the data collected from the research juice dispenser. The data plotted against the y-axis represent the average highest count observed in each month, once the dis-

FIGURE 4. Effect of service on the microbial counts. Open circles represent counts before services, closed circles counts after servicing. The program guidelines for maximum contamination level for "in-use" surfaces (40 CFU/cm^2) is shown by the dotted line.



penser had been placed in service in the lab. Average highest count represents the average of the highest 10% of all the counts observed in a given month. The average highest counts observed in the first two months after the dispenser was placed in service are within the program guidelines (40 CFU/cm^2, shown by the dotted line), although a slight upward trend is evident from month 1 to month 2. Months 3 through 5 all show average highest counts well above the program guidelines and a continued upward trend. Although the usage rate of the research juice dispenser was less than that of a typical dispenser used in a dining hall, the data for months 3 through 5 of the research dispenser closely approximates similar data obtained from juice dispensers in use in University Dining facilities.

The fact that microbial counts on a juice dispenser tip in a new dispenser increased with use and over time is consistent with the development of a biofilm inside the juice dispenser. Microorganisms tend to attach to surfaces that are in regular contact with liquids and form biofilms *(2)*. Biofilms may also cause biofouling, a term often used where the formation of biofilms is undesirable, e.g., impeding the flow of liquids, cross contamination, etc. *(8)*, although no evidence of impeded flow is evident in the case of the juice dispensers studied here.

Microscopic observation and epi-fluorescence imaging

Microbial evaluation of colonies isolated from dispenser tips revealed the presence of yeasts and some gram-negative bacteria. Previous studies have also indicated that there are a wide variety of yeasts in orange juice *(1)*.

Persistent high microbial counts from the beverage dispenser tips, which tended to increase over time, suggested the possibility of biofilm formation. Figure 3 shows epi-fluorescent microscopy images of the inner surfaces of orange juice dispenser tips. Figure 3 — top panel is an image taken from the inside of the main housing. Figure 3 — bottom panel is from an inner baffle piece. Similar images (data not shown) were obtained from other inside surfaces of the juice dispenser tip assembly. Blurred edges are due to the curved nature of the solid surfaces, but the images are consistent with the presence of microbial biofilms on the inside of juice dispenser tip surfaces. Swab tests of the internal surfaces of the juice dispenser typically revealed high concentrations (> 10^4 CFU/cm^2). It is interesting to note that although dispenser tips are the one location on a juice dispenser that are cleaned with detergent and physically scrubbed, biofilms still apparently develop.

Effect of dispenser servicing on microbial counts

The marginal decrease in microbial counts after servicing is seen clearly in Figure 4. Although servicing does appear to have an effect on the sanitary quality of the juice dispenser tips, and although the range of counts observed after servicing (solid circles) is lower than before services (open circles), in many cases the microbial counts observed were well in excess of the program guidelines (dotted line). The nominal reduction and the reduced variability are most likely due to the discarding of the old dispenser tips and their replacement with new ones.

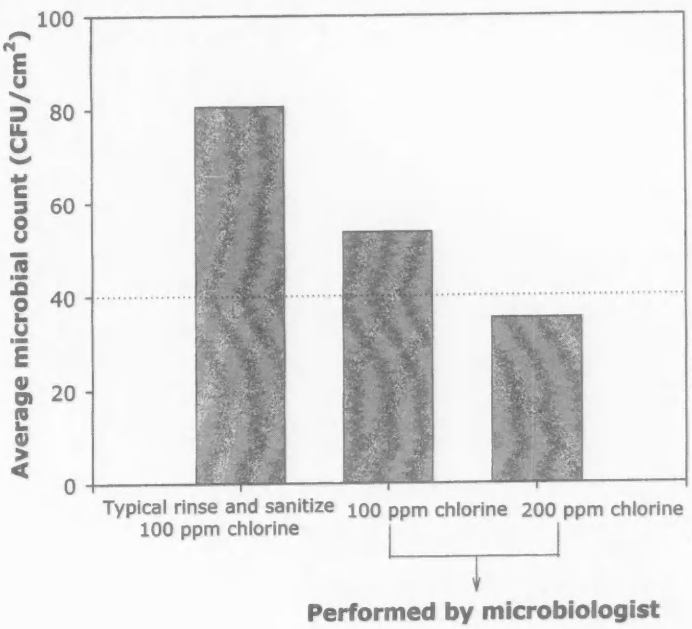
Effect of sanitizer concentration

Figure 5 shows that typical sanitizing by dining hall personnel results in a juice dispenser that will not, on average, meet the guidelines for sanitary quality of surfaces laid out in the program *(17)*. Careful, deliberate rinsing and sanitizing by one of the authors (CL) resulted in an improvement, but the dispenser would still not meet our guidelines for sanitary quality of surfaces on average. When careful, deliberate rinsing and sanitizing was coupled with a doubling in strength of the sanitizing solution, this did result in a juice dispenser tip that would, on average, over the course of the next day, meet our guidelines for sanitary quality of surfaces. These results indicated that improved training for dining hall employees and an increase in the level of sanitizer routinely used are probably warranted.

CONCLUSIONS

Our results indicate that microbial counts on juice dispenser tips are highest immediately after a beverage has been dispensed, after which counts tend to decline until the dispenser is used again. A new (previously unused) dispenser showed low average microbial counts in the first two months of use, but these microbial counts increased with time and use. In less than four months, counts in a new dispenser were comparable to those in dispensers in regular use in the dining halls. Examination of the inner surface of orange juice dispenser tips, by use of fluorescent microscopy, indicated possible biofilm formation inside them. Surface swabs of the internal surfaces of dispenser tips also revealed high counts consistent with biofilm formation. Servicing a dispenser (even after replacing old dispenser

FIGURE 5. The effect of juice dispenser rinsing and sanitizing on average microbial counts. The program guidelines for maximum contamination level for "in-use" surfaces (40 CFU/cm²) is shown by the dotted line.



tips with new) did not significantly reduce microbial counts. Properly rinsing the juice dispenser and increasing the concentration of the sanitizer to the maximum level allowed (200 ppm chlorine) helped to reduce average microbial counts to acceptable levels.

Our results indicate that juice dispensers that are rinsed and sanitized may eventually develop juice dispenser tips that are highly contaminated with a variety of microorganisms. This contamination is consistent with the development of a biofilm on the internal tubing of the juice dispenser and the juice dispenser tip. Proper rinsing (following the manufacturer's directions) and sanitizing (with the maximum allowed level of sanitizer) may help to control but not eliminate the problem. Our results suggest that development of a true clean-in-place system, which uses detergent and some type of physical action, may better control biofilm development.

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Special Report

Perspectives on Avian Influenza Risk Management for Food Safety Professionals

Prepared by The International Association for Food Protection®

Scientists, animal health, and public health advisors from government, academia, and industry are mobilizing to address the Asian form of the H5N1 avian influenza (AI, bird flu) spreading in Southeast Asia. While avian influenza primarily affects birds, health experts also are concerned that events in Southeast Asia could lead to a new human pandemic form, resulting from mutation of the virus or recombination between this virus and the human influenza virus. Given these events, scientists and advisors are cooperating to educate poultry producers, the food industry and the general public about avian influenza. The objective of this brief is to provide food safety professionals with a background on the Asian H5N1 avian influenza virus, methods to control its spread, suitable procedures to inactivate the virus should poultry or eggs be contaminated, and links to agencies for additional details.

Background on influenza: Influenza viruses are ubiquitous and normally attack only the one species they're named after; in other words, bird flu attacks birds. The current bird flu in Southeast Asia is caused by a specific strain of AI virus H5N1. Virus subtypes (ex. H5N3, H7N7) are named based on tests for specific surface proteins, hemagglutinin (H) and neuraminidase (N). Unfortunately, even specific strain designations can cover a whole range of viruses, some of which result in mild illness whereas others have higher morbidity and mortality. Therefore, strain designation itself, such as H7N3 or H5N1, does not provide the entire picture on virulence or ability to transmit between host species.

Recently, bird-to-human transmission of Asian-H5N1 has been responsible for cases of human respiratory disease and deaths in SE Asia. The reported human cases have been few, demonstrating that while the virus is very pathogenic it lacks the ability to easily infect humans. However, an even bigger concern is that sometime in the future, as a result of repeated human infections, this H5N1 poultry strain could mutate or combine with a human flu virus and create a new form that could spread from person-to-person. If this new virus is unique from other flu viruses and retains high virulence, then it has the potential to cause a flu pandemic similar to that seen in 1918, 1957, and 1968. However, at the moment the circulating H5N1 bird flu strain does not have this capability to be transmitted from human to human.

These H5N1 infections are primarily a problem of poultry. The World Organization for Animal Health (OIE) recommends early detection and rapid depopulation of any affected poultry flock in the event highly pathogenic avian influenza (HPAI) is detected. Poultry flocks containing HPAI-affected birds are humanely euthanized and destroyed to prevent the virus from spreading to other birds. Stopping the spread of virus among poultry populations also helps protect human health, as there are fewer opportunities for this virus to infect humans.

More on Avian Influenza: Infection of wild and domestic bird populations by low-pathogenic strains of AI (LPAI) have been reported globally for more than 125 years, carried without symptoms by wild birds, and typically presenting only mild illness in domestic birds. Research has demonstrated that low-pathogenic AI virus has a limited distribution in affected birds and is not found in muscle meat or eggs.

International Association for Food Protection
www.foodprotection.org

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Recent infections due to HPAI, specifically the Asian-H5N1 form, have resulted in the destruction of more than 150 million birds in Southeast Asia alone, either directly by virus infections or indirectly because of the destruction of suspect flocks as a method to control spread of the disease. Once domestic poultry are infected with HPAI, 50-100% of them die within 4 days. The remaining birds that survive stop eating and laying eggs, lose weight, have diarrhea, and become dehydrated and lethargic.

The current problem with the specific HPAI strain (Asian-H5N1 HPAI), appears to have developed in the 1990s in China, was first documented in the 1997 Hong Kong outbreak, and since has begun to move to other parts of Asia, Europe, and other regions of the world, through migratory birds and through legal and illegal agriculture commerce. Chickens are particularly susceptible to this H5N1 strain. In cases where people have become infected, it has been as a result of intimate contact with sick birds, like the slaughtering and destruction of sick birds. More than 130 people have developed illness and almost half of these people have died. There are no reported cases of human infections resulting from the consumption of cooked infected poultry.

While the current Asian H5N1 strain is clearly a serious concern to animal health and to the health of those who are directly exposed to infected birds, the risk of the virus to be transmitted through the food supply is very low. Even though the high pathogenic AI virus can be found in the muscle and eggs of the infected poultry, research and epidemiological investigations continue to show that contaminated poultry and eggs that have been properly cooked do not spread the disease. Consumption of raw poultry ingredients (e.g., raw blood-based dishes) is a high-risk practice and is discouraged.

Several factors along the "farm-to-fork" continuum contribute to the low probability of food as a vehicle for AI spread in humans and should continue to be practiced.

- Procedures to control AI in commercial flocks:
  - *Biosecurity:* Most commercial flocks, such as those in the US and Canada, are raised in enclosed housing to prevent contact with wild birds that may carry disease. Strict biosecurity measures limits exposure from all sources. Domestic flocks raised on range or in open flight pens may become exposed to fecal contamination from infected wild birds, and thus should be protected.
  - *Surveillance*: Commercial flocks are under continuous surveillance for the presence of any disease. HPAI can cause serious illness and death in chickens and turkeys. Infected layer flocks, even with LPAI, significantly reduce egg production and soon stop laying. Such indications are often enough to alert farmers, and remove laid eggs from the food chain. Any sign of widespread illness, death, or reduced egg laying brings animal health specialists to investigate.
  - *Intervention*: In many countries, like the United States, bird flu is a reportable disease. If avian influenza is found, government veterinarians move quickly to quarantine the farm and, where appropriate, humanely euthanize the birds. Afterwards, the housing facilities are vigorously cleaned and disinfected. Furthermore, the area is intensively monitored afterwards to watch for any signs that the deadly bird flu has remained. The United States has authority to compensate for losses resulting from these emergency measures.
  - *Inspection*: Poultry destined for slaughter in the US are inspected, another key tool for detecting potential disease and keeping sick animals from entering the food supply. Animal health officials are working cooperatively with the poultry industry to conduct surveillance at breeding flocks, slaughter plants, live-bird markets, livestock auctions, and poultry dealers.
- Interventions in food processing:
  - Regardless of whether a region is experiencing a bird flu outbreak, standard food processing practices used to reduce other microbial hazards such as *Salmonella* are sufficient to inactivate the AI virus. Therefore, the cooking, pasteurization, cleaning and sanitizing practices used to produce our food will inactivate the Asian H5N1 virus. Refrigeration or freezing has little effect.
  - *Detergents and Sanitizers*: Like other viruses with lipid envelopes, the H5N1 virus is also sensitive to most detergents and disinfectants used at the recommended concentrations.

- *Carcass washes*: Antimicrobial carcass washes used to reduce *Salmonella* and *Campylobacter* will inactivate the AI virus.
- *Egg surface disinfection*: Commercial egg suppliers in North America wash and then disinfect the outside of eggs with chlorine prior to breaking or packaging to eliminate shell contamination with both LPAI and HPAI from contaminated poultry droppings.
- *Cooking*: Normal cooking for poultry meat will inactivate the virus. HPAI virus is inactivated in poultry meat held at 70°C for one second, which is significantly less than the 82°C recommended to consumers for best flavor and to reduce other bacterial pathogens on poultry.
- *Egg Pasteurization*: Temperatures* that are used by industry in the preparation of foods to inactivate other pathogens are more than sufficient to inactivate AI. The World Organization for Animal Health (OIE) has published the following table of inactivation temperatures for HPAI virus present in egg and egg products:

	Temperature °C	Time
whole egg	60	210 sec
whole egg blends	60	372 sec
whole egg blends	61.1	210 sec
liquid egg white	55.6	372 sec
liquid egg white	56.7	210 sec
10% salted yolk	62.2	372 sec
10% salted yolk	63.3	210 sec
dried egg white	67	15 days

*These are not minimal temperatures required for the inactivation, but the temperatures normally used by industry in the preparation of these products, guaranteeing the inactivation of other pathogens as well.
Source: www.oie.int/eng/AVIAN_INFLUENZA/Terrestrial%20Code_Draft_Guidelines%20for%20AI%20inactivation.pdf

- *Advice for consumers*: For people traveling to areas of the world where the HPAI H5N1 bird flu has been found, several common sense precautions will minimize any chance of exposure: Avoid unprotected, direct contact with live poultry and pigs that may be infected with influenza, such as at farms or open-air markets. Follow all recommended food safety practices, including proper cooking and preventing recontamination. For best flavor and greatest margin of safety, cook poultry until no longer pink in any part (82°C; 180°F) and eggs until yolks are no longer runny (71°C; 160°F). And don't forget about hand washing – probably the most effective tool for protecting one's self from a whole range of disease-causing foodborne viruses, protozoan parasites, and bacteria.

Members of the International Association for Food Protection can access PDF files of slide presentations from the **Symposium on Avian Influenza held at IAFP 2005 in Baltimore, MD** by visiting the Members Only section of the IAFP Web site www.foodprotection.org. Log in with your membership number and last name.

History and Classification of the H5N1 Virus – David Swayne, U.S. Department of Agriculture, Southeast Poultry Research Laboratory, Athens, GA, USA

Risk Assessment, Risk Communication and Consequences – William Hueston, University of Minnesota, St. Paul, MN, USA

Risk Management Strategies in Southeast Asia – Mike Robach, Cargill, Minneapolis, MN, USA

Risk Management Strategies in the United States – Bruce Stewart-Brown, Perdue Farms, Salisbury, MD, USA

Decontamination Technologies – Bruce Cords, Ecolab, Mendota Heights, MN, USA

Avian Influenza – a Global Perspective – Alex Thiermann, International Office of Epizootics, Paris, France

Further WHO/FAO/OIE and CDC information on Avian Influenza, food safety issues, and disinfecting procedures is available at:
http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_en.pdf
http://www.who.int/foodsafety/micro/avian/en/index.html.
http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian_qa.html
http://www.fao.org/ag/againfo/subjects/documents/ai/AVIbull035.pdf
http://www.oie.int/eng/AVIAN_INFLUENZA/Terrestrial%20Code_Draft_Guidelines%20for%20AI%20inactivation.pdf
http://www.cdc.gov/flu/avian/professional/symposium_110304_archive.htm

European Food Safety Authority Press Release on Avian Influenza
http://www.efsa.eu.int/press_room/press_release/1193_en.html

Questions and Answers on Avian Influenza and Risk to FDA Regulated Shell Eggs and Egg Products
http://www.cfsan.fda.gov/~dms/avfluqa.html

Food Safety Information Center, National Agricultural Library, on Avian Influenza
http://www.nal.usda.gov/fsrio/topics/tpavianflu.htm

Center for Food Security and Public Health, Iowa State University
http://www.cfsph.iastate.edu/Feature/AIFeatureFiles/HPAI_technicalkeypoints.pdf

Partnership for Food Safety Education Answers Questions on Consumption of Poultry & Poultry Products
http://www.fightbac.org/pdf/Poultry_Q_A.pdf

General information on the safe handling, preparation and cooking of foods can be obtained from national food safety authorities and from the WHO at:
http://www.who.int/foodsafety/publications/consumer/5keys/en/index.html
http://www.fsis.usda.gov/Food_Safety_Education/index.asp
http://www.canfightbac.org

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David Swayne, US Dept. of Agriculture
Alex Thiermann, International Office of Epizootics

Highlights of the Executive Board Meeting

November 18, 2005
Teleconference

Following is an unofficial summary of actions from the Executive Board Meeting held by teleconference on November 18, 2005:

Approved the following:

- Minutes of August 12-18, 2005 Executive Board Meeting
- Minutes of October 28, 2005 Executive Board Meeting
- Implementing an online review system for *JFP* manuscripts
- Fiscal Year End August 31, 2005 Audit Report
- Joining the Partnership for Food Safety Education

Discussed the following:

- E-mail votes taken since the last meeting
- Elimination of the Monday Night Social for 2006
- Revised schedule of activities for IAFP 2006
- Member dues restructure plan – target date of January 1, 2007
- E-Newsletter to supplement new Member dues structure
- Reappointment of representatives to the 3-A Sanitary Standards, Inc. Board of Directors
- Financial results of the European Symposium on Food Safety
- Future International meetings – target October or November 2006 for a second European Symposium on Food Safety
- Exhibit trade with Food Safety Summit
- Exhibit trade with Food Safety World
- Support concepts, decline active participation with Global Harmonization Initiative at this time
- Work with Kraft Foods for continued supporting efforts
- IAFP 2005 and workshop financial results
- Texas locations for IAFP 2009

Reports received:

- *Food Protection Trends*
- *Journal of Food Protection*
- IAFP Web Site
- Board Members attending Affiliate meetings
- Affiliate Newsletter
- Future Annual Meeting schedule
- Exhibiting (IAFP on the Road)
- Future Board meeting dates

Next Executive Board meeting: February 19-20, 2006.

FOOD PROTECTION TRENDS

INSTRUCTIONS FOR AUTHORS

NATURE OF THE MAGAZINE

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

The major emphases include:

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

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All manuscripts should be submitted in triplicate (original and two copies), in flat form (*not folded*), to Donna Bahun, Production Editor at the address at the end of these instructions. A fourth copy of the manuscript must be provided on computer disk saved as text format.

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Manuscripts are accepted for publication only after they are reviewed by two members of the Editorial Board. Occasionally, when the subject of the paper is outside of the specialties of members of the Editorial Board, other specialists may be asked to review manuscripts. After review, a manuscript will be returned to the author by the Scientific Editor for revision in accordance with reviewers' suggestions. Three clean copies of the revised paper and a disk copy are to be returned to the Scientific Editor as soon as possible. Authors can hasten publication of their papers by submitting well-written manuscripts conforming to the journal's style and by revising and returning manuscripts promptly. If, after review of a manuscript is completed, an author chooses to withdraw rather than revise the paper, the Scientific Editor should be notified promptly. If an author does not respond in *four months* after a reviewed paper is returned, the paper will be considered as withdrawn. With authors' cooperation, articles are usually published within three to six months after they are received and may appear sooner.

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

Technical Research

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

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

(Contact the *FPT* Scientific Editor if there are questions concerning the suitability of material for publication.)

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

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A manuscript should be read critically by someone other than the author before it is submitted. If English is not the author's first language, the manuscript should be reviewed by a colleague of the author who is fluent in written English to ensure that correct English is used throughout the paper. *The Scientific Editor and editorial staff will not rewrite papers when the English is inadequate.*

Authors are encouraged to consult previously published issues of *FPT* to obtain a clear understanding of the style of papers published.

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Revised manuscripts that do not require a second review should be printed on plain white bond paper *without* numbered lines or box outlines, etc. A copy of the revised manuscript should be included on a disk saved as text formats.

ORGANIZATION OF ARTICLES

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

Full names and addresses of each author should appear on the title page. An *asterisk* should be placed after the name of the author to whom correspondence about the paper and proofs should be sent. The E-mail, telephone and facsimile numbers of this author should be given at the bottom of the page. No text of the manuscript should appear on the title page.

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

The references should be arranged in alphabetical order, by last name of first author and numbered consecutively. Only the first author's name and initial should be inverted. *Cite each reference in the text by number.* All references given in the list must be cited in the text. List references according to the style of the following examples.

Paper in journal

Cabedo, L., J. N. Sofos, and G. C. Smith. 1996. Removal of bacteria from beef tissue by spray washing after different times of exposure to fecal material. *J. Food Prot.* 12:1284–1287.

Paper in book

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

Book by author(s)

Pitt, J. I., and A. D. Hocking. 1997. Fungi and food spoilage. Blackie Academic and Professional, London.

Book by editor(s)

Doyle, M. P., L. R. Beuchat, and T. J. Montville (ed.). 1997, Food microbiology: fundamentals and frontiers. ASM Press, Washington, D.C.

Patent

Hussong, R. V., E. H. Marth and D. G. Vakaleris. 1964. Manufacture of cottage cheese. U.S. Pat. 3,117,870. Jan. 14.

Publication with no identifiable author or editor

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

References citing "personal communication" or "unpublished data" are discouraged, although it is recognized that sometimes it is unavoidable. An author may be asked to provide evidence of such references.

References consisting of papers that are "accepted for publication" or "in press" are acceptable, but the author may be asked to provide copies of such papers if needed to evaluate the manuscript in question.

Figures and tables should appear on separate pages and not within the text of the manuscript. Placement of tables and figures should be indicated in the text.

Electronic mail

E-mail messages should include the name of the person who sent the message, the date, the subject, the sender's E-mail address, and availability (if appropriate).

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

Web pages

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

ILLUSTRATIONS, PHOTOGRAPHS, AND FIGURES

Submission of photographs, graphics or drawings to illustrate the article will help the article. The nature of *FPT* allows liberal use of such illustrations, and interesting photographs and drawings often increase the number of persons who read the article.

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

Line drawings. All line drawings (graphs, charts, diagrams, etc.) must be submitted in camera-ready form on laser paper. Graphs must be produced by a laser printer, with sufficiently dark printing of appropriately sized symbols, letters, and numerals. Figures are commonly reduced to a 1-column width (85 mm). Lettering should be of sufficient size to allow for reduction. If symbols are used, they must be identified on the Figure and not in the legend. Data that are presented in Figures should not be repeated in Tables. A well-prepared Figure should be understandable without reference to the text of the paper.

When submitting electronic figures, the preferred formats are TIFF or EPS. The following native application file formats are also acceptable: Adobe Photoshop, Adobe Acrobat, Illustrator, PowerPoint, Word, Excel, InDesign, PageMaker, and QuarkXPress. The resolution required for halftone and color images is a minimum of 300 pixels per inch (ppi); line art should be 1,200 ppi. Please note that images that are in JPEG or GIF format will be 72 dpi and not acceptable for printing. Digital color files must be submitted in CMYK mode. The following media are accepted: 3 1/2" Floppy Disk, Zip Disks, Jazz Disks, CD-ROM, DVD. Large files should be compressed with StuffIt or WinZip if possible. When submitting electronic figures, hard copies must also be submitted.

Labeling of figures. All Figures should be labeled lightly on back, using a soft pencil or a typed adhesive label. Labeling should include:

- figure number,
- last name of author(s),
- title of manuscript,
- the manuscript number (on revised copies),
- identification of the top of the figure.

COMMON ABBREVIATIONS

Frequently used acceptable abbreviations may be used (i.e., using *wt* for the word *weight*, or *s* for the word *second*). For further details on abbreviations see the current edition of the *CBE Style Manual* or *ASM Manual of Style*. Note that a period is used with some but not all abbreviations. Authors may also contact the Production Editor if they are not sure about acceptable abbreviations.

REPRINTS

Reprints of an article may be ordered by the author. An order form for reprints will be sent to the corresponding author. Reprints may be ordered with or without covers, in multiples of 25. Reprint costs vary according to the number of printed pages in the article.

CORRESPONDING ADDRESS

International Association for Food Protection
Donna Bahun
Food Protection Trends
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
E-mail: info@foodprotection.org

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, USA
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 approches 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

Call for Abstracts

IAFP 2006

The Association's 93rd Annual Meeting
August 13–16, 2006
Calgary, Alberta, Canada

General Information

1. Complete the Abstract Submission Form.
2. All presenters must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
3. There is no limit on the number of abstracts registrants may submit. However, presenters must present their presentations.
4. Accepted abstracts will be published in the Program and Abstract Book. Editorial changes will be made to accepted abstracts at the discretion of the Program Committee.
5. Photocopies of the abstract form may be used.
6. Membership in the Association is not required for presenting a paper at IAFP 2006.

Presentation Format

1. Technical – Oral presentations will be scheduled with a maximum of 15 minutes, including a two to four minute discussion. LCD projectors will be available and computers will be supplied by the convenors.
2. Poster – Freestanding boards will be provided for presenting posters. Poster presentation surface area is 4′ high by 8′ wide. Handouts may be used, but audiovisual equipment will not be available. The presenter will be responsible for bringing pins and velcro.

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

Instructions for Preparing Abstracts

1. Title – The title should be short but descriptive. The first letter in each word in the title and proper nouns should be capitalized.
2. Authors – List all authors using the following style: first name followed by the surname.
3. Presenter Name & Title – List the full name and title of the person who will present the paper.
4. Presenter Address – List the name of the department, institution and full postal address (including zip/postal code and country).
5. Phone Number – List the phone number, including area, country, and city codes of the presenter.
6. Fax Number – List the fax number, including area, country, and city codes of the presenter.
7. E-mail – List the E-mail address for the presenter.
8. Format preferred – Check the box to indicate oral or poster format. The Program Committee makes the final decision on presentation format.
9. Category – Check the box to indicate which category best fits the subject of the abstract.
10. Developing Scientist Awards Competitions – 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 (Online submission only requires typed name). See "Call for Entrants in the Developing Scientist Awards Competitions."
11. Abstract – 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.

Abstract Submission

Abstracts submitted for IAFP 2006 will be evaluated for acceptance by the Program Committee. Please be sure to follow the format instructions above carefully; failure to do so may result in rejection. Information in the abstract data must not have been previously published in a copyrighted journal.

Abstracts must be received no later than February 8, 2006. Return the completed abstract form through one of the following methods:

1. Online: Use the online abstract submission form located at www.foodprotection.org. You will receive an E-mail confirming receipt of your submission.
2. E-mail: Submit via E-mail as an attached text or MS Word™ document to abstracts@foodprotection.org.

Selection Criteria

1. Abstracts must accurately and briefly describe:
   (a) the problem studied and/or objectives;
   (b) methodology;
   (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; chemial 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 Tamara P. Ford, 515.276.3344 or 800.369.6337; E-mail: tford@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

IAFP 2006
93rd Annual Meeting
August 13-16
Calgary
Alberta Canada

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 Foundation 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 to Association forums) are to be used as platforms for commercial sales or presentations by authors and/or presenters (hereafter referred to as authors) without the express permission of the staff or Executive Board. The Association enforces this policy in order to restrict commercialism in technical manuscripts, graphics, oral presentations, poster presentations, panel discussions, symposia papers, and all other type submissions and presentations (hereafter referred to as submissions and presentations), so that scientific merit is not diluted by proprietary secrecy.

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

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

2. TECHNICAL CONTENT OF SUBMISSIONS AND PRESENTATIONS

2.1 Original Work

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

2.2 Substantiating Data

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

2.3 Trade Names

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

2.4 "Industry Practice" Statements

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

2.5 Ranking

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

2.6 Proprietary Information (See also 2.2.)

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

2.7 Capabilities

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

3. GRAPHICS

3.1 Purpose

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

3.2 Source

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

3.3 Company Identification

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

3.4 Copies

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

4. INTERPRETATION AND ENFORCEMENT

4.1 Distribution

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

4.2 Assessment Process

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

4.3 Author Awareness

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

4.4 Monitoring

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

4.5 Enforcement

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

4.6 Penalties

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

NEW MEMBERS

AUSTRALIA

Doug W. Eddy
Dairy Food Safety Victoria
Hawthorn, Victoria

CANADA

Steve Boloudakis
bioMérieux
Toronto, Ontario

Dave Dodgson
Hastings & Prince Edward County Health Unit
Belleville

Alison Speirs
BC Ministry of Agriculture & Lands
Abbotsford, British Columbia

FRANCE

Christine Jacquet
Institut Pasteur
Paris Cedex

GERMANY

Denis S. Boursillon
Scheer

GREECE

George J. Kyratsakis
Thessaly Laboratories
Larissa, Thessaly

KOREA

Jiyong Park
Yonsei University
Seoul

PAKISTAN

Zuzzer Ali Shamsuddin
PCSIR Laboratories Complex Karachi
Karachi

SPAIN

Maria Isabel Gil Munoz
CEBAS – CSIC
Espinardo, Murcia

SWITZERLAND

Katia Szynalski
Nestlé PTC Konolfingen
Konolfingen

UNITED STATES

ARIZONA

Margo C. Jones
US Food & Drug Adminstration
Phoenix

Cheryl D. McCall
Maricopa Co. Sheriff's Office
Mesa

CALIFORNIA

Melissa Garrod-VanLaningham
Swift & Co.
Dixon

COLORADO

Wendy C. Woerner
Swift & Company
Greeley

FLORIDA

Cynthia Nyquist-Battie
University of North Florida
Jacksonville

INDIANA

Angela M. Valadez
Purdue University
West Lafayette

MICHIGAN

Steven Brunsting
Quincy Street, Inc.
Holland

Sharon Fracalossi
Quincy Street, Inc.
Holland

MINNESOTA

Stefanie E. Gilbreth
Ecolab
Eagan

OKLAHOMA

Dina Bryant
National Steak and Poultry
Owasso

UPDATES

Silliker, Inc. Announces New Appointments

Mark Carter was appointed general manager of the Silliker, Inc., Research Center in South Holland, IL. He previously served as a section manager for microbiology and food safety for Kraft Foods North America.

Phil Ihrke was named laboratory director of Silliker, Inc., Madison, WI. Prior to joining Silliker, he served as a quality control supervisor for Chr. Hansen in Milwaukee, WI.

Erdogan Ceylan, Ph.D., was promoted to director of the Silliker, Inc., Research Center in South Holland, IL.

Novazone Inc. Appoints Ram Prasad Vice President of Operations

Novazone has announced the appointment of Mr. Ram Prasad as vice president of operations. Mr. Prasad is responsible for all functions of operations for Novazone, and will report directly to Paul White, president and chief executive officer. Mr. Prasad will be instrumental in implementing key operational processes. He brings 15 years of operations, manufacturing and quality experience to Novazone. During his career, he held numerous executive positions in emerging technology markets including aerospace, petrochemical, semiconductor and contract manufacturing.

Before joining Novazone, Mr. Prasad was vice president of new product operations and business process development for Asyst Technologies, Inc. Prior to Asyst, Mr. Prasad was director of operations for Amber Networks, Inc. Previously, he held management positions at Sieger Engineering, Inc., Applied Materials, Inc., and Whessoe Varec, Inc.

Mr. Prasad holds a master's degree in mechanical engineering from New Mexico State University, and a bachelor's degree in mechanical engineering from Bangalore University, India.

FKI Logistex Promotes Three Senior Managers in North American Manufacturing Systems Unit

FKI Logistex® announces the promotion of three senior managers in the company's North American Manufacturing Systems unit, aimed at furthering the unit's growth plans. Leading the promotions is the appointment of Ken Thouvenot to vice president of project management and engineering.

A 10-year veteran of FKI Logistex, Mr. Thouvenot most recently served as vice president of project management and marketing in the Manufacturing Systems unit. He holds a bachelor of science in mechanical engineering from Southern Illinois University at Carbondale and a master of business administration from Washington University in St. Louis.

Ted Clucas, president, Manufacturing Systems, FKI Logistex North America also announced the promotion of Matt Wicks to director of systems engineering, as well as the promotion of Brett Felton to the new role of international sales manager.

With FKI Logistex since 1995, Mr. Wicks previously served as manager of controls engineering. He holds a bachelor of science in electrical engineering from the University of Missouri-Rolla.

"Matt's strength is systems controls and software, and he has been a major force in driving project execution within the organization," says Mr. Clucas.

Mr. Felton joined FKI Logistex in 1998 as senior mechanical engineer, and was subsequently promoted to project engineer and senior project engineer. He holds a bachelor of science in engineering management from the University of Missouri-Rolla and a master of business administration from the University of Missouri-St. Louis. In his new role, Mr. Felton will oversee the unit's international sales representative structure, adding representatives to increase the company's sales coverage in Latin America. He reports to Martin Clark, director, newspaper and international operations.

Rob Mitchell Joins Computerway Food Systems

Rob Mitchell has joined Computerway Food Systems as help desk officer.

In his position, Mr. Mitchell provides technical support to customers, assists in testing and development of Computerway products, and helps with on-site installations.

Mr. Mitchell has eight years experience in information technology. He attended Guilford Technical Community College and has certifications in information systems technology and networking. Mr. Mitchell served in the United States Marine Corps for four years.

Reducing Chicken Pathogens

Proteins called bacteriocins, produced by bacteria, can reduce *Campylobacter* pathogens to very low levels in chicken intestines and could help reduce human exposure to foodborne pathogens, Agricultural Research Service (ARS) scientists report. The research was coordinated by scientists at the ARS Richard B. Russell Research Center in Athens, GA. They collaborated with scientists from the former Soviet Union on this and other food safety research.

In a chicken's gut, the bacteriocins can crowd out pathogenic bacteria, making it less likely that pathogens could infect poultry or humans. Bruce Seal, research leader for the Poultry Microbiological Safety Research Unit in Athens, is directing the work on reducing foodborne bacterial pathogens like *Campylobacter*. The research was begun by ARS microbiologist Norman Stern in Athens. Stern was awarded a patent on uses for bacteriocins. He and colleagues Greg Siragusa and Eric Line have applied for several other patents as well.

The work was completed in collaboration with Edward Svetoch, a Russian Federation scientist at the State Research Center for Applied Microbiology in Obolensk. Svetoch and Stern evaluated tens of thousands of bacterial isolates from poultry production environments. Stern and his colleagues have found promise in numerous organisms for anti-*Campylobacter* activity, namely *Bacillus circulans* and *Paenibacillus polymyxa*.

In addition, Stern and his colleagues successfully enhanced the production of bacteriocins, making it much more attractive for industrial testing.

According to Stern, there has been substantial industry interest in licensing the technology. Bacteriocins could become an alternative to antibiotics for protecting poultry.

The current research is funded and coordinated by the US Department of State, the International Science and Technology Center, and the ARS Office of International Research Programs. http://www.ars.usda.gov/is/AR/archive/nov05/poultry1105.htm.

Salmonella Outbreaks Linked to Produce on the Rise

Most people properly associate *Salmonella* with raw poultry. But according to an analysis of food-poisoning outbreaks by the Center for Science in the Public Interest, fresh produce is catching up with chicken as a major culprit of *Salmonella* infections. And, says CSPI, produce-related outbreaks tend to be larger than poultry-related outbreaks, and sicken more people, sometimes hundreds at a time.

In CSPI's Outbreak Alert! database, which contains information on nearly 4,500 outbreaks between 1990 and 2003, produce triggered 554 outbreaks, sickening 28,315 people. Of those 554 outbreaks, 111 were due to *Salmonella*.

Although poultry has historically been responsible for far more *Salmonella* infections, in the most recent years in CSPI's database, produce seems to be catching up. From 1990 to 2001 poultry accounted for 121 *Salmonella* outbreaks and produce accounted for 80. But in 2002–2003, produce accounted for 31 *Salmonella* outbreaks and poultry accounted for 29.

"Fresh fruits and vegetables are at the center of a healthy diet, so it's critical that steps are taken to improve their safety," said CSPI food safety director Caroline Smith DeWaal. "FDA should require growers to limit the use of manure to times and products where it poses no risk. And packers and shippers should mark packaging to ensure easy traceback when fruits and vegetables are implicated in an outbreak."

Although produce outbreaks were responsible for the most illnesses, seafood was responsible for more outbreaks, 899, than any other food, but only 9,312 illnesses. Poultry triggered 476 outbreaks involving 14,729 illnesses; beef triggered 438 outbreaks involving 12,702 illnesses, and eggs triggered 329 outbreaks involving 10,847 illnesses. CSPI's database includes only outbreaks where both the food and the pathogen are identified, so its data represents only a fraction of the total burden of foodborne illnesses. The CDC estimates that 76 million Americans get sick and 5,000 die from foodborne hazards each year.

In recent years, *Salmonella* outbreaks have been traced back to lettuce, salads, melons, sprouts, tomatoes, and other fruit-and vegetable-containing dishes. In 2004, there were three separate outbreaks involving 561 *Salmonella* infections that were linked to contaminated Roma tomatoes. From 2000 to 2002, *Salmonella*-contaminated cantaloupe imported from Mexico sickened 155 and killed two.

Salmonella isn't the only pathogen that ends up on produce. In 2003, green onions in salsa from a Pennsylvania ChiChi's restaurant transmitted hepatitis A to 555 people, killing three. Also that year, *E. coli* on a bagged salad mix sickened more than 50 restaurant patrons in the San Diego area.

CSPI has long recommended the creation of a single food safety agency and an emphasis on improving on-farm practices to help curb foodborne illness. FDA-regulated foods are linked to two-thirds of foodborne illness outbreaks, yet the FDA's budget is only 38 percent of the total federal food safety budget. While USDA has the resources to inspect meat plants daily, the FDA inspects food facilities it regulates on average just once every five years. Neither agency has principal responsibility for overseeing on-farm food-safety practices.

CSPI's report, "Outbreak Alert! Closing the Gaps in Our Federal Food Safety Net," is updated annually, and is available at http://www.cspinet.org/foodsafety/outbreak_report.html.

Cooperative Extension Part of Food Safety Team in Schools

Every day, millions of children in the United States flock to their school cafeterias for lunch. For staff members, it can be a challenge to keep food safe while efficiently serving the large numbers of students who come to lunch at the same time and those who have lunch later in the day. In some older schools, safe food preparation is even more difficult when the staff must work in less than ideal cafeteria facilities that may not have easily accessible hot water for handwashing.

Food safety in schools gained some national attention when a Dateline NBC report in 2004 revealed that upon routine inspection, foods in some schools were being held at temperatures well below what is considered safe. For instance, hamburgers checked at a recently renovated high school in Oklahoma City were held at 20 degrees below the 140°F temperature required to prevent bacterial growth. In Detroit, violations were found in 60% of routine inspections. Other concerns included workers' lack of access to hot water and soap for handwashing and the presence of flies in cafeterias.

Incidents of food poisoning in schools are isolated, yet food safety violations can lead to unsafe food preparation practices and increase the chance of foodborne illness outbreaks. The National Coalition for Food-Safe Schools (NCFSS), a group that aims to improve food safety in US schools, has put together a list of food safety guidelines for food service professionals, with the idea that food service staff members are the key to safe cafeteria food.

According to the Coalition, no one person can ensure that the school is food-safe. Everyone interested in the health and safety of students has an important role. This includes school administrators, school foodservice staff, school nurses, teachers, families and students, the local health department staff, and the local cooperative extension service.

Cooperative extension services can help schools become food-safe by providing training, materials, and resources. The Food-Safe Schools Action Guide developed by the Coalition urges Cooperative Extension services to follow these simple but critical recommendations. Details, tips, and resources to help implement each recommendation are outlined in the Action Guide's in-depth modules found at www.foodsafeschools.org.

Action Guide

1. Assist schools in developing food safety policies and procedures.
2. Provide food safety support and training for school staff.
3. Maintain knowledge of current food safety research and practices and provide this information to school staff.
4. Provide food safety curricula and materials.
5. Publicize and provide recognition for food safety activities of schools.
6. Be members of or consultants to Food-Safe School Teams.

Sources:

1. Dateline NBC Report, November 2004. Available at: www.msnbc.msn.com/id/6430258.
2. The National Coalition for Food-Safe Schools. Available at: www.foodsafeschools.org/foodservice.php.

Targeting Antibiotic Resistance in Bacteria

A genetic chip that detects more than 100 antimicrobial-resistance genes in bacteria has been developed by Agricultural Research Service (ARS) scientists in Georgia.The DNA chip, called a DNA microarray, is a small glass slide that allows researchers to determine the presence or absence of particular DNA sequences in a sample.

ARS microbiologists Jonathan Frye, Charlene Jackson, Mark Englen and Paula Cray developed the DNA microarray to detect genes that make bacteria resistant to antibiotics. The scientists are based at the ARS Bacterial Epidemiology and Antimicrobial Resistance Unit in Athens, GA.

Antimicrobial compounds, or antibiotics, have been used for years to fight bacterial infections. But some bacterial pathogens, like *Salmonella* and *Campylobacter*, and other intestinal bacteria, like *Escherichia coli* and *Enterococcus*, are becoming resistant to antibiotics.

Unfortunately, under the right conditions, DNA that's linked to resistance may be exchanged between bacteria—including those bacteria responsible for animal and human infections—when they come together. Scientists need to know which bacteria are resistant to antibiotics and how bacteria continue to develop resistance to new antibiotics.

The researchers use the microarrays to track resistant genes in bacteria from farm and slaughter facility samples. According to Frye, this information will help identify possible points to target for intervention strategies to prevent the development and spread of resistance.

Read more about the research in the November 2005 issue of *Agricultural Research* magazine, available online at: http://www.ars.usda.gov/is/AR/archive/nov05/dna1105.htm.

Flexible Coating Made from Milk

View this report online, plus any included photos or other images, at www.ars.usda.gov/is/pr.

Several products commonly found in grocery store dairy aisles could soon be coated in an edible and water-resistant milk protein, thanks to a new process developed by Agricultural Research Service (ARS) scientists that makes possible the continuous manufacture of casein film.

The process, created at the ARS Eastern Regional Research Center (ERRC) in Wyndmoor, PA, uses the unique characteristics of casein, a milk protein that is the chief nutritional ingredient in cheese. Casein is also used in non-food products including adhesives, finishing materials for paper and textiles, and paints.

Casein is first extracted from milk with high-pressure carbon dioxide (CO_2), a method developed by Peggy Tomasula, the research leader at ERRC's Dairy Processing and Products Research Unit. She found that if this casein is mixed with water and glycerol and left undisturbed to dry, it results in a water-resistant, flexible, film-like material. ARS holds a patent on the method Tomasula developed.

The casein films could serve as stand-alone sheets or as thin coatings that form a barrier to outside substances while protecting a product from damage or contamination. The edible film locks in moisture, so it can coat dairy food products, such as cheese, or function as part of a laminate in packaging for cottage cheese or yogurt. Flavorings, vitamins or minerals could be added to enhance flavor and nutrition.

Michael Kozempel, a recently retired ERRC chemical engineer, developed a continuous pilot plant process to produce the film. He found a suitable belt material and feeding mechanism so that the solution can be uniformly spread and dried to form a film that is readily removed from the belt. The process can be modified for other proteins.

ARS has filed a patent application on the continuous production process Kozempel has developed, and is interested in finding business partners to move it to market.

Read more about this research in the November 2005 issue of *Agricultural Research* magazine: http://www.ars.usda.gov/is/AR/archive/nov05/milk1105.htm.

Current FDA Activities Related to the *Listeria monocytogenes* Action Plan

Objective 1: Develop and revise guidance for processors that manufacture or prepare ready-to-eat foods and develop or revise guidance for retail and food service and institutional establishments.

The FDA will develop and issue guidance on enhancing the safety of the production of fresh-cut produce.

A Produce Action Plan Public Meeting was held on 6/29/04. One of the outcomes of the meeting was a greater need to involve the retail segment of the food industry in training regulators/industry in ensuring the safety of produce. One of the organisms of concern mentioned was *Listeria monocytogenes*.

FDA, in cooperation with Michigan State University, will continue to examine the levels of *Listeria monocytogenes* transferred in retail food establishments. Specifically, the project is to study transfer rates between foods contaminated with *Listeria monocytogenes* and food contact surfaces (i.e., slicing machines, knives, spoons, etc.). This was a grant awarded through the Center for Food Safety and Applied Nutrition's (CFSAN) Office of Science collaborative grant process in 2002. The researchers are writing a paper for peer review. These results should be considered as we move forward and discuss appropriate intervention strategies at retail.

FDA will review the Model Food Code to determine if provisions that address preventive controls, such as approved source, date marking, and cold-holding times and temperatures, warrant revision.

The 2002–2004 Conference for Food Protection (CFP) Date-marking Committee compiled a list of Food Code sections that pertain to *Listeria monocytogenes* control. The Committee is currently in the process of developing a guidance document detailing the use of targeted sanitation procedures to assist in the control of *L. monocytogenes*.

FDA issued a Federal Register Notice on March 4, 2005 requesting the following data and information from the retail and foodservice industry:

L. monocytogenes levels in products stored in retail and foodservice facilities;

Levels of environmental harborage of *L. monocytogenes* on food and non-food contact surfaces;

Effects of short and long-term refrigerated storage on levels of *L. monocytogenes*;

Impact of time and temperature on levels of *L. monocytogenes* in products;

Efficacy of cleaning procedures and sanitizing agents on environmental surfaces and utensils;

Frequency of use and efficacy of adding inhibitors to food products in retail and food service establishments to reduce or prevent *L. monocytogenes* growth; and

Effect of training regarding hygienic practices and sanitation on levels of *L. monocytogenes* in products in retail and foodservice establishments.

FDA will issue guidance, in conjunction with the CFP, to the retail and food service industry and state and local regulatory professionals on the use of HACCP principles to identify and control risk factors contributing to foodborne illness. This guidance will include intervention strategies that can be used to control *L. monocytogenes* and other pathogens.

At their 2004 meeting, the CFP accepted two HACCP guidance documents developed by FDA and reviewed by the CFP HACCP Committee. These two guides outline the identification and control of risk factors by industry operators and the use of risk-based inspections by regulators. Many of the intervention strategies outlined in the guides pertain to the control of *L. monocytogenes*. The guides have been widely disseminated to state and local regulatory officials and industry.

FDA will promote the inclusion of *L. monocytogenes* control strategies in future guidance documents that address food processing at retail operations (e.g., smoked seafood, specialty meats).

FDA representatives worked with the Association of Food and Drug Officials (AFDO), the University of Florida, and Florida A&M University to develop guidance for food processing at retail. These guidance documents have been finalized and released. The draft guidance documents were specifically reviewed to assess the risk of *L. monocytogenes* and the organism was identified as a hazard in a number of these guidance documents (e.g., smoked seafood, cured and hot smoked sausage).

L. monocytogenes guidance for dairy plants is under development at CFSAN.

FDA/CFSAN is developing guidance on the Control of *Listeria monocytogenes* in Refrigerated Ready-To-Eat Foods.

Objective 2: Develop and deliver training and technical assistance for industry and food safety regulatory employees.

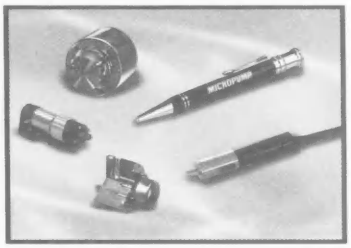
L. monocytogenes Preventative Controls for Regulators — satellite course under development. Purpose: To review existing training for regulators and processors on preventive controls and guidance and to update and develop training for regulators to reduce *L. monocytogenes* related illnesses. Mode: Satellite/web. Satellite course (3 hours in length) Web course (1 hour in length) Primary Audience: FDA and state/local regulators of retail food, milk and manufactured food (includes seafood, except shellfish) operations. Secondary audience: industry.

Objective 3: Enhance consumer and health care provider infomation and education efforts.

Educational programs about the risks of listeriosis have taken place through the media, health professional organizations, contacts with authors of books on pregnancy, and educational programs for special at-risk groups including seniors and pregnant women. During the last 3 years, CFSAN has participated in a program of health fairs utilizing Hispanic radio and television and Wal-Mart. Health messages on the risk of listeriosis are delivered over the Spanish language radio and television programs and information is distributed at health fairs at Wal-Mart locations in Hispanic areas. A further specialized campaign targeted to the Latino community on the concerns of queso fresco cheese was launched in the spring of 2005. The program utilizes the Hispanic media and community outreach workers (promotoras) to get the message out. A public health educational campaign by the public-private Partnership for Food Safety Education is underway to advise consumers to keep their refrigerators at 40°F to prevent foodborne illness, including listeriosis. Information has been released through the media and is also being disseminated through grocery stores where refrigerator thermometers are promoted.

Objective 4: Review, redirect, and revise enforcement and regulatory strategies including microbial product sampling and analytical methods.

INDUSTRY PRODUCTS



Micropump Inc.

Micropump® Accelerates Fluid Handling Product Development

Micropump® introduces a refined rapid response prototyping process to help bring products to market faster. Rapid response prototyping accelerates product development cycle times, allowing quick iterative design changes to meet any dispensing, transfer, circulation or dosing application.

Micropump's engineering team blends flexible thinking and application expertise with a systematic, customer-focused approach to meet liquid handling challenges. Micropump employs Design for Six Sigma and other Operational Excellence processes to integrate customer expectations with Micropump's capabilities. This allows for short cycle time innovation and reduced overall development times. In addition, Micropump can seamlessly integrate a wide selection of fluid handling components and assemblies into a system's architecture.

Micropump's diverse range of pumping technologies includes micro-cavity and external gear pumps, multiple and valveless piston pumps, peristaltic, micro-annular, vane and centrifugal pumps. Our pumps offer accurate and reliable performance with smooth, pulseless delivery, precise flow and leak-free operation. A wide range of materials provides optimum fluid compatibility, low maintenance and long life.

For more than 40 years, Micropump has led the fluid handling industry in the development of miniature pumps and systems for OEM and industrial applications. Micropump operates as a business unit of IDEX Corp., a world leader in positive displacement pump technologies and other industrial products. As an IDEX company, Micropump utilizes Kaizen, Lean Manufacturing, Value Stream Mapping and Six Sigma process improvement strategies to improve quality and increase value in its product.

Micropump Inc.
360.253.2008
Vancouver, WA
www.micropump.com/pr

Silliker, Inc. Releases "Swabbing Techniques" for Sampling the Environment and Equipment

Silliker, Inc. has released "Swabbing Techniques for Sampling the Environment and Equipment Technician Training Program," a groundbreaking learing tool for QA technicians who collect samples in wet processing environments.

Deficiencies and variations in sampling practices can significantly affect the accuracy, consistency, and the usefulness of environmental data, promoting many leading companies to seek cost-effective training solutions to protect their significant investment in environmental monitoring programs.

Developed in partnership with Biotrace International Inc., an ISO 9001 maufacturer of industrial microbiology products, "Swabbing Techniques" combines expert content, outstanding instructional design, and proven adult learning strategies into an interactive, and time savings training tool. The hands-on program can help companies reduce common technician errors and protect the integrity of environmental data by providing sampling technicans with comprehensive training on industry best practices. The program contains: A presentation on CD containing video clips and digital pictures that demonstrate proper sampling steps and techniques; a facilitator's presentation guide that provides instructors with insightful recommendations and tips to implement and conduct training sessions; technician workbooks that provide learing objectives, step-by-step diagrams, interactive excercises, work-sheets and challenging questions; and a quiz addressing key points covered in the program.

Silliker, Inc.
708.957.7878
Homewood, IL
www.silliker.com

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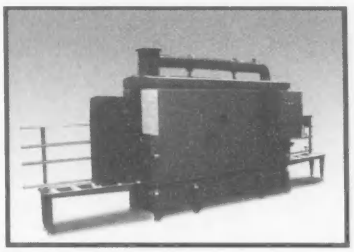

Systemate Numafa NA

Systemate Numafa Offers Pallet Washer PWMV-E

Systemate Numafa's new PWMV-E is an economical alternative for the cleaning of pallets, freezer spacers and slip sheets.

The PWMV-E offers effective water circulation which results in the conservation of water. At the end of the washing cycle, the washing water also passes through the strainer system into the tank for re-use. This reduces water costs.

The PWMV-E can be easily adjusted to the correct product size, allowing for smooth product transport. With in-feed and out-feed sides, the PWMV-E is suitable for placing in a continuous transport system. Approximately 50 units can be washed per hour.

The washer is stainless steel in construction with the exception of accessories. It features removable stainless steel spraying pipes, stainless steel nozzles and sieve filtration.

Heating takes place by means of direct-steam injection, heat exchanger, or electric calrod heating elements. Temperature is adjustable via a thermostat.

Systemate Numafa has manufactured and developed cleaning systems since 1977. The company provides high-capacity, fully automated in-line and stand-alone cleaning systems which allow for continuous use of product. Systemate Numafa's product line also includes equipment to clean and sanitize vats, containers, racks, smoke trees, smoke sticks, smoke screens, wooden and plastic pallets, totes, lugs and baskets.

Systemate Numafa NA
800.240.3770
Canton, GA
www.numafa.com

Two-year Warranty on Expanded Dry Run Capability Mag Drive Pump from Iwaki America

Iwaki America Inc. announces larger sizes of their MDM chemical process magnetic drive pumps, which are now rated for dry run operation and come with a full 2-year warranty.

The MDM wide-ranging line of chemical process pumps offers models that exceed ANSI hydraulics. Capable of handling temperatures to 302°F, the competitively priced MDM also provides patented, repeatable dry-run technology up to 25 HP.

MDM is a compact close-coupled design with modular construction and individually replaceable parts, allowing simple maintenance and lower cost of ownership. The convenient mounting configuration and dual back pull-out design provides user the ability to maintain line pressure while removing the motor, or if necessary, access to the pump internals from the foot mounted front casing design to avoid disturbing the piping.

The MDM design features standard construction materials of ETFE, for cost-effective handling of most aggressive chemistries, and PFA, for added temperature capabilities and high purity applications. Available bearing systems of carbon and high purity alumina ceramic, or alpha sintered silicon carbide, ensure process integrity. Patented one-hour dry run rated bearing system now available for the high head versions. Heads to 350 ft, flows to 350 GPM, 25 HP sizes and dry run rated.

Applications for the MDM include fume scrubbers, plating, bulk chemical transfer, desalination, paper production, chlorination, refineries, metal pickling and water treatment.

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

Eagle Introduces New Red Hots® Heat Lamps

New Red Hots® heat lamps from Eagle Foodservice Equipment are the ideal way to keep prepared foods warm while preserving their appetizing appeal, appearance and taste.

Featuring a top-quality non-corrosive, durable aluminum exterior construction, Red Hots® heat lamps also contain a reflector plate that focuses heat from the calrod heating element. Each element can be controlled individually, with dedicated switches for each of the elements, plus a red-lighted rocker switch that indicates whether the unit is on.

Red Hots® heat lamps are available in 120V, 208V and 240V units, in standard or high-watt options. Customers can choose from 16 standard models ranging from 18 inches to 144-inches in length. Shatterproof 60-watt incandescent bulbs are available for purchase with the units, or separately. All heat lamps can be attached to a shelf or other surface using stainless

steel brackets or, if preferred, suspended from the ceiling using hanging tabs. The wire guards are constructed of 10-gauge chrome-plated wire. Dual and tandem-mount units are also available.

Eagle Foodservice Equipment
800.441.8440
Clayton, DE
www.eaglegrp.com

Flowserve Limitorque Launches the MT Series of Bevel Gear Operators

Flowserve Corp. announces the launch of the Limitorque Actuation Systems MT series of bevel gear operators. The MT series operators are optimized to deliver reliable performances in power industry valve applications, among other uses.

Designed as a superior combination of a bevel gear operator torque housing with a new thrust base design, the MT series is ideally suited for torque-seated valve applications and applications involving elevated process temperatures. MT series bevel gears and thrust base housings are made of dectile iron.

The MT series features robust thrust bearings and drive sleeve/stem nut design. These combine to offer the most rugged bevel gear operator available for handling the seating and unseating forces of high-pressure gate and glove valves found in power plants around the world. The MT operator stem nut is shouldered in the drive sleeve to capture thrust forces within the thrust housing without transferring those forces to the torque housing.

Available in torque ranges to 8,000 ft-lb and thrust ranges to 325,000 lb, the MT series provies high efficiency and strong design for every application. When motorized by the Limitorque MX, SMB or L120 series electric actuators, the MT series offers flexibility for a wide range of valve opening and closing times.

Flowserve Corp.
434.528.4400
Lynchburg, VA
www.flowserve.com

IQ Scientific Instruments, Inc.

Waterproof Non-glass pH and Conductivity from IQ Scientific Instruments

The IQ170 is a dual technology pH meter — non-glass or glass — with multi-parameter capabilities. This rugged meter system is NEMA4x (IP 67) rated, showcases an extra large LCD display with LED backlight, and has the ability to measure accurately pH, mV, temperature, ORP, conductivity, TDS and salinity. Features include automatic temperature compensation, automatic pH buffer recognition, automatic conductivity cell constant recognition with auto ranging, and up to three-point pH calibration (five-point conductivity – one point per range). The stainless steel pH probe has a virtually unbreakable sensor that eliminates the frustrations of delicate glass electrodes. Complete with both a non-glass pH probe and solid-state conductivity electrode, this ultra-rugged meter system is engineered to withstand harsh use in the most difficult of applications.

IQ Scientific Instruments, Inc.
760.930.6501
Carlsbad, CA
www.phmeters.com

New Daymark Error-proof Monitoring Device Ensures Food Safety

DayMark® Safety Systems introduces the new TimeStrip® freshness indicators. TimeStrip®, which automatically monitors freshness, helps processors and distributors track food freshness in transit and in storage, thereby saving the expense and potential health hazards caused by spoiled or wasted food.

TimeStrips are ideal for processors because they can be applied to food items where there is a high risk of bacteria such as seafood, poultry, meat and dairy. By protecting these types of high-quality foods, processors will be ensuring the safety of their products while contributing to their bottom line.

DayMark TimeStrips are easy to apply and use, and with their strong adhesive, they can be applied to any fresh or frozen food packaging. To activate the TimeStrip,® simply peel off the backing, squeeze the bubble at the back of the strip and apply it to the food container. Once activated, a purple mark appears that gradually

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moves along the white horizontal bar as the food approaches its expiration date. When the horizontal bar turns completely purple it's time to discard the food.

TimeStrips are available in two, three, five and seven-day progression strips. For large volume orders, DayMark can customize the time length on the progression strips to track by hours or weeks. TimeStrips can be used within an existing HACCP program.

DayMark® Safety Systems
800.847.0101
Bowling Green, OH
www.daymark.biz

Videojet Technologies Inc.

Videojet Dataflex® Plus Thermal Transfer Overprinter Offers Maximum Reliability, Efficiency for Coding on Flexible Packaging

The new DataFlex® Plus thermal transfer overprinter (TTO) from Videojet Technologies Inc. offers the industry's highest reliability, lowest cost of ownership and simplest operation for high resolution coding on flexible packaging and labels. This TTO unit provides on-line printing of variable and real-time data, such as expiration dates, batch/lot codes, ingredients/parts listings, bar codes and logos.

The DataFlex Plus features proven, patented direct-drive ribbon technology that contains few wearable parts, which increases reliability and minimizes downtime and costs associated with ribbon breaks. The 1,000-meter ribbon is the longest standard length on the market, so there are less frequent changes and higher production line efficiency. Additionally, the unit features the simplest ribbon cassette on the market, making changeovers fast, easy and virtually fail-safe.

The DataFlex Plus has an intuitive 8.4-inch SVGA graphical user interface and color touch screen with easy-to-learn, icon-based controls. The standard WYSIWYG job display features a zoom facility to reduce operator error and minimize the potential for printing incorrect codes. Three levels of password protection provides added security.

"The DataFlex Plus offers superior flexibility for all production environments," says Kent Morris, TTO product manager, Videojet Technologies. "It has the built-in capability to change between intermittent and continuous modes in right-hand or left-hand operation. Serial, Ethernet and USB communications are standard, delivering the most comprehensive communications package in the industry. The DataFlex Plus also provides the ability to manage up to four printers from one controller, delivering a simple and cost-effective solution for applications that require more than one printing system."

The bi-directional ribbon drive allows unused ribbon to be recaptured following each print. This maintains a 1 mm gap between prints for the complete length of the ribbon, creating more prints per roll and ensuring the highest possible efficiency.

Videojet Technologies Inc.
800.843.3610
Wood Dale, IL
www.videojet.com

X treme Steam by AmeriVap Systems

X treme Steam are industrial cleaning and sanitizing systems. *X* treme Steam, 220°–365°F, known as 95% dry steam (only 5% moisture). Being a state of aeriform aggregation, it has a remarkable propagation capacity even in difficult places to reach on equipment, production lines, packaging sensors, refrigeration systems, electrical panels, circuit boards, gaskets, slicers, dicers, etc. No need for toxic cleaning and disinfectant agents. Uses only quarts per hour, not gallons per minute.

AmeriVap Systems
404.350.0239
Atlanta, GA
www.amerivap.com

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COMING EVENTS

FEBRUARY

- **7–9, FPA's 2006 Food Claims and Litigation Conference,** San Juan, Puerto Rico. For more information, go to www. fpa-food.org.
- **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.
- **13–14, ISO 22000 Food Safety Management System Essentials,** Mississauga, Ontario, Canada. For more information, call Canadian Standards Association at 800.463.6727; E-mail: seminars@csa.ca.
- **15–16, 4th European Symposium on Oats: Oats and Health Foods,** Brussels, Belgium. For more information, call 32.(0)1620.4035; E-mail: hilde.keunen@scisoceurope.org.
- **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.
- **21–25, Diploma in Food Hygiene and Safety,** GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **26–March 3, International Meeting on Radiation Processing,** Hilton Kuala Lumpur, Malaysia. For more information, go to www.imrp2006.com.
- **28–March 1, Wisconsin Process Cheese Short Course,** University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Bill Wendorff at 608.263.2015 or go to www.cdr.wisc.edu.

MARCH

- **8–10, Food Safety World Conference and Expo,** Washington, D.C. For more information, go to www. foodsafetyworldexpo.com.
- **14–16, HACCP Short Course for Dairy Processing Operations,** Cornell University, Dept. of Food Science and International Dairy Foods Association (IDFA), Wyndham Syracuse Hotel, Syracuse, NY. For more information, contact Steve Murphy at 607.255.2893; E-mail: scm4@cornell.edu.
- **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.
- **19–22, Annual Conference of the Association for General and Applied Microbiology,** Jena, Germany. For more information, call 49.(0)3641. 65.66.42; E-mail: vaam@conventus.de.
- **20–22, Food Extrusion Training Course,** St. Etienne, France. For more information, call 32.(0)1620.4035; E-mail: hilde.keunen@scisoceurope.org.
- **21–22, Product Development: Planning for Longevity in the Marketplace,** Orlando, FL. For more information, call 32.(0)1620.4035; E-mail: hilde.keunen@scisoceurope.org.
- **22–24, Food Safety Summit,** Mandalay Bay Convention Center, Las Vegas, NV. For more information, call 800.746.9646 go to www.foodsafetysummit.com.
- **26–29, Food Microbiology Research Conference XX 2006,** Radisson Hotel Northbrook, Northbrook, IL. For more information, call 847.298. 2525 or go to www.radisson.com.fmrc.

APRIL

- **7–12, Conference for Food Protection,** Hyatt on Capitol Square, Columbus, OH. For more information, contact Trevor Hayes at 408.848.2255; E-mail: TWHgilroy@starband.net.
- **12–13, ISO 22000 Food Safety Management System Internal Auditor,** Mississauga, Ontario, Canada. For more information, call Canadian Standards Association at 800.463.6727; E-mail: seminars@csa.ca.

MAY

- **9–12, ABB Automation World Users Conference,** Hilton Americas, Houston, TX. For more information, contact Marcia Zemanek at 440. 585.6830; E-mail: marcia.zemnek@us.abb.com.
- **12–14, Interbake China 2006,** Guangzhou International Convention & Exhibition Center, Guangzhou, China. For more information, go to www. faircanton.com.

JULY

- **3–6, SFAM Summer Conference —"Living Together" Polymicrobial Communities,** Apex International Hotel, Edinburgh, United Kingdom. For more information, E-mail: meetings@sfam.org.uk; or go to www.sfam.org.uk.
- **14–21, XXVI International Workshop/Symposium on Rapid Methods and Automation in Microbiology,** Manhattan, KS. For more information, contact Daniel Y.C. Fung at 785.532.1208; E-mail: dfung@ksu.edu.

IAFP UPCOMING MEETINGS

AUGUST 13-16, 2006
Calgary, Alberta, Canada

JULY 8-11, 2007
Lake Buena Vista, Florida

AUGUST 3-6, 2008
Columbus, Ohio

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List your open positions in *Food Protection Trends*. Special rates for this section provide a cost-effective means for you to reach the leading professionals in the industry. Call today for rate information.

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CHEMISTRY BRANCH CHIEF

Chemistry Branch Chief – FT Federal job opportunity with the USDA Food Safety and Inspection Service in Alameda, CA. The Branch Chief directs and performs complex analyses of meat and poultry. B.S. chemistry & professional work as a lead or supervisory chemist in a residue or food analyses laboratory required. Salary $96,300, plus recruitment incentives up to $24,000 and relocation incentives available. Please contact Wendy at wendy.rohleder@fsis.usda.gov or at 1-800-370-3747 x2554 for information on how to apply.

IAFP Members

Did you know that you are eligible to place an advertisement if you are unemployed and looking for a new position? As a Member benefit, you may assist your search by running an advertisement touting your qualifications.

Continued from page 68

But what about those juices? The public health inspectors I've spoken with say that sales of unpasteurized apple cider continue to flourish in the Ontario countryside, where urbanites venture for a taste of all things natural – including *E. coli* O157. The argument for such natural flirtations was laid out by a letter written to the *Cobourg Daily Star* on October 31, 2005. "Because unpasteurized cider is not boiled, it retains many of the nutrients of an apple... People should be aware of where their food is coming from, but that is why those 'roadside stands, community fairs, [and] farmers' markets' will often offer high quality products sold to you directly from farmers and their families who produce them – not only for you, but also for their own consumption. Consumers worried about the possible health risks of cider, or any other juices or foods, should take a walk down the road and befriend a local farmer; safety doesn't always come in the form of a supermarket shelf." Tell that to the unsuspecting consumers who end up in the hospital.

During the halfway point of the golf tournament in Baltimore in August at the IAFP Annual Meeting, a burley, 50-ish goateed he-man requested his hamburger be cooked, "Bloody ... with cheese." His sidekick piped up, "Me too." Our golf foursome of food safety types were alternately alarmed and amazed, but ultimately resigned to conclude that much of what passes for food safety advice falls on deaf ears. So who's to blame? Silly consumers or boring food safety educational campaigns? Both.

I asked the kid flipping burgers if he had a meat thermometer. He replied, snickering, "Yeah, this is a pretty high-tech operation." The young woman taking orders glanced about, and then confided that she didn't think there was a meat thermometer anywhere in the kitchen; this, at a fancy golf course catering to weddings and other swanky functions along with grunts on the golf course. This is a failure of management. But it is also a failure of complacency.

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Letter to the Editor

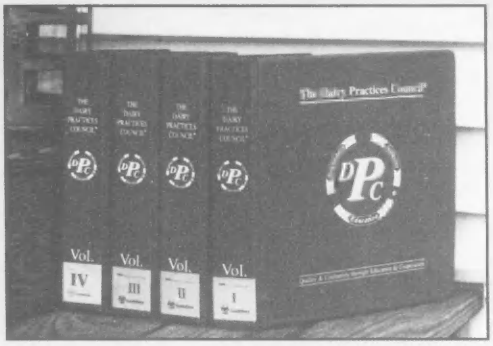
Articles

Research Notes

ERRATUM

In the article "Comparison of Pressure and Heat Resistance of *Clostridium botulinum* and Other Endospores in Mashed Carrots," by Margosch, Ehrmann, Gänzle, and Vogel, that appeared in the *Journal of Food Protection* 67(11):2530–2537, The $D_{105^{\circ}C}$ value of *C. botulinum* TMW 2.359 was given as 7.2 min. However, the value as determined in the experiments was 1.2 min.

*Asterisk indicates author for correspondence.



IAFP
Offers
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from
The Dairy Practices Council®

This newly expanded Four-volume set consists of 70 guidelines.

1 Planning Dairy Freestall Barns
2 Effective Installation, Cleaning, and Sanitizing of Milking Systems
3 Selected Personnel in Milk Sanitation
4 Installation, Cleaning, & Sanitizing of Large Parlor Milking Systems
5 Directory of Dairy Farm Building & Milking System Resource People
6 Natural Ventilation for Dairy Tie Stall Barns
7 Sampling Fluid Milk
8 Good Manufacturing Practices for Dairy Processing Plants
9 Fundamentals of Cleaning & Sanitizing Farm Milk Handling Equipment
10 Maintaining & Testing Fluid Milk Shelf-Life
11 Sediment Testing & Producing Clean Milk
12 Tunnel Ventilation for Dairy Tie Stall Barns
13 Environmental Air Control and Quality for Dairy Food Plants
14 Clean Room Technology
15 Milking Center Wastewater
16 Handling Dairy Products from Processing to Consumption
17 Prevention of & Testing for Added Water in Milk
18 Fieldperson's Guide to High Somatic Cell Counts
21 Raw Milk Quality Tests
22 Control of Antibacterial Drugs & Growth Inhibitors in Milk and Milk Products
23 Preventing Rancid Flavors in Milk
24 Troubleshooting High Bacteria Counts of Raw Milk
25 Cleaning & Sanitation Responsibilities for Bulk Pickup & Transport Tankers
27 Dairy Manure Management From Barn to Storage
28 Troubleshooting Residual Films on Dairy Farm Milk Handling Equipment
29 Cleaning & Sanitizing in Fluid Milk Processing Plants
30 Potable Water on Dairy Farms
31 Composition & Nutritive Value of Dairy Products
32 Fat Test Variations in Raw Milk
33 Brucellosis & Some Other Milkborne Diseases
34 Butterfat Determinations of Various Dairy Products
35 Dairy Plant Waste Management
36 Dairy Farm Inspection
37 Planning Dairy Stall Barns
38 Preventing Off-Flavors in Milk
39 Grade A Fluid Milk Plant Inspection
40 Controlling Fluid Milk Volume and Fat Losses
41 Milkrooms and Bulk Tank Installations
42 Stray Voltage on Dairy Farms
43 Farm Tank Calibrating and Checking
45 Gravity Flow Gutters for Manure Removal in Milking Barns
46 Dairy Odor Management
48 Cooling Milk on the Farm
49 Pre- & Postmilking Teat Disinfectants
50 Farm Bulk Milk Collection Procedures
51 Controlling the Accuracy of Electronic Testing Instruments for Milk Components
53 Vitamin Fortification of Fluid Milk Products
54 Selection of Elevated Milking Parlors
54S Construction Materials for Milking Parlors
56 Dairy Product Safety (Pathogenic Bacteria) for Fluid Milk and Frozen Dessert Plants
57 Dairy Plant Sanitation
58 Sizing Dairy Farm Water Heater Systems
59 Production and Regulation of Quality Dairy Goat Milk
60 Trouble Shooting Microbial Defects: Product Line Sampling & Hygiene Monitoring
61 Frozen Dessert Processing
62 Resources For Dairy Equipment Construction Evaluation
63 Controlling The Quality And Use Of Dairy Product Rework
64 Control Points for Good Management Practices on Dairy Farms
65 Installing & Operating Milk Precoolers Properly on Dairy Farms
66 Planning A Dairy Complex - "100+ Questions To Ask"
69 Abnormal Milk - Risk Reduction and HACCP
71 Farmers Guide To Somatic Cell Counts In Sheep
72 Farmers Guide To Somatic Cell Counts In Goats
73 Layout of Dairy Milk Houses for Small Ruminant Operations
78 Biosecurity for Sheep and Goat Dairies
80 Food Allergen Awareness In Dairy Plant Operations
83 Bottling Water in Fluid Milk Plants
100 Food Safety in Farmstead Cheesemaking
103 Approving Milk and Milk Product Plants for Extended Runs

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

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

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

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

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

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THOUGHTS
ON TODAY'S FOOD SAFETY...

Complacency Leads to Failures

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Five-year-old Mason Jones died a painful and unnecessary death. Sharon Mills, Mason's grief-stricken mother, recounted the events leading to her son's death on BBC Radio Wales last year. "His head was soaking wet and he was drifting in and out of consciousness. He was saying silly things, like he could see slugs, and [he was] looking for a fork which he had never had – because he hadn't eaten anything." Mason died October 4, 2005, from *E. coli* O157 as part of an outbreak sickened some 170 people – primarily schoolchildren in South Wales. The cause is still under investigation, although food supplied to a number of schools from a single facility is the leading suspect.

Sharon said that her son's death was "avoidable" and that lessons "have to be learned... There was nothing wrong with him, only that he ate a dinner – an innocent child eating a dinner.I never thought you could die from *E. coli*. Never. I had heard of *E. coli* and I just thought it was food poisoning. I never ever thought Mason would die from it." Such tales are heart-wrenching but unfortunately, all too familiar.

The carnage from foodborne illness continues unabated in the so-called developed world, with tales of unnecessary illness and death appearing on a weekly basis. The Jack-in-the-Box outbreak in January 1993 in which some 600 were sickened and four died from *E. coli* O157:H7 was supposed to have thrust foodborne illness front and center in the public consciousness. In the summer of 1996, over 9,500 Japanese, largely schoolchildren, were stricken with *E. coli* O157:H7 and 12 were killed. In November 1996, over 400 fell ill and 16 – largely pensioners who had attended a church supper – were killed in Scotland. That same month, 65 people in four US states and British Columbia fell ill after drinking juice manufactured by Odwalla Inc. of Half Moon Bay, California and found to contain *E. coli* O157:H7. A 16-month-old girl died in Denver. For Canadians, just mention Walkerton.

Many in the farm-to-fork food system have taken excellent proactive steps to reduce the risk posed by dangerous microorganisms. Educational campaigns have been undertaken in many countries. And while consumers and others report through surveys that they are aware of the risks and have changed their behavior, stories like those from Sharon Mills suggest that many of us in the food safety community have missed the target.

Last fall, four people were stricken with *E. coli* O157:H7 after consuming unpasteurized apple cider from a producer in Bowmanville, Ontario. Because of the 1996 Odwalla outbreak, the majority of cider sold in grocery stores is pasteurized. Since 1998, the US has required warning labels on all unpasteurized juices sold at retail (although not at the farm gate). Canada has undertaken consultations, surveys, and best practices, but really, has done... nothing.

Canadian authorities issue warnings every fall that consumers should not consume unpasteurized juices, and be careful about petting the animals at the county fair. But they can be confusing (assuming anyone reads them). The Canadian Food Inspection Agency says it's fine to consume such juices as long as the producers follow a code of practice, which many do, but not all. And then Health Canada and local health units tell people to avoid unpasteurized ciders and juices, period.

How is a consumer to know? So national agencies can't agree on what to do about unpasteurized juices, but they do agree that food safety is largely a consumer problem, and fund sterile campaigns telling consumers to cook, clean, chill and separate.

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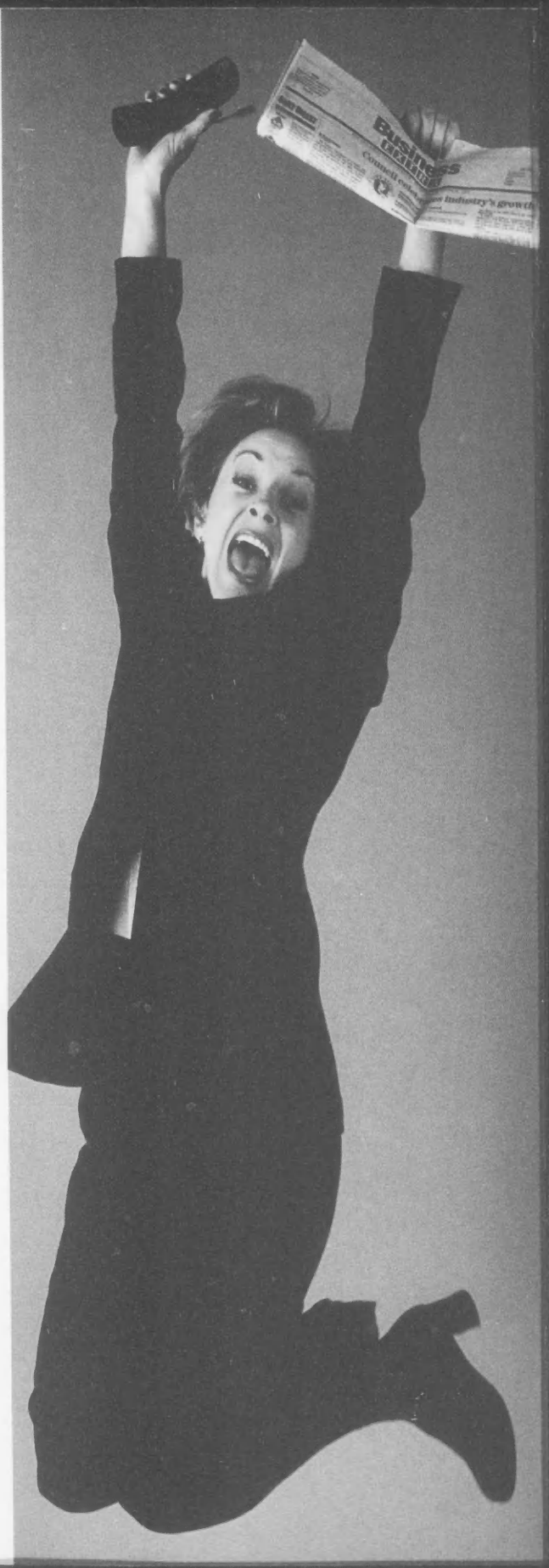

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