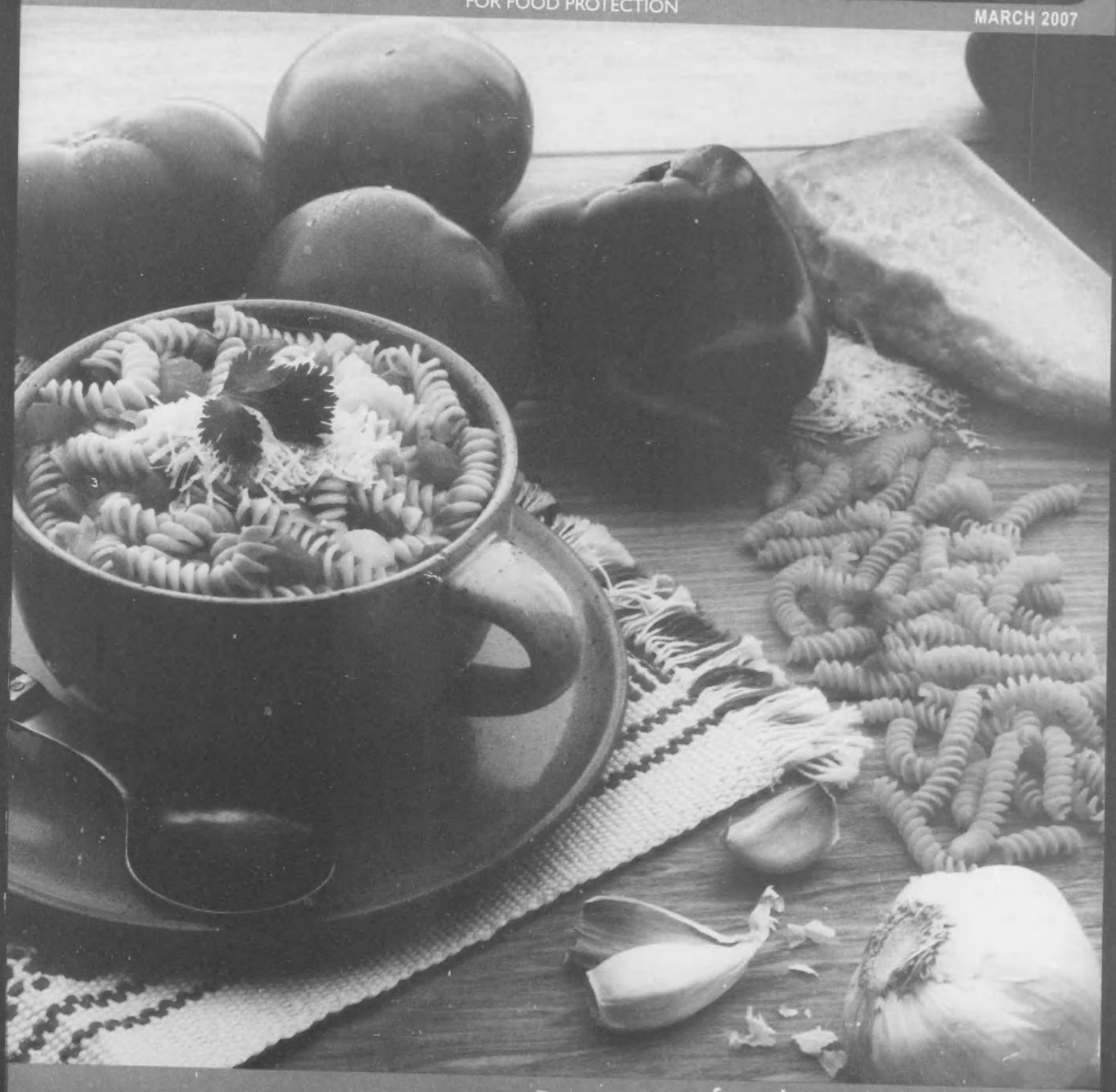
VOL. 27, NO. 3
ISSN: 1541-9576
PERIODICALS
6200 Aurora Avenue•Suite 200W
Des Moines, Iowa•USA•50322-2864

FOOD PROTECTION TRENDS

SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

MARCH 2007



www.foodprotection.org

THEY BOTH LOOK CLEAN, FRESH AND DELICIOUS.

WHICH ONE CONTAINS DANGEROUS PATHOGENS?*

You can't afford to guess at how clean your vegetables are. The standards for fresh-cut fruits and vegetables are becoming more stringent due to the recent rise of industry outbreaks, and you need a proven product to consistently meet those standards. ***You need Tsunami® 100.***

*Tsunami 100 is the ONLY EPA-registered antimicrobial water additive product on the market that reduces pathogens in process water. It reduces 99.9% of *Escherichia coli* O157:H7; *Listeria monocytogenes* and *Salmonella enterica* in fruit and vegetable processing waters. It also provides control of spoilage and decay causing non-public health organisms present on the surface of post-harvest, fresh-cut, and processed fruits and vegetables.

***E. coli* O157:H7 in process water**

Typical results without Tsunami 100 treatment.

Typical results with Tsunami 100 treatment.

Be confident you've got the most effective process in place for proven food quality with Tsunami 100. Find out more about how Tsunami and Ecolab can help you by calling **1-800-392-3392.**

tsunami
The new wave in processing performance and safety

Ecolab Inc.
370 Wabasha Street N.
St. Paul, Minnesota 55102-1390 U.S.A.
www.ecolab.com 1-800-392-3392

ECOLAB®

BBL™ CHROMagar™ Listeria

Improving Your Laboratory Efficiencies

Only BBL™ CHROMagar™ Formulations Have AOAC™-RI Approval

BBL™ CHROMagar™ Listeria is a selective medium for the isolation, differentiation, and identification of *Listeria monocytogenes* and *L. ivanovii* from food* when using FDA BAM, USDA FSIS, AOAC and ISO methods with no confirmatory biochemical tests required.

BBL CHROMagar Listeria provides:

- **Faster time to results**
- **Accuracy – Sensitivity 100% and specificity 100% in food matrix testing**
- **Greater recovery from raw ground beef compared to USDA methods**
- **Ability to test environmental samples**

BBL CHROMagar O157, BBL CHROMagar Salmonella, and BBL CHROMagar Staph aureus have also been validated by the AOAC™-Research Institute (AOAC-RI) under the Performance Tested Methods Program using AOAC and ISO Official Methods.[1]

For more information, contact your BD sales representative, call us at 800.638.8663 selection 2, or visit our web site at www.bd.com/ds.

BBL™ CHROMagar™ Family AOAC™-RI Approved	Cat. No.	Unit
BBL™ CHROMagar™ Listeria	215085	20 plates
BBL™ CHROMagar™ O157	214984	20 plates
BBL™ CHROMagar™ Salmonella	214983	20 plates
BBL™ CHROMagar™ Staph aureus	214982	20 plates

BD

Helping all people live healthy lives

BD Diagnostics
800.638.8663
www.bd.com/ds

* Raw ground beef, smoked salmon, lettuce and brie cheese

[1] Data on file, Diagnostic Systems, Sparks, MD 21152, USA.

International Association for Food Protection

FOOD PROTECTION TRENDS

ARTICLES

ASSOCIATION NEWS

DEPARTMENTS

EXTRAS

International Association for Food Protection

FOOD PROTECTION TRENDS

ARTICLES

ASSOCIATION NEWS

DEPARTMENTS

EXTRAS

UNIVERSAL SANITIZERS AND SUPPLIES, INC.

Innovations in Food Sanitation

CONTACT US TODAY
888-634-3196
www.universalsanitizers.com

Products and Services:

- Cleaners and sanitizers
- Cleaning supplies
- Contract cleaning
- Equipment passivation
- Training
- Consultation
- Specialty services
- Laboratory testing

UNIVERSAL SANITIZERS AND SUPPLIES, INC.

P.O. Box 50305
Knoxville, TN 37950-0305

Phone: 888-634-3196
Fax: 865-584-3203
E-mail:
info@universalsanitizers.com

Universal Sanitizers and Supplies, Inc. (USS) is a **food and beverage sanitation company** that has offered high quality products and unparalleled service since 1994. USS staffs food microbiologists and mycologists that can develop the right sanitation program for each company needs.

USS offers **contract cleaning and specialty services**: silo cleaning, in-depth plant cleaning, fogging, passivation of new equipment, etc. No job is too small or too big. Call us for a quote on these services.

USS is a certified **women-owned business (WBE)** by the Women Business Enterprises National Council (WBENC).

Certified WBENC Women's Business Enterprise

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

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

Food Protection Trends (ISSN-1541-9576) is published monthly beginning with the January number by the International Association for Food Protection, 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2864, USA. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, Iowa 50010, USA. Periodical Postage paid at Des Moines, Iowa 50318 and additional entry offices.

Manuscripts: Correspondence regarding manuscripts should be addressed to Donna A. Bahun, Production Editor, International Association for Food Protection.

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.

Orders for Reprints: All orders should be sent to *Food Protection Trends*, International Association for Food Protection. Note: Single copies of reprints are not available from this address; address single copy reprint requests to principal author.

Reprint Permission: Questions regarding permission to reprint any portion of ***Food Protection Trends*** should be addressed to: Donna A. Bahun, Production Editor, International Association for Food Protection.

Business Matters: Correspondence regarding business matters should be addressed to Lisa K. Hovey, Managing Editor, International Association for Food Protection.

Membership Dues: Membership in the Association is available to individuals. Dues are based on a 12 month period. *Food Protection Trends*, *Journal of Food Protection* and *JFP* Online are optional Member benefits. See the Membership form at the back of this issue for pricing information. 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 $241.00 US, $256.00 Canada/Mexico, and $271.00 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.

Claims: Notice of failure to receive copies must be reported within 30 days domestic, 90 days outside US.

Postmaster: Send address changes to ***Food Protection Trends,*** 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2864, USA.

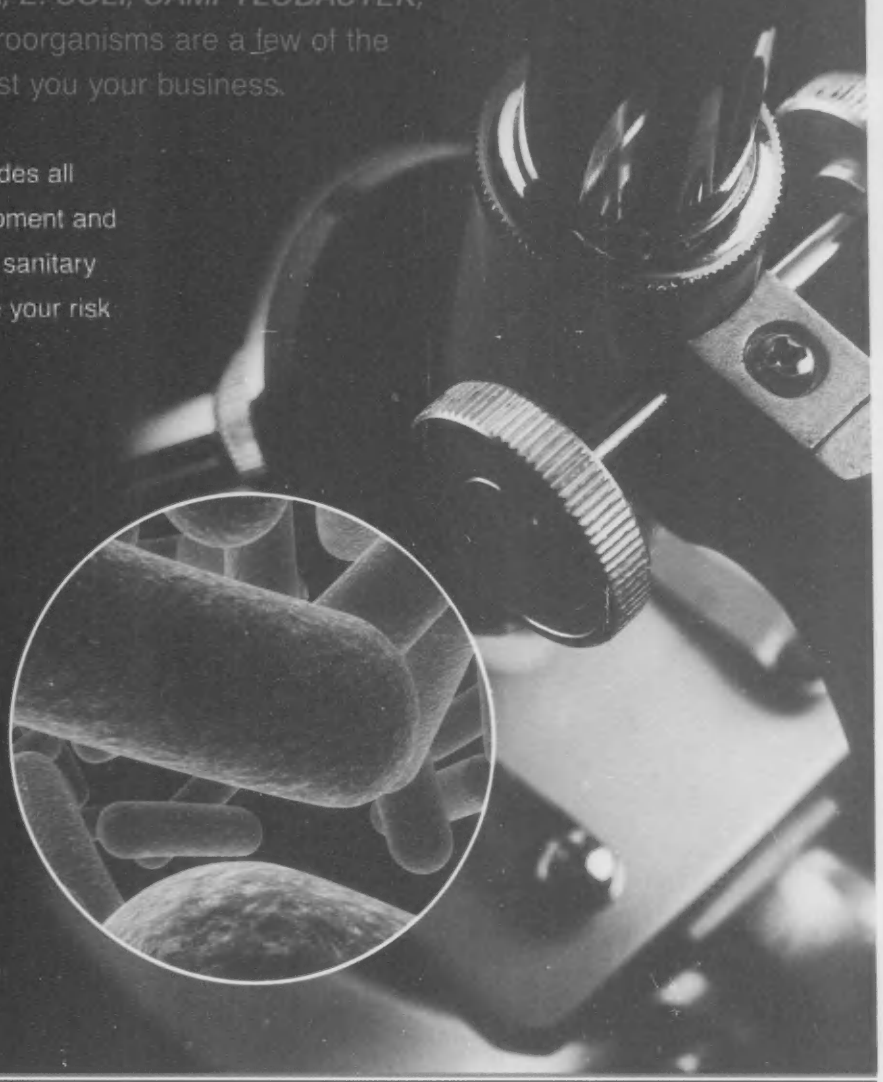
Food Protection Trends is printed on paper that meets the requirements of ANSI/NISO 239.48-1992.

Afraid to look?

"A picture is worth a thousand birds..."

LISTERIA, SALMONELLA, E. COLI, CAMPYLOBACTER, SHIGELLA and other microorganisms are a few of the little creatures that can cost you your business.

Stop being afraid. ZEP provides all the sanitation chemicals, equipment and service you need to operate a sanitary facility and significantly reduce your risk of cross-contamination.



Call your local **ZEP service professional** today for an audit of your facility.

1-877-I-BUY-ZEP

www.zep.com

"Intervention is the Best Prevention"

ZEP Food & Beverage Sanitation Division

FUTURE ANNUAL MEETINGS

IAFP 2007

JULY 8-11

Disney's Contemporary Resort
Lake Buena Vista, Florida

IAFP 2008

AUGUST 3-6

Hyatt Regency Columbus
Columbus, Ohio

IAFP 2009

JULY 12-15

Gaylord Texan Resort
Grapevine, Texas

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."

FPT EDITORIAL BOARD

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®

SUSTAINING MEMBERS

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.

GOLD

BCN Research Laboratories, Inc.
Knoxville, TN
800.236.0505

BD Diagnostics
Sparks, MD
410.316.4467

bioMérieux, Inc.
Hazelwood, MO
800.638.4835

BPI Technology, Inc.
Dakota Dunes, SD
605.217.8000

Cargill
Minneapolis, MN
800.227.4455

The Coca-Cola Company
Atlanta, GA
404.676.2177

DuPont Qualicon
Wilmington, DE
302.695.5300

Ecolab Inc.
St. Paul, MN
800.392.3392

Kraft Foods
Glenview, IL
847.646.3678

Microbial-Vac Systems, Inc.
Jerome, ID
208.324.7522

Silliker Inc.
Homewood, IL
708.957.7878

Universal Sanitizers & Supplies, Inc.
Knoxville, TN
865.584.1936

(Continued on next page)

SUSTAINING MEMBERS

SILVER (Continued)

F & H Food Equipment Co.
Springfield, MO; 417.881.6114

Food Safety Net Services, Ltd.
San Antonio, TX; 210.384.3424

MATRIX MicroScience, Inc.
Golden, CO; 303.277.9613

Microbac Laboratories, Inc.
Wexford, PA; 724.934.5078

Orkin Commercial Services
Atlanta, GA; 404.888.2241

Quality Flow Inc.
Northbrook, IL; 847.291.7674

Warnex Diagnostics Inc.
Laval, Quebec, Canada; 450.663.6724

Weber Scientific
Hamilton, NJ; 609.584.7677

SUSTAINING

3-A Sanitary Standards, Inc., McLean, VA; 703.790.0295

3M Microbiology Products, St. Paul, MN; 612.733.9558

ABC Research Corporation, Gainesville, FL; 352.372.0436

Aerotech P & K Laboratories, Phoenix, AZ; 800.651.4802

ASI Food Safety Consultants, Inc., St. Louis, MO; 800.477.0778

Bentley Instruments, Inc., Chaska, MN; 952.448.7600

BioControl Systems, Inc., Bellevue, WA; 425.603.1123

Biolog, Inc., Hayward, CA; 510.785.2564

Bio-Rad Laboratories, Hercules, CA; 510.741.5653

Biotrace International, Inc., Bothell, WA; 425.398.7993

Birds Eye Foods, Inc., Green Bay, WI; 920.435.5301

Burger King Corp., Miami, FL; 305.378.3410

Charm Sciences, Inc., Lawrence, MA; 978.687.9200

Chestnut Labs, Springfield, MO; 417.829.3724

ConAgra Foods, Omaha, NE; 402.595.6983

DARDEN Restaurants, Inc., Orlando, FL; 407.245.5330

Decagon Devices, Inc., Pullman, WA; 509.332.2756

Deibel Laboratories, Inc., Lincolnwood, IL; 847.329.9900

DeLaval Cleaning Solutions, Kansas City, MO; 816.891.1549

Diversified Laboratory Testing, LLC, Mounds View, MN; 763.785.0484

DonLevy Laboratories, Crown Point, IN; 219.226.0001

DSM Food Specialties USA, Inc. Eagleville, PA; 610.650.8480

Electrol Specialties Co., South Beloit, IL; 815.389.2291

Elena's, Auburn, Hills, MI; 248.373.1100

SUSTAINING MEMBERS

SUSTAINING

ELISA Technologies, Inc., Gainesville, FL; 352.337.3929

EMD Chemicals Inc., Gibbstown, NJ; 856.423.6300

Fisher Scientific, Pittsburgh, PA; 412.490.4488

Food Directorate, Health Canada, Ottawa, Ontario, Canada; 613.957.0880

FoodHandler Inc., Mesa, AZ; 800.338.4433

Food Lion, LLC, Salisbury, NC; 704.633.8250

Food Products Association, Washington, D.C.; 202.639.5985

FOSS North America, Inc., Eden Prairie, MN; 800.547.6275

GOJO Industries, Akron, OH; 330.255.6286

FPA Research and Education Foundation, Washington, D.C.; 800.355.0983

HiMedia Laboratories Pvt. Limited, Mumbai, Maharashtra, India; 91.22.2500.3747

Hygiena, Camarillo, CA; 805.388.8007

IBA, Inc., Millbury, MA; 508.865.6911

Idaho Technology, Inc., Salt Lake City, UT; 801.736.6354

Institute for Environmental Health, Lake Forest Park, WA; 206.522.5432

International Dairy Foods Association, Washington, D.C.; 202.737.4332

Iowa State University Food Microbiology Group, Ames, IA; 515.294.4733

Jimmy Buffett's Margaritaville, Orlando, FL; 407.224.3216

JohnsonDiversey, Sharonville, OH; 513.956.4889

Kellogg Company, Battle Creek, MI; 269.961.6235

The Kroger Co., Cincinnati, OH; 513.762.4209

Maxxam Analytics Inc., Mississauga, Ontario, Canada; 905.817.5700

Michelson Laboratories, Inc., Commerce, CA; 562.928.0553

MicroBioLogics, Inc., St. Cloud, MN; 320.253.1640

Micro-Smedt, Herentals, Belgium; 32.14230021

Nasco International, Inc., Fort Atkinson, WI; 920.568.5536

The National Food Laboratory, Inc., Dublin, CA; 925.833.8795

Nelson-Jameson, Inc., Marshfield, WI; 715.387.1151

Neogen Corporation, Lansing, MI; 517.372.9200

Nestlé USA, Inc., Dublin, OH; 614.526.5300

NSF International, Ann Arbor, MI; 734.769.8010

Oxoid, Inc., Nepean, Ontario, Canada; 800.267.6391

Penn State University, University Park, PA; 814.865.7535

Polar Tech Industries, Genoa, IL; 815.784.9000

The Procter & Gamble Co., Cincinnati, OH; 513.983.8349

Process Tek, Des Plaines, IL; 847.296.9312

Q Laboratories, Inc., Cincinnati, OH; 513.471.1300

Randolph Associates, Birmingham, AL; 205.595.6455

REMEL, Inc., Lenexa, KS; 800.255.6730

Ross Products, Columbus, OH; 614.624.7040

rtech™ laboratories, St. Paul, MN; 800.328.9687

Seiberling Associates, Inc., Dublin, OH; 614.764.2817

The Steritech Group, Inc., San Diego, CA; 858.535.2040

Strategic Diagnostics Inc., Newark, DE; 302.456.6789

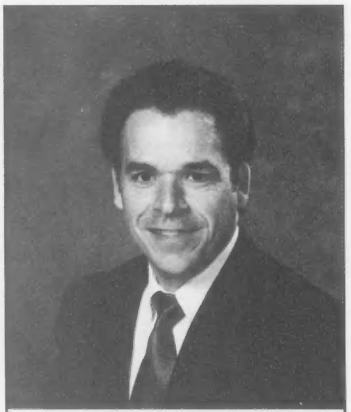
Texas Agricultural Experiment Station, College Station, TX; 979.862.4384

United Fresh Produce Association, Davis, CA; 530.756.8900

Walt Disney World Company, Lake Buena Vista, FL; 407.397.6060

Zep Manufacturing Company, Atlanta, GA; 404.352.1680

"POINT OF VIEW" FROM YOUR PRESIDENT



By FRANK YIANNAS
PRESIDENT

"If you look at foodborne disease trends over the past few decades, it's clear to me that the soft stuff is still the hard stuff"

As you think about improving the food safety performance within your organization or area of responsibility, if you aim to create a bigger or better food safety program, then may I suggest that although you may be well-intentioned, you might be missing the mark. Your goal should be to create or strengthen a food safety culture – not a food safety program. There is a big difference between the two.

The words we use and how we use them are important. So let's take a brief moment to review the word *culture*.

Culture is a word that is often used (maybe even overused) in today's society. As a food safety professional, culture could be one of those terms that you're uncomfortable with. You might feel much more comfortable talking about terms related to specific microbes, time/temperature processes, post-process contamination, and HACCP – things often called the hard sciences. You might feel less comfortable talking about terms related to human behavior and culture – often referred to as the "soft stuff."

If you look at foodborne disease trends over the past few decades, it's clear to me that the soft stuff is still the hard stuff. We won't make dramatic improvements in reducing the global burden of foodborne disease, especially in certain parts of the food system and world, until we get much better at influencing and changing human behavior (the soft stuff).

Think about it. If you're trying to improve the food safety performance of an organization, industry, or region of the world, what you're really trying to do is change people's behaviors. Simply put, food safety equals behavior.

So what is culture? One of the best definitions I've come across by Coreil, Bryant, and Henderson states that "Culture is patterned ways of thought and behavior that characterize a social group, which can be learned through socialization processes and persist through time." As food safety professionals, a food safety culture can be viewed as how and what the individuals in an organization think about food safety. It's the food safety behaviors that they routinely practice and demonstrate. According to this definition, employees will learn these thoughts and behaviors by simply becoming part of the company or organizational group. Furthermore, these thoughts or behaviors will permeate throughout the entire organization. If you can truly create a food safety culture, these thoughts and behaviors will be sustained over time as opposed to being the "program of the month" or this year's focus.

In an organization or social group, there is no question about it; food safety is a shared responsibility. However, when it comes to creating a food safety culture, there is one group of individuals who really own it – the leaders. I came across a quote by Edgar Schein, author on organizational culture, which states this point quite well. He said, "Organizational cultures are created by leaders, and one of the most decisive functions of leadership may well be the creation, the management, and – if and when necessary – the destruction of culture." Although this quote may strike you as being a bit strong, it's true. Having a strong food safety culture is a choice and it's the leaders who own it.

As a professional in the field of food safety, I encourage you to join us at IAFP and help us lead the way in creating a food safety culture – not just a food safety program. We won't be as completely effective in reducing the global burden of foodborne disease and advancing food safety worldwide until we do.

Frank

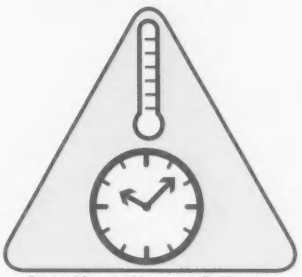
If you have any questions, comments, or suggestions, please let me know. You can E-mail me at frank.yiannas@disney.com. Until next month, thanks for reading.

International Food Safety Icons

Available from International Association for Food Protection®

Handwashing

Potentially Hazardous Food



Cooking

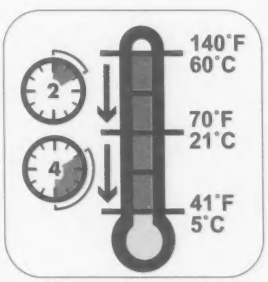
Do Not Work If Ill

Cross Contamination

Wash, Rinse, and Sanitize

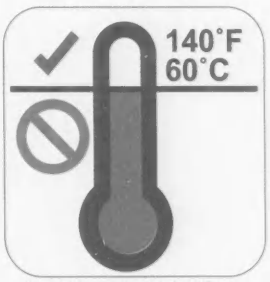
No bare hand contact

Cooling

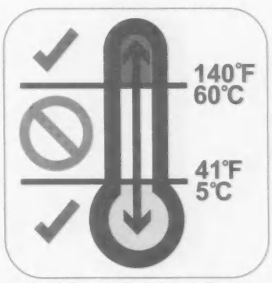


Refrigeration/Cold holding

Hot Holding

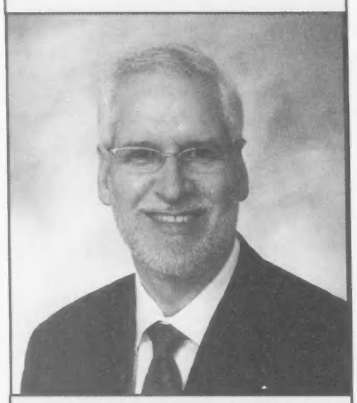


Temperature Danger Zone



For additional information, go to our Web site: www.foodprotection.org or contact the IAFP office at 800.369.6337; 515.276.3344; E-mail: info@foodprotection.org

"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"As we prepare for IAFP 2007, there are many details that need to be tended to"

February has been a very busy month for IAFP and March will continue to be the same! I thought this month, we could review the many items and projects underway at the IAFP office.

As we prepare for IAFP 2007, there are many details that need to be tended to. The Program Committee met at the end of January to review technical abstracts and symposia. Upon completion of our two-day meeting, the program for IAFP 2007 was finalized. Symposia titles are shown on page 202 in this issue and a more detailed program is available online at the IAFP Web site. The Program Committee also reviewed and accepted four workshops to be held in conjunction with IAFP 2007. Those titles are on page 167 with additional information available on the IAFP Web site.

Now that the program is finalized, we are working with *Disney's Contemporary* Resort to place each of the sessions in the appropriate rooms. In addition, we have a large number of "special" functions that have to be scheduled around our sessions. Those include Exhibit Hall receptions, the President's Reception, our Past Presidents' Dinner, a Student Mixer, the Foundation Fundraiser, our Monday Night Social at Epcot, Saturday's Golf Tournament and more! See our Annual Meeting information starting on page 200 for more details.

At the first of February, we mailed ballots to all IAFP Members for the 2007–2008 Secretary election. You should have received a ballot by now and we hope you have marked your vote and mailed your ballot back to the IAFP office for receipt prior to Friday, March 16. Candidate pictures and bios are presented on page 186. Once the deadline date passes, we will box up the unopened ballots and send them to the IAFP Teller for tabulation. Our new Secretary will be announced in May's issue of *Food Protection Trends*.

Two other important deadlines arrive on March 12. Those are the deadlines for Award nominations and applications for the Student Travel Scholarship. Both are excellent mechanisms for recognition. IAFP's Awards Program recognizes those individuals who have contributed to the Association and to food safety throughout their careers. The Student Travel Scholarship recognizes those students who have a most promising career in front of them!

Up to this point, we have reviewed Annual Meeting related projects. In addition, we are now producing a monthly, electronic newsletter titled, *IAFP Report*, that is sent to all IAFP Members. There is a new base level of Membership that includes the *IAFP Report* without print copies of either the *Journal of Food Protection* or *Food Protection Trends*. Members can now choose to add *FPT*, *JFP* or *JFP* Online to their base Membership, thus allowing each Member to select the information that is important to them individually. We have had to restructure our Member records to allow for this change and there is additional work during this year of transition as Members settle into the type of Membership that suits them. Although there is extra work involved, we feel this is a great new opportunity for Members to be able to select the services they really want to receive.

At the Board meeting held at the end of January, the Board agreed to continue to plan a European Symposium each year. We will target the fall months of September, October or November as we make our plans. The Organizing Committee for the 2007 Symposium, now our third, has been formed and the program topic and speakers are expected to be finalized by June. So, as we prepare for IAFP 2007, concurrently, we are planning for the European Symposium. Keep watching our Web site and *FPT* for further announcements on this Symposium.

In addition to the European Symposium, beginning in 2008, we plan to hold an "International Symposium" in another region of the world. Preliminary plans are to conduct a symposium in South America, most likely Brazil. Then in 2009, we are looking to the Pacific Rim. IAFP is making strategic moves to become actively involved in providing food safety information on the International level.

We hope this update of some of the projects at IAFP helps you to understand the working of your Association. It is a truly exciting time to be a Member of IAFP!

IAFP 2007 Workshops

Friday and Saturday
July 6–7
8:00 a.m. – 5:00 p.m.

Workshop 1

Environmental Sampling of Food and Water – Wet Lab

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

Workshop 2

Creating a Food Safety Management System (FSMS)

Saturday, July 7
8:00 a.m. – 5:00 p.m.

Workshop 3

Predictive Microbiology as a HACCP Validation and Support Tool

---

Saturday, July 7
8:00 a.m. – 5:00 p.m.

Workshop 4

Controlling *Listeria monocytogenes* in Ready-to-Eat Meat and Poultry Products: A Train the Trainer Workshop

---

Additional information will be available soon on our Web site at www.foodprotection.org

ARTICLES
Food Protection Trends, Vol. 27, No. 3, Pages 168–173

6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2864
International Association for Food Protection

A Comprehensive Evaluation of Temperatures within Home Refrigerators

SANDRIA L. GODWIN,[1,2*] FUR-CHI CHEN,[1] EDGAR CHAMBERS IV,[3] RICHARD COPPINGS,[1] and DELORES CHAMBERS[3]

[1]Institute of Agricultural and Environmental Research, Tennessee State University, Nashville, TN 37209, USA; [2]Department of Family and Consumer Sciences, Tennessee State University, Nashville, TN 37209, USA; and [3]Sensory Analysis Center, Department of Human Nutrition, Kansas State University, Manhattan, KS 66506, USA

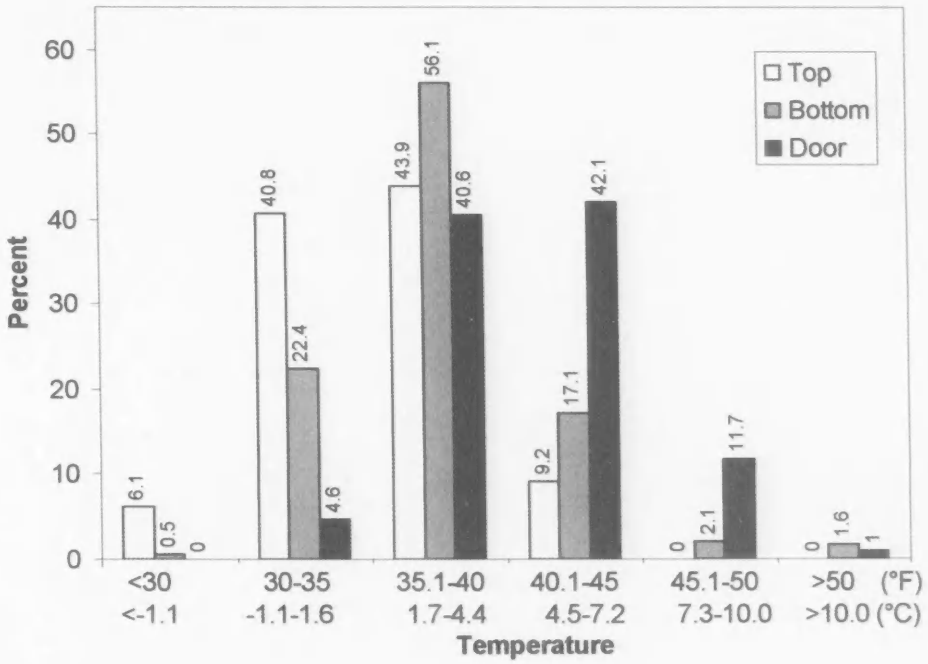
SUMMARY

Microbial growth in many foods can be controlled by proper refrigeration. Thus, it is recommended that refrigerators be maintained at 40°F (4.4°C) or below. However, no recent extensive studies have been reported that assess actual temperatures at which cold foods are stored over time within the home. The objective of this project was to evaluate the temperatures of refrigerators in 200 homes in the United States. Loggers were used to record temperatures each minute in several locations in each refrigerator. In some homes, a thermocouple was also placed in a commercially sealed hot dog and in a cup of yogurt. Data were analyzed using Excel and SPSS-PC. Mean temperatures were 35.5, 38.0 and 41.3°F (1.9, 3.3 and 5.2°C) for the top shelf, bottom shelf and door, respectively, with 9, 25 and 61% of these areas having average temperatures above 40°F (4.4°C). Over 66% of refrigerator door temperatures were above 40°F (4.4°C) for more than eight hours per day. The temperature of the foods fluctuated less than the temperature of the surrounding air. Temperatures rose above the danger zone (above 40°F or 4.4°C) for more than 2 hours a day for 33%, 45%, and 80% (top shelf, middle shelf, door, respectively) of refrigerators. Consumers need to check the temperature regularly and should be advised to store temperature-sensitive foods on the top shelf of the refrigerator when appropriate.

A peer-reviewed article

*Author for correspondence: 615.963.5619; Fax: 615.963.5033
E-mail: sgodwin@tnstate.edu

FIGURE 1. Distribution of mean temperatures for three locations in home refrigerators; N = 98, 187, and 197 for top shelf, bottom shelf, and door, respectively



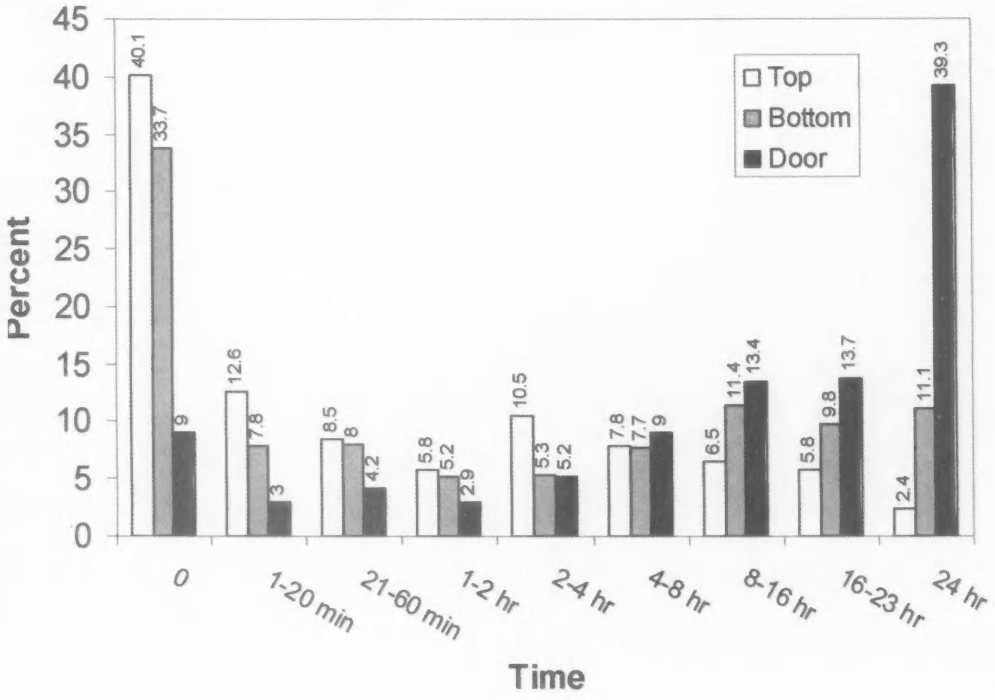
INTRODUCTION

Data indicate that 25% of reported foodborne illnesses are traced back to food items that are consumed in the home *(13)*. However, little information is available to determine if any of these cases are actually attributable to the domestic environment and if, or to what extent, domestic food handling practices contribute to the problem. Although most outbreaks are attributed to poor temperature control of raw and cooked foods, many are associated with cross contamination *(14)*.

Regulatory agencies have also recognized the importance of safe consumer food-handling practices. A refrigerator is recognized as one of the most important pieces of equipment in the kitchen for helping keep food safe. It helps maintain the microbiological safety of the food supply by inhibiting the growth of bacteria that reproduce rapidly at temperatures above 40°F (4.4°C). Consumers are told to store their cold foods at 40°F (4.4°C) or below *(3, 5)*. However, some bacteria such as *Listeria monocytogenes*, will continue to thrive at cold temperatures and have the potential to grow in the refrigerator and subsequently cause serious illness and possibly death. A recently released risk assessment on *Listeria* in ready-to-eat foods *(6)* noted that both refrigerator storage temperature and duration of refrigerated storage before consumption are important factors in measuring the possible public health impact to consumers from foodborne listeriosis. The few studies that have reported on cold storage of food in homes have concluded that lack of adequate practices for determining the temperature of the refrigerator in the home is a major problem *(2, 4, 9)*. For example, rather than using a thermometer, most consumers rely on how cold the food feels *(8)*. Only 25% of consumers in one study in the United States reported having a thermometer in their refrigerator, and most persons were unaware of the ideal refrigerator temperature *(12)*. In a study conducted in Greece in which household refrigerator temperature was assessed, Sergelidis et al. *(11)* reported that 55% of refrigerators had temperatures of 48°F (8.9°C) or higher. Similarly, in a study of elderly Britons, 70% had refrigerators that were too warm for the safe storage of food *(10)*. In the most thorough study of refrigerator temperatures, which was conducted in the United Kingdom, James and Evans *(9)* found that fewer than 2% of refrigerators operated below 41°F (5.0°C) at all times and that a third were consistently over 41°F (5.0°C) Around 70% of the refrigerators monitored were above 41°F (5.0°C) more than 50% of the time. Data from a more recent study in New Zealand show that 30% of refrigerators were operating above 41°F (5.0°C) *(7)*.

In spite of the need for comprehensive information on storage of cold foods in the home environment, few recent studies have been reported. No studies have been found that investigated actual temperatures at which cold foods are stored within homes in the United

FIGURE 2. Percentage of refrigerator compartments that exceeded 40°F (4.4°C) for specified lengths of time; N = 98, 187, and 197 for top shelf, bottom shelf, and door, respectively



States, variations of temperature within different areas of the refrigerators, and whether consumers are aware of cold storage recommendations.

The objective of this project was to evaluate the consistency and appropriateness of temperatures for different locations within domestic refrigerators over time. Temperature differences among refrigerator areas and selected foods were also assessed.

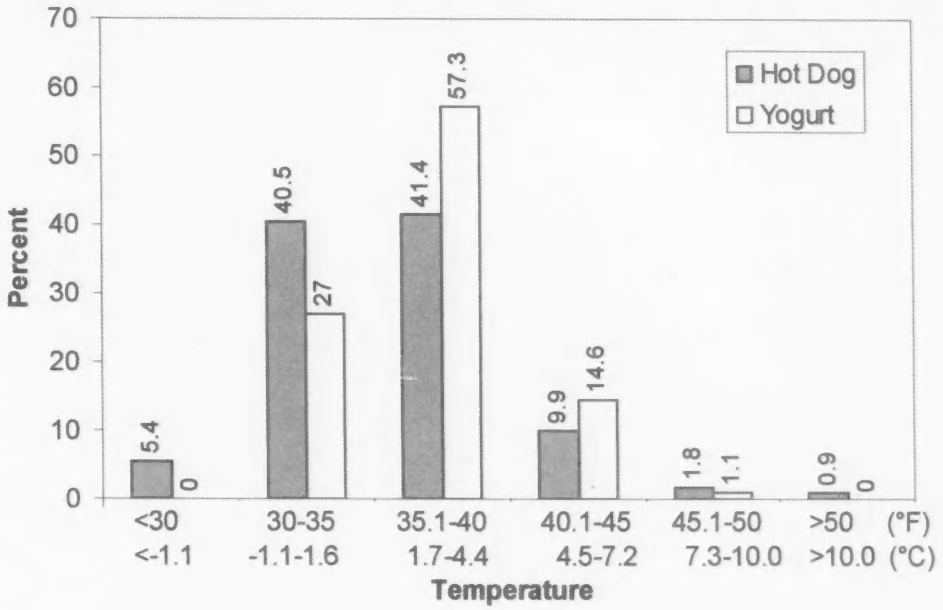
MATERIALS AND METHODS

Temperatures from household refrigerators in routine use were collected during visits to participants' homes for in-person interviews. The purpose of the interview was to assess consumers' knowledge and practices on handling and storing refrigerated foods at home. Temperature loggers (Precision Temperature Data Logger, Spectrum 1000, accuracy ± 0.1°F (0.05°C), were placed in 200 refrigerators in homes in Tennessee, Kansas, and Florida. Generally, three loggers were used, one placed on the bottom shelf of the door panel, and the others in one or more of four other locations, such as top shelf, middle shelf, meat drawer, vegetable bin, the site of each depending on the model of the refrigerator. Items stored in the refrigerators were kept in their original arrangements. This report describes results obtained from loggers placed on the door panel and from those placed at the back of the top and bottom shelves. In some refrigerators, a thermocouple also was placed in a commercially sealed hot dog (111 refrigerators) or a cup of yogurt (89 refrigerators), both of which were provided by the researchers. These foods, which are commonly found in refrigerators, represent solid and semi-solid "ready-to-eat" foods of interest to food safety researchers. Each logger recorded the temperature every minute for at least three consecutive days.

Temperature data were downloaded for each refrigerator and evaluated by use of Excel and SPSS-PC. Analysis included calculations of means and standard deviations for temperatures measured by loggers placed on top and bottom shelves and doors; minimum, maximum, and range of temperatures, and frequency distributions of numbers of refrigerators and amount of time per day that those refrigerators exceeded 40°F (4.4°C).

Although most scientists report temperatures in Celsius, the temperature data in this paper are presented not only in °C for the scientific community but also in °F, because the Fahrenheit scale is familiar to American consumers and because refrigerator temperature recommendations made in such programs as FightBAC® are specified in °F.

FIGURE 3. Distribution of mean temperatures for hot dogs and yogurt in home refrigerators; N = 111, and 89 for hot dogs and yogurt, respectively



RESULTS AND DISCUSSION

Figure 1 shows the distribution of mean temperatures recorded in three locations within home refrigerators. The mean temperature was at or below the currently recommended 40°F (4.4°C) in 91% of the top shelves but in only 79% of bottom shelves and 45% of refrigerator doors. None of the mean temperatures of the top shelves within each refrigerator exceeded 45°F (7.2°C), the maximum temperature that may have been recommended when some of the refrigerators in the study were manufactured, whereas 3.7 and 12.7 percent of bottom shelves and doors, respectively, exceeded 45°F (7.2°C). Overall temperatures (mean ± standard deviation) for top shelves, bottom shelves, and doors were 35.5 ± 3.96, 38.0 ± 3.98 and 41.3 ± 3.85°F (1.9 ± 2.2, 3.3 ± 2.2 and 5.2 ± 2.1°C), respectively. Nearly half of the top-shelf areas, 46.9%, had mean temperatures of 35°F (1.7°C) or less, while 22.9% of bottom shelves and only 4.6% of refrigerator doors averaged 35°F (1.7°C) or less. Thus, as expected, because the cold air enters in the area close to the top shelf in most refrigerators, this area was the coldest for most of the refrigerators. Temperatures fluctuated as much as 26°F (14.4°C) within an area during the study. The mean temperature fluctuation for the top shelves was 10.1 ± 4.1°F (5.6 ± 2.3°C), a range that was significantly greater than the range for the bottom shelves and refrigerator doors, (6.7 ± 1.98 and 7.0 ± 2.81°F, or 3.7 ± 1.1 and 3.9 ± 1.6°C, respectively), again probably because this is where the cold air enters the unit. However, it should be noted that because the temperature fluctuates greatly, the time at which the consumer checks the temperature could be critical in determining whether the food is being kept cold enough or not, and whether adjustments to the temperature or repairs to the refrigerator are warranted.

The length of time each refrigerator compartment exceeded 40°F (4.4°C) is displayed in Fig. 2. The air around the top shelf was the coldest for almost all refrigerators. The temperature never exceeded 40°F (4.4°C) for 40% of them, in contrast to 33.7% of bottom shelves and only 9% of the doors. Thus, the consistently high temperature of the door is a major concern. When the temperature of the air exceeded 40°F (4.4°C), it was for shorter periods each day, from 1–20 min up to 2–4 h, for the top shelves than for the other areas. Only 2.4% of top shelves continuously exceeded 40°F (4.4°C). In contrast, a greater proportion of refrigerator

doors exceeded 40°F (4.4°C) in each of the longer intervals, beginning with the 4–8 h period. Over one third (39.3%) of doors and 11.1% of bottom shelves were continuously above recommended refrigerator temperature.

Since the temperature of the food, not of the air, is probably the most important factor in temperature control, we also recorded temperature in thermocouples placed in hot dogs and yogurt cups. Lower mean temperatures were recorded in a greater percentage of commercially sealed hotdogs than of yogurt containers, as shown in Fig. 3. The mean temperature was 36.3°F (2.4°C) for hot dogs and 37.1°F (2.8°C) for the yogurt. The hot dog averaged 0.2°F (0.1°C) colder, and the yogurt 0.7°F (0.4°C) colder, than the surrounding air. Therefore, the hot dogs and yogurt had mean temperatures slightly less than those recorded from temperature sensors placed in the same refrigerator in the same area, indicating that these foods maintained the low temperature better. Air temperature within a refrigerator would be expected to change rapidly as the door is opened, foods are added or taken out, cold or warm air enters, or the defrost cycle occurs.

Only 18 of the 200 refrigerators evaluated in this study (9%) contained a refrigerator thermometer when we arrived in the home. Of additional concern was the fact that for those homes where a thermometer was present in the refrigerator, the respondents reported that they rarely or never checked it.

Thus, circumstances do appear to exist in many homes that could lead to increased microbial growth in refrigerated foods, and consequently lead to a higher risk of consumers contracting a foodborne illness. A large percentage of refrigerators in the current study were not maintaining the recommended temperature of 40°F (4.4°C) or below continuously. The top shelf had the lowest mean temperature, probably because the cold air inlet is located in this area in most refrigerators. The door was too warm in the majority of refrigerators and stayed that way a large percentage of the time; indeed, nearly 40% of refrigerator doors were above 40°F (4.4°C) all of the time. Thus, foods that are potentially hazardous, such as milk and eggs, should not be stored on the door, which is of concern because many refrigerators have compartments on the door especially designed for storage of these foods. Consumers should be educated to place highly perishable foods in the main compartment of the refrigerator and use the refrigerator door only for items that do not spoil readily, such as condiments (mustard, ketchup, etc.), highly salted foods such as pickles or olives, and cold beverages.

All refrigerators should be equipped with a thermometer that should be checked regularly, which is not the current situation, since few consumers have refrigerator thermometers (only 9% in the current study). This figure of 9% is much lower than figures reported by other researchers, who asked consumers if they had a thermometer in their refrigerator *(1)*. There is a clear need to inform consumers of the value of refrigerator thermometers and to encourage their correct use.

An additional problem arises in that refrigerator thermometers are of little value if not properly used. When asked, 33% of consumers with refrigerator thermometers replied that they had not checked them within the last week *(8)*. We recommend that the refrigerator thermometer be checked frequently, because the large fluctuation in refrigerator temperatures reported herein suggests that infrequent checks would not reliably indicate overall temperature maintenance. Observing the temperature initially in the morning would provide insight into the ability of the refrigerator to maintain proper temperature. Checking the thermometer temperature at different times during the day following periods of normal use would give consumers information regarding if and how often the temperature in their refrigerator exceeds 40°F (4.4°C). We further recommend that the thermometer be placed on the door, since this is nearly always the warmest part of a domestic refrigerator and thus would provide the best indication as to whether the entire refrigerator is cold enough.

In our previous study, a significant proportion (45%) of consumers reported that they had changed the temperature setting within their refrigerator in the past six months, suggesting an awareness of the need to maintain an adequate temperature *(8)*. The decision to change the temperature setting, however, usually was based on intuition; consumers judged refrigerator temperature most commonly by assessing the temperature of cold beverages. Clearly, these methods are unreliable. Such decisions should be based on observations from a refrigerator thermometer.

Consumers need to realize the importance of maintaining cold foods at the recommended temperature in the home to reduce the risk of foodborne illness. Moreover, it is imperative that consumers recognize that the responsibility for controlling food temperature in the home rests on them. Regulatory agencies such as the Food and Drug Administration, US Department of Agriculture, and health departments can not help guarantee the safety of foods once these have been purchased. Consumers need to adhere to agency recommendations for handling and storing foods to best avoid foodborne illness. Researchers and educators need to provide instruction to consumers to ensure that they are aware of and understand current recommendations. Furthermore, we believe that it would be helpful if manufacturers were required to install thermometers in all refrigerators and include instructions for their proper use, as well as information on the safe storage of refrigerated foods.

ACKNOWLEDGMENTS

This material is based on work supported by Food and Drug Administration under cooperative agreement FD-U-001950, and US Department of Agriculture under Project TENX-0402-FSHNT23.

REFERENCES

1. American Dietetic Association (ADA) and ConAgra Foods Foundation. 2001. Home food safety refrigeration survey. Available at: http://www.homefoodsafety.org/pages/media/releases/apr6_2001_key.jsp. Accessed November 1, 2006.
2. American Dietetic Association and ConAgra Foundation. 6 April 2001. Survey reveals Americans need a refrigerator refresher. Press release. Available at: http://www.homefoodsafety.org/pages/media/releases/apr6_2001.jsp. Accessed 23 May 2006.

3. Anonymous. FightBAC! Partnership for Food Safety Education. Available at: http://www.fightbac.org/content/view/169/2/ Accessed November 1, 2006.
4. Albrecht, J. A. 1995. Food safety knowledge and practices of consumers in the U.S.A. J. Consumer Stud. Home Econ. 19:119–134.
5. Food and Drug Administration. Center for Food Safety and Applied Nutrition. 2001. Foodborne illness: What consumers need to know. Available at http://www.foodsafety.gov/~dms/fsefborn.html. Accessed November 1, 2006.
6. Food and Drug Administration. Center for Food Safety and Applied Nutrition. Food Safety Inspection Service. Centers for Disease Control. 2003. Quantitative assessment of relative risk to public health from foodborne *Listeria monocytogenes* among selected categories of ready-to-eat foods. Available at http://www.foodsafety.gov/~dms/lmr2-toc.html. Accessed November 1, 2006.
7. Gilbert, S. Fridge snoopers. Food Protection Trends 2006:26:572, 563.
8. Godwin, S., R. Coppings, L. Speller-Henderson, and L. Pearson. 2005. Study finds consumer food safety knowledge lacking. J. Fam. & Cons. Sci. 97:40–44.
9. James, S. J., and J. A. Evans. 1992. Consumer handling of chilled foods: temperature performance. Int. J. Refrigeration 15:299–306.
10. Johnson, A. E., A. J. Donkin, K. Morgan, J. M. Lilley, R. J. Neale, R. M. Page, and R. Silburn. 1998. Food safety knowledge and practice among elderly people living at home. J. Epi. Commun. Health 52:745–748.
11. Sergelidis, D., A. Abrahim, A. Sarimvei, C. Panoulis, P. Karaioannoglou, and C. Genigeorgis. 1997. Temperature distribution and prevalence of *Listeria* spp. in domestic, retail and industrial refrigerators in Greece. Int. J. Food Microb. 34:171–177.
12. Towns, R. E., R. W. Cullen, J. A. Memken, and N.E. Nnakwe. 2006. Food safety-related refrigeration and freezer practices and attitudes of consumers in Peoria and surrounding counties. J. Food Prot. 69:1640–1645.
13. Redmond, E. C., and C. J. Griffith. 2003. Consumer food handling in the home: a review of food safety studies. J. Food Prot. 66(1):130–161.
14. Woodburn, M. J., and C. A. Raab. 1997. Household food preparer's food safety knowledge and practices following widely publicized outbreaks of foodborne illness. J. Food Prot. 60:1105–1109.

Food Protection Trends, Vol. 27, No. 3, Pages 174–184

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

Survey of Food Defense Practices in Produce Operations in the Southeast

KAREN SIMMONS,[1] MARK A. HARRISON,[1*] WILLIAM C. HURST,[1*] JUDY HARRISON,[2] JEFFREY BRECHT,[3] KEITH SCHNEIDER,[4] AMY SIMONNE,[5] and JAMES RUSHING[6]

[1]Dept. of Food Science and Technology, University of Georgia, Athens, GA 30602, USA; [2]Dept. of Foods and Nutrition, University of Georgia, Athens, GA 30602, USA; [3]Dept. of Horticultural Sciences, University of Florida, Gainesville, FL 32611, USA; [4]Dept. of Food Science and Nutrition, University of Florida, Gainesville, FL 32611, USA; [5]Dept. of Family, Youth, and Community Sciences, University of Florida, Gainesville, FL 32611, USA; [6]Coastal Research & Educational Center, Clemson University, Charleston, SC 29414, USA

SUMMARY

A survey of produce growers, packers, and fresh-cut processors in the southeastern states of Georgia, Florida and South Carolina assessed the food defense practices of these operations. Findings indicate that two-thirds of the fresh-cut processors have written food defense plans, provide employee training in emergency procedures and have restricted access to their facilities. However, less than half of the farm and/or packing operations provide employee emergency procedure training, and only 24% of the packing shed operations and 20% of the growers surveyed have written defense plans. About half (52%) of the packing sheds surveyed have perimeter fencing and half have locks on the cooler doors. Documentation of any sort of security practices is lacking among both growers and packers. Survey data collected indicate that while fresh-cut processing facilities are dealing with current security challenges, farm and packing operations in the tri-state region are lagging behind. Admittedly, the open nature of farm and packing operations would tend to preclude them from increased security; however, based on the findings of the survey conducted, there are measures that could be put into place to raise their level of security. While security must be a greater concern for produce providers, balance and rationality must also exist in this time of heightened security.

A peer-reviewed article

*Author for correspondence: 706.542.1088; Fax: 706.542.1050
E-mail: mahfst@uga.edu

INTRODUCTION

Fresh fruits and vegetables are known to be important components of a healthy diet. The 2005 dietary guidelines recommend consumption of from 2½ to 6½ cups per day of fruits and vegetables *(9)*. Fresh produce contributes essential vitamins and minerals, fiber and various phytochemicals that may possibly prevent cancer, lower cholesterol, or enhance immune function. Global production and distribution, coupled with innovative packaging, along with improved marketing and merchandising strategies, have provided consumers with an abundance of fruits and vegetables. Currently, food from over 130 countries around the world is available to US consumers, resulting in year-round availability of fresh produce *(7)*. Increased awareness of the benefits of consuming fresh produce, combined with increased availability, led to a 24% rise in US per capita annual consumption of fruits and vegetables between 1970 and 1997, from 577 to 781 pounds *(7)*.

Increased availability and consumption naturally leads to increased food safety and defense concerns. Traditional Good Agricultural Practices (GAP) and Hazard Analysis Critical Control Point

(HACCP) programs focus on unintentional contamination and thus do not ensure that products are protected from intentional tampering. Even before the events of September 11, 2001, it was recognized that the food supply of the US is vulnerable to tampering. The fresh produce sector of the food supply is particularly vulnerable to tampering for a variety of reasons. Food processing and packing facilities tend to lack security, and this is especially true for small to mid-sized operations, thousands of which exist across the country. Produce is grown, harvested and packed literally "in the open" and is subject to very little inspection. In addition, there is often little or no testing done on products to identify possible chemical contaminants before shipment to retail outlets. Because produce is usually eaten raw or in a minimally processed (fresh-cut) state, there is no kill step to destroy microbial pathogens prior to consumption. Other factors that may contribute to the commercial fruit and vegetable industry's vulnerability include high employee turnover, low wages, and the presence of toxic chemicals, often readily available onsite *(5)*.

Security checklists were constructed to assess the current status of security measures at farms, packing sheds and fresh-cut processing facilities in the southeastern United States. We examined such areas as security procedures, facility security, personnel security, administrative security, transportation security and, where applicable, laboratory security. The results will aid in the identification of security weaknesses and also contribute to the design of educational programs for industry personnel and extension agents.

MATERIALS AND METHODS

Security checklist forms were prepared based upon the U.S. Food and Drug Administration's Guidance for Industry Food Producers, Processors, Transporters and Retailers: Food Security Preventive Measures Guidance *(3)* and after reviewing similar forms available for industry use (IFPA, UFFVA) *(2, 4)*. Three forms were prepared, each specific for the type of operation being surveyed, i.e., farm, packing shed or fresh-cut processor. The forms contained from 6 to 11 pages of yes/no/not applicable questions. After initial review by industry members, the forms were revised to more appropriately address the facilities to be examined. The survey forms were subsequently used to audit growers, packers, and fresh-cut processing operations in Georgia, Florida, and South Carolina. Investigators in each of the three states were responsible for conducting the surveys in their respective states. A letter of introduction explaining the project and requesting participation was mailed to potential participants. Those replying in the affirmative were visited, and in most cases the surveys were conducted in person. All participants completed a consent form in compliance with the Code of Federal Regulations (CFR) Title 45, Part 46 *(8)* regarding human subjects. In Georgia, on two occasions, because of time constraints, it became necessary to leave the checklist form to be completed by the owner/manager. Surveys were conducted between 2003 and 2005. A total of 25 farms, 25 packing sheds and 6 fresh-cut produce processing operations were surveyed in this manner.

The responses were entered in the Centers for Disease Control and Prevention's database management program, Epi-Info, Version 3.2.2, for statistical analysis. The program is available to download via Internet at no cost at the CDC website, http://www.cdc.gov/epiinfo. Survey responses from the three states were combined. Response frequencies were computed for each question and assembled in table form.

Follow-up surveys were prepared at the end of 2005 and mailed to all the Georgia participants to ascertain if any changes in security practices had been made since the original surveys were conducted. The surveys also included questions regarding receipt of printed food defense material from various sources, i.e., governmental agencies, third party auditors, trade organizations, etc. The mailing included envelopes with return postage for the convenience of the participants. Attempts were made to reach all participants by phone prior to the mailing of the follow-up surveys.

RESULTS

Security procedures

Various trends observed among the growers, packers and fresh-cut processors are shown in Table 1 and summarized in the following sections. Written food defense plans are generally lacking among packing shed operations and farms, with only 24% and 20%, respectively, responding they had a written plan. However, two-thirds of fresh-cut produce processors indicated they had written food defense plans. Fresh-cut processors (83%) maintained documentation of their security practices, while only thirty-six percent of packing sheds and thirty-two percent of growers reported they maintained documented security practices. Few of the facilities surveyed indicated there was a written emergency plan or program in place to respond to tampering or criminal events, with the highest proportion of affirmative responses (50%) coming from fresh-cut processors.

Facility security

Packing sheds generally tended to be more open and accessible than fresh-cut processing facilities. Only 62% indicated that access to the packing shed was controlled by locks, guards, entrance cards or other devices, whereas 83% of fresh-cut operations had controlled access to the facility. A high percentage of fresh-cut processors (83%) stored raw materials and packaging materials in secured areas, and all of the fresh-cut operations stored processing materials in secured areas with controlled access. Sixty-four percent of the packing sheds and 75% of the farms surveyed stored packaging materials and raw materials in secured areas with limited access, and 84% of the packing operations had secured storage for processing materials. Security cameras were used by 36% of packing operations and 33.3% of fresh-cut operations to monitor their facilities, whereas only 8% of the farms made use of security cameras. Thirty-six percent of packing sheds and 24% of farms employed security guards, compared with 16% of fresh-cut operations. A majority (83.3%) of the fresh-cut operations indicated the HVAC and recirculation systems were sealed against introduction of contaminants versus 36% of packing sheds.

TABLE 1. Comparison of frequencies of response percentage to selected questions from security surveys completed at farms, packing sheds and fresh-cut processors

	ON FARM (N=25)			PACKING SHED (N = 25)			FRESH-CUT PRODUCE PROCESSORS (N = 6)		
	YES	NO	NA	YES	NO	NA	YES	NO	NA
SECURITY PROCEDURES									
a) Are responsibilities for security assigned to authorized individuals(s)?	56	36	8	76	24	0	83.3	6.7	0
b) Has a written Food Security Plan been implemented for the facility?	20	80	0	24	76	0	66.7	33.3	0
c) Is documentation (logs, sign-in sheets, etc.) of security practices kept current?	32	68	0	36	64	0	83.3	0	16.7
d) Are all supervisors encouraged and trained to be alert for any signs of tampering with product or equipment, other unusual situations, or areas that may be vulnerable to tampering, and encouraged to alert management personnel about findings?	92	8	0	96	4	0	66.7	33.3	0
e) Are all employees encouraged and trained to be alert for any signs of tampering with product or equipment, other unusal situations, or areas that may be vulnerable to tampering, and encouraged to alert management personnel about findings?	80	20	0	76	24	0	66.7	33.3	0
f) Is there an immediate investigation of all information about suspicious activity?	100	0	0	88	12	0	83.3	16.7	0
g) Are proper authorities alerted immediately about possible criminal activity?	100	0	0	100	0	0	50	33.3	16.7
h) Are there procedures to ensure the security of incoming packages (parcel post, mail, etc.) and supplies?	36	64	0	48	52	0	*	*	*
i) Is there a written emergency plan or program in place to respond to tampering, criminal or terrorist events?	16	84	0	20	80	0	50	50	0
j) Does program include a Crisis Communication Plan with documentation?	20	80	0	32	68	0	33.3	66.7	0
k) Does program include a Recall Strategy with documentation?	32	68	0	64	36	0	100	0	0
l) Does program include an Employee Training Program for emergency procedures?	36	64	0	40	60	0	66.7	33.3	0
m) Does program contain the names, phone numbers, etc., of management personnel designated to be the company spokesperson in a crisis?	44	56	0	60	40	0	100	0	0
n) Is an evaluation program in place that regularly reviews and tests the effectiveness of security strategies through random inspections, mock tampering events, mock recalls, and security contractor evaluations?	20	80	0	32	68	0	83.3	16.7	0

TABLE 1. *(Continued)* **Comparison of frequencies of response percentage to selected questions from security surveys completed at farms, packing sheds and fresh-cut processors**

	ON FARM (N=25)			PACKING SHED (N = 25)			FRESH-CUT PRODUCE PROCESSORS (N = 6)		
	YES	NO	NA	YES	NO	NA	YES	NO	NA
FACILITY SECURITY									
a) Is the facility surrounded by security fencing?	*	*	*	52	48	0	33.3	66.7	0
b) Is access to the facility controlled by guards, cards, locks or other devices?	*	*	*	62.5	37.5	0	83.3	16.7	0
c) Are gates located at entrances to farm roads?	48	52	0	*	*	*	*	*	*
d) Are the gates kept locked when not in daily use?	36	64	0	*	*	*	*	*	*
e) Is signage in place to indicate restricted access?	64	36	0	84	16	0	83.3	16.7	0
f) Are cameras utilized to increase security at various locations?	8	92	0	36	64	0	33.3	66.7	0
g) Are security guards employed, either in stationary location or on roving patrols?	24	76	0	36	64	0	16.7	83.3	0
h) Are raw product materials (fruit, vegetables, etc.) stored in secured areas with controlled access?	*	*	*	64	36	0	83.3	16.7	0
i) Are process materials (preservatives, waxes, chemicals, sanitizers, other supplies) stored in secured areas with controlled access?	80	20	0	84	16	0	100	0	0
j) Are packaging materials (cartons, wrap film, etc.) stored in secured areas with controlled access?	75	25	0	60	40	0	83.3	16.7	0
k) Are all keys to equipment, chemical and other storage areas accounted for on a regular basis?	80	20	0	76	24	0	*	*	*
l) Are HVAC recharge and/or circulation systems secured against introduction of contaminants?	*	*	*	36	64	0	83.3	16.7	0
PERSONNEL SECURITY									
a) Are background checks conducted on critical personnel?	44	56	0	56	44	0	83.3	16.7	0
b) Are all personnel required to store "carry-in" material in designated areas?	33.3	66.7	0	60	40	0	100	0	0
c) Does company provide security storage for staff's "carry-in" materials?	16	84	0	44	56	0	50	50	0
d) Are supervisors trained in food security issues (e.g., during Worker Protection Standard training programs, etc.), with regular refreshers?	68	32	0	56	44	0	66.7	33.3	0
e) Does company document food security training for all personnel?	32	68	0	48	52	0	50	50	0
f) Does company provide staff with printed educational material on food security issues?	24	76	0	32	68	0	50	50	0

TABLE 1. *(Continued)* **Comparison of frequencies of response percentage to selected questions from security surveys completed at farms, packing sheds and fresh-cut processors**

	ON FARM (N=25)			PACKING SHED (N = 25)			FRESH-CUT PRODUCE PROCESSORS (N = 6)		
	YES	NO	NA	YES	NO	NA	YES	NO	NA
PERSONNEL SECURITY *(continued)*									
g) Are employees issued non-reproducible identification badges?	24	76	0	36	64	0	16.7	83.3	0
h) Are visitors required to wear ID badges while on premises?	8	92	0	16	84	0	50	50	0
i) Are visitors' ID badges collected and logged in upon departure?	4	4	92	16	4	80	50	16.7	33.3
ADMINISTRATIVE SECURITY									
a) Are product materials clearly identified and records maintained (e.g., logged in as to their source, MSDS sheets, Letters of Guarantee, etc.)?	*	*	*	84	16	0	100	0	0
b) Are process materials (preservatives, waxes, chemicals, sanitizers, other supplies) stored in secured areas with controlled access?	*	*	*	84	16	0	83.3	16.7	0
c) Are process materials clearly identified and records maintained (e.g., logged in as to their source, MSDS sheets, Letters of Guarantee, etc.)?	*	*	*	88	12	0	100	0	0
d) Are packaging materials (cartons, wrap film, cans, fruit cups, etc.) stored in secured areas with controlled access?	75	25	0	60	40	0	100	0	0
e) Are packaging materials clearly identified and records maintained (e.g., logged in as to their source, MSDS sheets, Letters of Guarantee, etc.)?	72	24	4	12	88	0	100	0	0
f) Are these records periodically reviewed and reconciled to material on hand?	*	*	*	80	20	0	*	*	*
g) Are written procedures in place regarding receiving materials from suppliers?	*	*	*	80	20	0	83.3	16.7	0
h) Are deficiencies on receiving (e.g., weight of chemical fertilizer) logged and a record of corrective actions maintained?	56	40	4	64	24	12	83.3	16.7	0
i) Are computer controls and critical data systems protected from unauthorized access by passwords, firewalls, anti-virus software?	*	*	*	84	16	0	83.3	16.7	0
j) Is computer protection software scheduled to be updated daily via the Internet with a full-system scan performed each night?	*	*	*	52	48	0	66.7	33.3	0
k) Are all computer systems backed up on a frequent basis by a designated person?	*	*	*	80	20	0	83.3	16.7	0
l) Are backup files tested randomly to assure completeness?	*	*	*	60	36	4	83.3	0	16.7
m) Are backup schedules documented and logged concurrent with backup?	*	*	*	64	28	8	66.7	16.7	16.6

TABLE 1. *(Continued)* **Comparison of frequencies of response percentage to selected questions from security surveys completed at farms, packing sheds and fresh-cut processors**

	ON FARM (N=25)			PACKING SHED (N = 25)			FRESH-CUT PRODUCE PROCESSORS (N = 6)		
	YES	NO	NA	YES	NO	NA	YES	NO	NA
ADMINISTRATIVE SECURITY *(continued)*									
n) Are computer back-up procedures reviewed on a regular basis?	*	*	*	52	40	8	83.3	0	16.7
o) Are computer hardware, software and paper records that document food production controls backed up and secure?	*	*	*	64	28	8	83.3	0	16.7
p) Are computer access passwords changed on a regular basis and records of the changes kept in a secure place?	*	*	*	56	40	4	33.3	50	16.7
q) When an employee is terminated, is all computer access for that person removed immediately?	*	*	*	64	20	16	66.7	0	33.3
r) Is any change in computer access documented?	*	*	*	56	36	8	33.3	50	16.7
s) Is there an established system of traceability of computer transactions?	*	*	*	52	48	0	66.7	33.3	0
t) Is there a system to validate the computer security system?	*	*	*	44	44	12	50	33.3	16.7
TECHNICAL SECURITY									
a) Is any testing done on finished product prior to shipment?	8	80	12	40	60	0	66.7	33.3	0
b) Is incoming raw material subject to random testing for residues or other adulteration?	*	*	*	24	76	0	50	50	0
c) Is incoming packaging visually examined for surface contamination?	*	*	*	92	8	0	*	*	*
d) Is packaging designed to be tamper-evident (e.g., seals on raw product bins)?	*	*	*	12	88	0	66.7	16.7	16.6
e) Are water sources tested periodically for contamination?	88	12	0	96	4	0	100	0	0
f) is a hydrocooler is in use, is the water tested and changed regularly?	*	*	*	16	0	84	*	*	*
g) Is finished product tested for contamination prior to shipment?	8	80	12	44	48	8	66.7	33.3	0
h) Is incoming packaging examined visually for surface contamination?	*	*	*	92	8	0	*	*	*

TABLE 1. *(Continued)* **Comparison of frequencies of response percentage to selected questions from security surveys completed at farms, packing sheds and fresh-cut processors**

	ON FARM (N=25)			PACKING SHED (N = 25)			FRESH-CUT PRODUCE PROCESSORS (N = 6)		
	YES	NO	NA	YES	NO	NA	YES	NO	NA
TRANSPORTATION SECURITY									
a) Are trailers sealed for all inbound or outbound loads?	*	*	*	32	64	4	66.7	16.7	16.6
b) Are transportation vehicles carrying products sealed for security?	*	*	*	40	56	4	*	*	*
c) Are transportation vehicles (trucks, trailers, rail cars, etc.) subject to sanitation procedures (chlorine sprays, ozonation, etc.) prior to loading?	56	44	0	72	28	0	83.3	16.7	0
d) Are ventilation and refrigeration systems in transport vehicles sealed against recharge tampering?	*	*	*	24	56	20	50	33.3	16.7
e) Are transportation terminals, depots staging yards, etc., subject to security fencing or surveillance?	28	56	16	44	32	24	33.3	16.7	50
f) Are transport vehicles left unattended at truck stops, lodging or storage yards?	32	48	20	28	28	44	33.3	33.3	33.4
g) Are off-premises transport trucks equipped with GPS or other positioning systems?	*	*	*	24	36	40	33.3	33.3	33.4
h) Are shipping logs maintained and reviewed?	56	24	20	76	0	24	66.7	33.3	0
i) Are transport drivers subject to background check upon hiring, and periodically updated?	24	52	24	28	40	32	16.7	0	83.3
j) If so, are such background checks/updates documented?	20	36	44	24	8	68	16.7	0	83.3
COLD STORAGE FACILITY SECURITY									
a) Is the cooler surrounded by security fencing?	*	*	*	48	52	0	*	*	*
b) Is access to the cooler controlled by guards, cards, locks or other devices?	*	*	*	60	40	0	*	*	*

*Indicates the question was either not applicable to the facility or content was incorporated in survey questions not included on this table.

Personnel security

Background checks on critical personnel were conducted routinely by 56% of the packing operations, 44% of the farms and 83% of the fresh-cut processing facilities. All fresh-cut operations, 60% of packing sheds and 33.3% of growers required all personnel to store "carry in" material in designated areas. About half of all packing and fresh-cut processing locations surveyed provided storage areas for employees' use, while 16% of farms supplied such storage. Thirty-six percent of packing sheds and 24% of farms issued ID badges to employees, whereas only 17% of fresh-cut operations used employee ID badges. Half of the fresh-cut processors required visitors to wear ID badges while on the premises, while only 16% of the packing shed operations and 8% of farms issued ID badges to visitors.

Administrative security

Whereas computer access was not deemed a vulnerable component of farm operations, questions regarding this topic were not asked of growers. Computer controls and data access systems were protected from unauthorized access with passwords, anti-virus software or firewalls at 83% of the packing sheds and fresh-cut operations surveyed. Computer systems were backed up by a designated person at 83% of the facilities. A majority of fresh-cut operations (83%) reviewed backup procedures regularly, and just over half (52%) of the packing facilities performed reviews of their backup procedures. Computer access passwords were changed on a regular basis and records were maintained at 33% of the fresh-cut processors and 56% of the packing sheds. Half of the packing sheds and two-thirds of the fresh-cut operations maintained established systems of traceability of computer transactions.

Transportation security

Thirty-two percent of packing sheds and 67% of fresh-cut processing facilities indicated inbound and outbound trailers were sealed. There were, however, facilities, both packing sheds and fresh-cut operations, that did not know if trailers were sealed. Among the packing sheds, 44% indicated that transportation terminals and staging yards were fenced or subject to surveillance, whereas 24% of the packing sheds had no knowledge of terminal and staging yard security conditions. This trend held true for fresh-cut operations as well, with 33% indicating knowledge of terminal fencing and surveillance and 50% having no awareness of truck security after a driver left the facility. Fifty-six percent of the growers surveyed responded that transportation terminals and staging yards were not subject to fencing or surveillance. Forty-four percent of packing shed operators, 33% of fresh-cut operators and 20% of farm operators did not know if trucks were ever left unattended at truck stops or storage yards. A large majority of fresh-cut processors (83%) had little knowledge of whether transport drivers were subject to background checks upon hiring, while 17% of the facilities knew that drivers were subject to such checks.

Follow-up survey

Follow-up surveys were prepared at the end of 2005 and mailed to all the Georgia participants to determine if any changes in security practices had been made since the original survey. Attempts were made to contact all participants by phone to explain the follow-up survey. Three participants could not be reached via phone even with repeated efforts. Twenty-one surveys were conducted in Georgia as part of the original study, and follow-up surveys were received from eleven of these participants. Multiple attempts were made by telephone to request completion of the follow-up forms from all participants.

Also included in the follow-up survey were questions concerning the receipt of food defense literature and the sources of that literature. The results are summarized in Table 2. Three of the respondents indicated that their company had received food defense information. The predominant source for the material was trade organizations or trade publications, with auditors, governmental agencies and consultants also providing some material to at least one of the three respondents.

DISCUSSION

Food defense measures undertaken by fresh fruit and vegetable farm and packing shed operations seem to be somewhat lacking compared to those undertaken by fresh-cut processing operations. Even such seemingly simple practices as limiting access to the facility and requiring visitor ID badges are not followed routinely throughout the industry. Granted, the nature of farming and packing fresh produce make security a challenge. However, it is precisely this quality of openness and accessibility that can make the food supply an attractive target for groups or individuals wishing to generate disorder. Fresh-cut operations, by their nature, tend to be more contained and therefore easier to secure. However, farms and packing facilities bear the responsibility of developing and applying the best security practices that will provide some measure of protection for their products, employees and facilities.

At the very least, all fresh fruit and vegetable operations should perform a food defense assessment of their facility to identify potential security risks. From this assessment, individuals responsible for facility security may then begin to develop a written defense plan that will outline the practices to be put in place to provide an acceptable level of security. Although three-fourths of the packing sheds surveyed indicated that security responsibilities were assigned to an individual within the company, only one-fourth of those surveyed indicated that they had a written food defense plan. Sixty-four percent of the packing sheds responded that the documentation of their security practices (logs, sign-in sheets, etc.) was not current, and eighty percent indicated they had no written emergency plan to respond to tampering or criminal events. Thirty-six percent of the packing shed facilities had no documented recall program, and forty percent had no individual designated to be the company spokesperson in the event of a crisis. Responses from growers were similar and indicated an overall lack of documented security and emergency programs. Clearly there is a need for greater numbers of owners and managers to develop defense plans with complete documentation.

Fresh-cut processing facilities, perhaps out of necessity, appear to be more aware of the need for security planning and documentation of their practices. As their products are often packaged for the retail market and promoted as ready to eat, processors perhaps see the need for

TABLE 2. Summary of responses to follow-up survey. Numbers signify quantity of respondents indicating a security practice implemented since original site survey was conducted

	ON FARM (N=3)	PACKING SHED (N=4)	FRESH-CUT PRODUCE PROCESSORS (N=4)
a) Documentation that ID's how access to restricted areas is controlled?			2
b) Security cameras in use?			1
c) Evacuation procedure in place?			1
d) Procedures established to assure emergency personnel have access to the facility during an emergency?			1
e) Crisis communication plan in place?			1
f) Written food security plan been implemented?	1	1	1
g) If so, is there documentation of security practices?	1	1	
h) Does company provide secured storage for staff's carry-in material?	1	1	1
i) Does co. conduct employee training in food security for all workers?	1	3	
j) Prepared recall strategy?	1	1	
k) Increased usage of restricted access indicators, signs, paint, etc.?	1	2	
l) Prduction and packaging materials stored in secure areas w/controlled access?	1	1	
m) Testing done on finished product prior to shipping?	1	1	
n) Visitors required to wear ID badges?	1	1	
o) Transportation terminals, depots, staging yards subject to security fencing or surveillance?	1	1	
p) Security fencing added around the facility?		1	
q) Packing shed been made more secure through use of locks, guards, etc.?		1	
r) Raw product materials stored in secured areas upon receipt?		1	
s) Any changes to visitor policy? (same response from all – visitors must sign in at office)		3	
t) Computer backup schedules documented?		2	
u) Increased knowledge of transportation security?			1
v) Incoming raw materials subject to random testing for residues or other adulteration?			1

increased security and recognize the great risks and liability issues associated with a less-than-secure operation. In addition, customers of the minimally processed or "fresh-cut" produce industry are increasingly using contractual specifications to require the processors to adhere to certain security practices *(1, 6)*. Two-thirds of the fresh-cut operations surveyed had a written defense plan, and eighty-three percent had current documentation of their security practices. All the fresh-cut operations had a documented recall plan and a designated crisis spokesperson. Only half, however, had a written emergency plan in place to respond to tampering or criminal events.

Security of the outside grounds is perhaps the most obvious place to begin when assessing a facility's security. Fresh-cut processing operations tend to be more enclosed; thus, outside security may be easier to accomplish than in packing sheds, which are at a disadvantage as relatively open operations. Obviously, growers face unique challenges with regard to securing the physical grounds of their operations. However, certain measures can be implemented to improve overall security. While it may not be feasible to enclose a facility's perimeter completely, fencing may be used to secure coolers, chemical storage areas, water sources, etc. Half of the packing sheds surveyed did have security fencing surrounding the facility, while one-third of the fresh-cut operations had security fencing. Installation of exterior lighting and security cameras may also contribute to the exterior security of a facility. One-third of the packing sheds and fresh-cut operations surveyed indicated that they utilized security cameras. Only 8% of the farms utilized cameras to increase security at vulnerable sites such as storage tanks, equipment storage areas and onsite trailers used for storage.

Personnel security is another layer of the security challenge. Background checks, employee ID badges, and company-provided storage for personnel carry-in materials are all measures to consider *(5)*. Employee access to sensitive areas should be limited to only those needed to perform job duties. All the fresh-cut operations surveyed required personnel to store "carry-in" material in designated areas, while only 60% of packing sheds had similar requirements. None of the facilities surveyed made use of employee or visitor ID badges in great numbers.

Administrative security must be included in a facility's defense plan. Computer systems should be protected and backed up regularly by a designated person. A majority (80%) of those responding to questions regarding computer security did use such controls. Other than lacking documentation, administrative security seemed to be well applied among the operations surveyed. In addition to these computer system protections, a majority responded that computer backup schedules were documented; backup files were tested randomly; and established systems of computer transaction traceability existed. Over 80% of the packinghouses and fresh-cut operations indicated that product materials and processing materials were clearly identified, with records maintained, and that the materials were stored securely. Also, over 80% of all the facilities had written procedures for receiving materials from suppliers.

Security of product shipping and receiving practices is vital to the delivery of a secure product. Owners and operators should understand the transport chain before and after their operation. However, as many operators in our survey contracted with transportation carriers, there appeared to be an overall lack of transportation knowledge. Few had information, for example, regarding transport driver background or qualifications, and little was known about load security after it left the packing or processing facility. Operators often had no knowledge of whether the transport vehicles were left unattended at truck stops or storage yards. Unscheduled deliveries and products shipped in unsecured trucks represent additional vulnerabilities. Trailer seals for inbound and outbound loads were used by 32% of the packing shed operations and 67% of the fresh-cut processing operations.

The follow-up survey responses were so low in number that it is difficult, if not impossible, to draw conclusions based on them. One might assume that operations that did not respond had made no changes in security practices, but that is only conjecture. Of the eleven responses that were received, few indicated that any changes had been implemented. Only one of each type of operation had made multiple changes in its security practices, whereas just isolated changes were made by the remaining respondents that indicated that any change had been implemented.

CONCLUSION

The owners and operators of the farms, packing sheds and fresh-cut processing operations surveyed in Georgia, South Carolina and Florida were all well aware of the need for increased defense of their agricultural products from the farm to the table. While fresh-cut operations appeared to be facing the challenges of better security, admittedly somewhat in response to the necessity to meet the requirements of customer audits, farms and packing sheds seemed to be lagging behind in security improvements. As mentioned previously, the open nature of these operations does present special defense challenges, and in attempting to improve security, one must always consider the uniqueness of a facility and must implement measures that provide security that is feasible and cost effective and yet provides effective control. The severity of the risk posed to an operation must also be considered. Is it necessary for an owner to spend thousands of dollars, for example, to install security cameras or hire security guards to monitor a small packing shed that realistically may not be at great risk of becoming a victim of attack? However, such operations are not relieved of the responsibility of taking steps to ensure to the extent possible the security of the facility, the employees and the product. Balance and rationality must prevail in this time of heightened security.

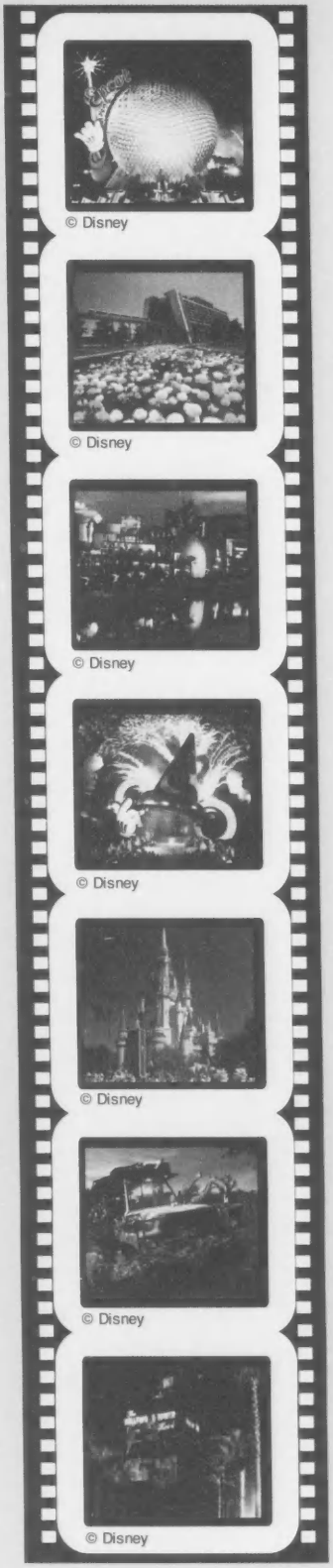
ACKNOWLEDGMENT

The authors acknowledge the assistance of the farmers, packers and processors who agreed to participate in the survey. The project is funded through a grant from the National Integrated Food Safety Initiative (Grant no. 2002-51110-01982) of the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture and by the Georgia, Florida, and South Carolina Agricultural Experiment Stations.

REFERENCES

1. AIB International. 2005. Food security assessment. http://www.aibonline.org/audits/foodsafety/foodsecurityaudits (Accessed May 12, 2006).

2. Anonymous. 2001. National food security coalition food security checklist. International Fresh-cut Produce Association.
3. Anonymous. 2002. Food producers, processors, transporters, and retailers: food security preventive measures guidance. United States Department of Health and Human Services, Food and Drug Administration, Center for Food Safety & Applied Nutrition. http://www.cfsan.fda.gov/~dms/secguid.html (Accessed January 11, 2003).
4. Anonymous. 2002. Food security guidelines and questionnaire for fresh fruits and vegetables, United Fresh Fruit and Vegetable Association.
5. Lee, R.V., R. D. Harbinson, and F.A. Draughon. 2003. Food as a weapon. Food Prot. Trends. 23:664–674.
6. McLeod, S. 2003. Ensuring food safety through supply chain traceability. Food Safety Magazine. http://www.foodsafetymagazine.com/signature/rossss.html (Accessed March 23, 2006).
7. Rangarajan, A., E. A. Bihn, R. B. Gravani, D. L. Scott, and M. P. Pritts. 2000. Food safety begins on the farm: a growers guide. Cornell Good Agricultural Practices Program, Cornell University, Ithaca, NY.
8. United States Department of Health and Human Services. 2002. Protection of human subjects. http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm (Accessed January 13, 2003).
9. United States Department of Health and Human Services. 2005. HealthierUS.gov. http://www.healthierus.gov/dietaryguidelines/ (Accessed March 8, 2006).



International Association for Food Protection®

IAFP 2007

One destination. Global connections.

Celebrate novel advances in food safety research and technology with a diversity of committed professionals. Experience three inspiring days of presentations, discussions, and networking with those who share your passion.

Explore, participate, exhibit at IAFP 2007.

IAFP 2007 • 94th Annual Meeting • July 8–11 • Lake Buena Vista, Florida

515.276.3344; 800.369.6337
info@foodprotection.org
www.foodprotection.org

International Association for Food Protection

2007-2008 Secretary Election

The following page contains biographical information for the 2007-2008 Secretary candidates. Review the information carefully as you make your voting decision.

Ballots were mailed to all International Association for Food Protection Members during the first week of February. Completed ballots are due back to the Association office by March 16, 2007. Sealed ballot envelopes are forwarded to the Tellers Committee for opening and counting. Watch for the election results in the May issue of *Food Protection Trends*.

If you have questions about the election process, contact David W. Tharp, CAE, Executive Director at 800.369.6337, or 515.276.3344, or E-mail dtharp@foodprotection.org.

The Candidates

LEE-ANN JAYKUS

JOHN N. SOFOS

DR. LEE-ANN JAYKUS
Raleigh, North Carolina

Dr. Lee-Ann Jaykus is a Professor of Food Science and Microbiology at North Carolina State University (NCSU) in Raleigh. She earned a B.S. degree in Food Science (1979) and an M.S. degree in Food Microbiology (1982), both from Purdue University. Her background is somewhat unique for an academician, as she worked in industry for six years prior to pursuing the Ph.D. In her first industrial experience, Dr. Jaykus served as a quality control manager (1981–1983) for Frito Lay, Inc. She later joined Dairy and Food Laboratories, Inc., in Modesto, CA, as their microbiology department manager. It was during her time in California, which coincided with a large listeriosis outbreak associated with the consumption of Hispanic-style cheese, that Dr. Jaykus became interested in the interface between food microbiology and public health. In 1988, she entered a Ph.D. program in the School of Public Health at the University of North Carolina at Chapel Hill to study foodborne viruses, molecular biology, epidemiology, and risk assessment. After completing her degree (1993), Dr. Jaykus joined the faculty of the Food Science Department at NCSU.

In her role as a professor, Dr. Jaykus is responsible for teaching the undergraduate course in Food Microbiology and graduate level courses in Microbial Food Safety. She has been instrumental in initiating a graduate food safety minor at NCSU and currently serves as chair of the NCSU Food Safety faculty. Over the last 13 years, she has had the opportunity to interact with over 400 students in the classroom, and she finds it particularly rewarding to mentor these young people as they mature, both personally and professionally.

Dr. Jaykus' research expertise lies in food virology, the development of rapid molecular methods for pathogen detection, and microbial risk assessment. She has served roles as lead investigator and collaborator on several large multi-institutional projects addressing the safety of fresh produce items and molluscan shellfish. Dr. Jaykus' research philosophy is collaborative, and she enjoys bringing together professionals from diverse disciplines to form teams which take on complex food safety problems. She currently supervises over 10 graduate students, post-doctoral researchers, and staff; to date, she has mentored the complete programs of 17 graduate students (several of whom have received IAFP Developing Scientists awards), 5 post-doctoral research associates, and various visiting scientists. She and her students/staff have authored over 60 peer-reviewed research publications, 14 book chapters, and numerous special interest papers.

In addition to IAFP, Dr. Jaykus' many professional affiliations include membership in the Institute of Food Technologists, the American Society for Microbiology, and the Society for Risk Analysis. She has served each of these organizations, most notably by participation in a variety of colloquia and as a member of expert panels. Recently, Dr. Jaykus has also been involved with the Council for Agricultural Science and Technology, for whom she chaired a working group on microbial risk analysis, and as a member of the Best Practices in Microbiological Methods working group of the Association of Official Analytical Chemists. She is currently serving her third term as a member of the National Advisory Committee on Microbiological Criteria for Foods (NACMCF).

Dr. Jaykus has been committed to the goals of IAFP since joining the Association in 1993, at which time she was the recipient of a Developing Scientist Award. Since then, she has organized and convened numerous symposia and has served as a speaker and participant in workshops. She was a founding member of the Foodborne Virus and Parasitic Protozoa PDG (chair, 1995–1999; 2002–2004) and the Microbial Risk Analysis PDG (chair, 1998–1999). She also served as a member of the *Journal of Food Protection* Management Committee (1998–2001) and editorial board (1997–present); chair of the Nominations Committee (2004); and judge (2005, 2006) and chair (2006) for the Developing Scientist Competition Committee. In 2006, Dr. Jaykus was the recipient of the IAFP Educator Award and she is currently serving as chairperson of the 2007 IAFP Program Committee.

DR. JOHN N. SOFOS
Fort Collins, Colorado

Dr. John N. Sofos is Professor of Microbial Food Safety in the Department of Animal Sciences at Colorado State University, and holds B.S. (Agriculture), M.S. (Animal Science) and Ph.D. (Food Science) degrees from the Aristotle University of Thessaloniki, Greece, and from the University of Minnesota, respectively. In the past he has served as Research Associate at the University of Minnesota, and as Assistant and Associate Professor at Colorado State University. His research interests address the ecology, detection, stress-resistance and control of bacterial pathogens in foods, and he teaches Meat Safety and HACCP. In the past he has taught Food Processing, Food Microbiology, and Food Biotechnology. The major focus of research conducted by Dr. Sofos and his group during the past decade has targeted control of *Escherichia coli* O157:H7, *Salmonella* and *Listeria monocytogenes* in fresh and processed meat products, and other foods.

Listed as a "Highly Cited Scientist" by Thomson Scientific (www.ISIHighlyCited.com), Dr. Sofos has authored or co-authored approximately 220 refereed scientific journal articles, six books, over 50 book chapters, and more than 600 other publications (including abstracts, popular press articles, bulletins, conference proceedings, and research reports). He has received numerous awards, including the Distinguished Research Award of the American Meat Science Association, the Distinguished Meats Award of the American Society of Animal Science, the Educator Award of the International Association for Food Protection, and the United States Department of Agriculture Secretary's Honor Award for Superior Service for leading studies on bacterial pathogen control. He is a Fellow of the American Academy of Microbiology, the Institute of Food Technologists, the American Society of Animal Science, and IAFP.

Dr. Sofos has served on 90, and has chaired 55 M.S. and Ph.D. graduate student committees, and his graduate students, postdoctoral fellows and visiting scientists have come from the United States and other countries including Belize, Botswana, Brazil, Bulgaria, Canada, China, Greece, India, Indonesia, Iran, Italy, Ivory Coast, Kenya, Korea, Saudi Arabia, South Africa, Spain, Thailand, Turkey, Ukraine, United Arab Emirates, Venezuela, and Zimbabwe. Many of them hold industry, academic and government positions in various countries. He has presented over 140 invited lectures, seminars, workshops and research papers on food safety related topics, approximately half of which were presented in countries such as Argentina, Australia, Austria, Belgium, Bulgaria, Canada, France, Greece, Hungary, Indonesia, Italy, Japan, Mexico, New Zealand, Poland, Portugal, Spain, The Netherlands, and United Kingdom.

Currently, Dr. Sofos serves as a Scientific Co-Editor for the *Journal of Food Protection*. In addition he has served on the United States National Advisory Committee on Microbiological Criteria for Foods; the American Council on Science and Health, Board of Scientific and Policy Advisors; the United States National Academy of Sciences Institute of Medicine Committee on the Review of the United States Department of Agriculture *Escherichia coli* O157:H7 Farm to Table Process Risk Assessment; as Task Force Chair on Natural Antimicrobials for the Council for Agricultural Science and Technology; as Panel Manager for the United States National Integrated Food Safety Initiative; and on numerous committees of professional associations.

NEW MEMBERS

AUSTRALIA

Ed J. Stuttard
EML Consulting Services Qld.
Tennyson, Brisbane

CANADA

Selena Jung
Hamilton, Ontario

Sarah C. McIlwham
Health Canada
Ottawa, Ontario

COSTA RICA

Amancay Tapia
Chaso Del Valle S.A.
San Jose

DENMARK

Birte Fonnesbech Vogel
Technical University of Denmark
Kongens, Lyngby

GREECE

Stefanos B. Karageorgis
Ministry of Rural Development
and Food
Athens

IRELAND

Cronan McNamara
Dublin

SOUTH KOREA

Sang Duk Kim
Koyang City

Shin Ae Kim
Jeil Pharmaceutical Co., Ltd.
Seoul-si

UNITED KINGDOM

Stuart J. Ray
Seward Limited
Worthing, West Sussex

UNITED STATES

ALABAMA

Neil Howard
US Army
Huntsville

ARKANSAS

Andrea R. Goucher
CTL
Bentonville

Joshua C. Saldivar
University of Arkansas
Fayetteville

ARIZONA

Charles P. Gerba
University of Arizona
Tucson

CALIFORNIA

Kerry I. Chapman
Tesco USA
El Segundo

Robert S. Elliott
Sunkist Growers
Ontario

Haiping Li
University of California–Davis
Davis

Arnold Zimmerman
Hollander Horizon International
Redondo Beach

DISTRICT OF COLUMBIA

Cory M. Bryant
Institute of Food Technologists
Washington

GEORGIA

Tom Childers
Chick-fil-A, Inc.
Atlanta

Francis A. Ferko, III
RARE Hospitality International, Inc.
Atlanta

Gregory Orman
Chemstar Corporation
Lithia Springs

INDIANA

John B. Mueller
Fumigation Service & Supply
Westfield

LOUISIANA

Feifei Han
Louisiana State University
Baton Rouge

Ravirajsinh P. Jadeja
Louisiana State University
Baton Rouge

Reshani N. Senevirathne
Louisiana State University
Baton Rouge

MARYLAND

Keith A. Lampel
FDA
College Park

MASSACHUSETTS

Robert H. Sproule
Steritech
Boston

MICHIGAN

Jessica R. Dyer
Sunny Fresh Foods
Lake Odessa

NEW MEMBERS

Robert L. Long
Kellogg's
Battle Creek

MINNESOTA

William Hueston
University of Minnesota
St. Paul

Terry Kerby
3M Microbiology Products
St. Paul

Damian P. Montoya
Hormel Foods
Austin

Sarah Row
Provesta Flavor Ingredients
Hutchinson

Robert C. Tetzloff
Hormel Foods Corporation
Austin

NEW YORK

Muhammed Zeki Durak
Cornell University
Ithaca

OHIO

Robert McCarty
Ohio Dept. of Agriculture
St. Louisville

Wannasawat Ratphitagsanti
The Ohio State University
Columbus

OREGON

Bill Emminger
Benton Co. Environmental Health
Corvallis

Ryan E. Wist
Scenic Fruit Co.
Gresham

SOUTH CAROLINA

Marion W. Shepherd, Jr.
Clemson University
Central

TENNESSEE

Omaima M. Ahmed
University of Tennessee
Knoxville

John R. Chipley
US Smokeless Tobacco Co.
Nashville

Faith J. Critzer
University of Tennessee
Knoxville

Coesha A. Fairley
University of Tennessee
Knoxville

Millie Curtis-Hornsby
US Smokeless Tobacco Co.
Nashville

Diana L. Moore
M & M Mars
Cleveland

VIRGINIA

Govindaraj Dev Kumar
Virginia Tech
Blacksburg

Abigail Villalba
Virginia Tech
Hampton

WEST VIRGINIA

Deborah L. James
West Virginia University
Morgantown

WISCONSIN

Stephen C. Irving
Irving Polishing & Mfg. Co., Inc.
Kenosha

Scott C. Sprangers
ProChemicals LLC
Green Bay

NEW SUSTAINING MEMBERS

Kristen Dixon
Chestnut Labs
Springfield, Missouri

Bruce Ritter
ELISA Technologies, Inc.
Gainesville, Florida

UPDATES

Strategic Diagnostics Announces New Chief Financial Officer and Executive Director of Marketing

Strategic Diagnostics Inc. has announced that Stan Fronczkowski has joined the company as chief financial officer effective January 2007.

Mr. Fronczkowski joins SDI after 29 years with Keystone Foods. He began his career with Keystone in 1978 rising to the position of vice president, international finance in 1988, and over the next 10 years supported Keystone's growth across multiple companies on four continents. In 1998, Mr. Fronczkowski became COO for Keystone Europe, Middle East and Africa with full responsibility for the operating results of this business group. Following Keystone's reorganization to Strategic Business Units in Europe and North America, Mr. Fronczkowski assumed his most recent assignment as Keystone's vice president for finance, Asia-Pacific.

SDI has also announced that Ms. Faye Coggins has also joined the company as executive director of marketing. Ms. Coggins is a highly experienced marketing leader with over 30 years in the life sciences industry. Ms. Coggins spent 20 years in the specialty diagnostics business of DuPont where she advanced through a series of regional and global sales and marketing positions. Most recently she has been vice president of marketing for the Life Science Research Division of Fisher Biosciences, and executive director of marketing, North America, for Qiagen, Inc.

NETZSCH Fine Particle Technology Names Gregory Stevens Northeast Regional Manager

NETZSCH Fine Particle Technology, LLC has named Gregory S. Stevens Northeast regional manager. He will manage all aspects of NETZSCH customer relationships in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, and New York as well as eastern Canada.

Stevens is responsible for expanding the customer base for NETZSCH's grinding division throughout the Northeast region. He will be the key point of contact for current and prospective NETZSCH customers.

Prior to joining NETZSCH in 2004, Stevens served as senior inside sales engineer for grinding equipment supplier Sturtevant, Inc., Hanover, MA. Previously, he had worked as a consultant to the steel industry for a total of 6 years with Charles River Associates in Boston and Hatch Associates, Mississauga, Ontario. As a consultant, his objective was to improve the performance and steel-making capabilities of several integrated steel plants, including one in Russia.

Stevens is a magna cum laude graduate of Northeastern University, Boston, where he earned bachelor of science and master of science degrees in chemical engineering. He has also successfully completed the EIT (Engineer in Training) certification and is a member of the New England Society for Coatings Technology.

Hoffman Announces Recent Promotions

Margie Basney, director of sales for Hoffman Industrial/Electric, has been promoted to vice president of US Electrical Sales for the Hoffman Division, succeeding Dean Field, who accepted a position as general manager of a Pentair Water Group operation. Ms. Basney joined Hoffman in 1990 as the first district sales manager for the Electrical/Industrial markets. In 1995, she was promoted and established the customer sales support department.

Ms. Basney also served as vice president of sales and marketing for Northland Electric from 1997 to 2002, then returned to Hoffman as national sales manager, electrical. She was promoted to director of electrical sales in 2004.

Scott Marion, vertical market manager for commercial, has been promoted to director of sales for Hoffman's US Electrical Division. Mr. Marion joined Hoffman in early 2005 after 14 years with General Electric and has an extensive electrical industry sales background. His most recent role at G.E. prior to joining Hoffman was as district sales manager in Minneapolis, MN.

David Huml, vertical market manager for consumer and energy, assumes a role as Hoffman's manager of electrical marketing. He is expected to spearhead strategic efforts surrounding product development and promotion as well as vertical market focus, pricing, and marketing communications.

Prior to joining Hoffman in early 2006, Mr. Huml had a variety of field and sales marketing leadership roles with Graco, Inc.

Joe Stark, vertical market manager for Hoffman Data Networking, will now assume responsibility for both marketing and sales in the DataCom segment as Hoffman's national manager of DataCom sales and marketing. Mr. Stark will focus on setting a new strategic directive for the Data Networking organization.

Mr. Stark began his career with Eaton Cutler-Hammer as a sales engineer in the industrial arena and progressed into the consulting arena in various capacities with firms like Arthur Andersen Business Consulting, Grant Thornton and Business Dynamics, where his specialty resided in strategic and tactical marketing. Before joining Hoffman in mid-2006, Mr. Stark was the vice president of marketing and product management for Rimage Corporation where he specialized in the data storage, distribution and archiving of digital images.

Sargento Adds Three Senior Executives and Announces Personnel Changes

Sargento Foods Inc. has announced the hiring of three senior executives – Craig Hackl, Mike Ruhland and Guy Turnbull.

Mr. Hackl joins the research and development department as a senior research scientist. Prior to joining the Sargento family, he spent 24 years at Dean Foods as a project leader in its research and development department. He has a bachelors degree in food science from Iowa State, masters in food science from Illinois and MBA from Northern Illinois.

Mike Ruhland has been added to the consumer products division as a retail sales representative for the Minneapolis area. With an extensive background in sales and marketing, the Minnesota native will be responsible for supporting sales initiatives. Mr. Ruhland earned both a bachelors degree in business administration and a MBA in marketing from the University of St. Thomas in St. Paul, MN.

Guy Turnbull joins the engineering department as the new senior packaging development manager for new business development. The Illinois graduate held similar positions at Solo Cup, ACCO Brands and Dow Chemical. Mr. Turnbull will work with the new business development department in creating new packaging.

William Ericsen, who joins Sargento after spending the previous eleven and a half years at The Dannon Company, Inc., has been named senior quality engineer in the quality systems department. He held a quality systems engineer position at Dannon, and has played key roles in quality at Jewel Companies, Inc. and the Illinois Department of Public Health.

The University of Wisconsin graduate is a certified quality engineer and certified quality auditor, meeting the standards of the American Society for Quality.

Todd Hunter, who spent 12 years at Kraft Foods before joining the Sargento family in 1994, has been named procurement director-dairy in recognition for his excellent service to the company. He continues to be directly responsible for purchasing bulk cheese as he did in his prior role as procurement manager-dairy, and will focus on supplier relationships and strategic dairy initiatives.

Mr. Hunter holds a bachelors degree in dairy science from South Dakota State University, and is working on a masters in business administration from Concordia University.

NEWS

3-A SSI Announces New and Updated 3-A Sanitary Standards

3-A Sanitary Standards, Inc. (3-A SSI) announces the availability of one new 3-A Sanitary Standard and four updated standards.

The new and revised 3-A Sanitary Standards include:

- Machine Leveling Feet and Supports, Number 88-00.
- Compression-Type Valves for Milk and Milk Products, Number 53-03.
- 3-A Sanitary Standards for Multiple-Use Plastic Materials, Number 20-24.
- Sanitary Standards for Centrifugal Separators and Clarifiers, Number 21-01.
- Sanitary Standards for Equipment for Packaging Viscous Products, Number 23-05.

Copies of the documents are now available for purchase in electronic format or printed version through the 3-A SSI Web site at: http://www.3-a.org/. A comprehensive list of all documents currently under revision is also available at the 3-A SSI Web site at: http://www.3-a.org/standards/chart.

Campylobacteriosis Overtakes Salmonellosis as the Most Reported Animal Infection Transmitted to Humans in the EU

The European Food Safety Authority (EFSA) has published its second annual Community report on infectious diseases transmissible from animals to humans (zoonotic diseases) which affect over 380,000 European Union (EU) citizens every year. In 2005, campylobacteriosis overtook salmonellosis as the most reported zoonotic disease in humans in the EU. The European Centre for Disease Prevention and Control (ECDC) provided the data on human zoonoses cases and contributed in the analysis of human related data in the report.

The second annual Community report (2005) on infectious diseases transmissible from animals to humans (zoonotic diseases) published has highlighted campylobacteriosis as the most reported animal infection transmitted to humans in the EU. In 2005, reported *Campylobacter* infections in humans increased by 7.8% compared to the previous year rising to an incidence rate of 51.6 cases per 100,000 people and to a total of 197,363 recorded cases. As in 2004, the primary source of most human *Campylobacter* infections is related to fresh poultry meat with up to 66% of some samples being positive. On the other hand, *Salmonella* infections, while also still remaining a serious public health challenge, fell by 9.5% in 2005 to an incidence rate of 38.2 cases per 100,000 (176,395 reported cases). Salmonellosis in humans is most likely linked to the presence of *Salmonella* in eggs and poultry and pig meat. A decrease in *Salmonella* contamination in eggs was observed during the last years.

The report also provides data on important resistance rates to antibiotics in *Campylobacter* originating from farm animals and food of animal origin. Some results indicated that over 80% of the tested bacteria were resistant to antibiotics commonly used to treat human diseases. This is a growing area of concern for public health specialists as this important reservoir of antimicrobial resistance might compromise effective treatment of these diseases in humans.

The report includes data on other zoonotic diseases, which, although more rare in people in comparison to *Campylobacter* and *Salmonella*, are still a major concern in terms of public health owing to their severe impact on human health. One example is listeriosis which, although affecting relatively few people (1,439 reported cases in 2005), has a high case-fatility rate and can also seriously affect the unborn child often resulting in miscarriage. VTEC[1] infections, a type of *E. coli*, which affected 3,314 people in 2005 is also another disease which can seriously damage human health and is most severe in children.

In 2005, the reporting of investigated outbreaks caused by consumption of contaminated food was mandatory for the first time in EU. Together 5,311 foodborne outbreaks were reported in the EU involving 47,251 people and resulting in 5,330 hospitalization and 24 deaths.

Member States receiving Community co-financing for eradication programs of bovine tuberculosis in cattle and brucellosis in cattle, sheep and goats, reported less positive herds in 2005 compared to 2004, indicating that the programs seem to be having an impact.

The full text of the report is available on the EFSA Web site at: http://www.efsa.europa.eu/en/science/monitoring_zoonoses/reports/zoonoses_report_2005.html.

Microwave Oven Can Sterilize Sponges, Scrub Pads

Microwave ovens may be good for more than just zapping the leftovers; they may also help protect your family.

University of Florida engineering researchers have found that microwaving kitchen sponges and plastic scrubbers – known to be common carriers of the bacteria and viruses that cause foodborne illnesses – sterilizes them rapidly and effectively.

That means that the estimated 90-plus percent of Americans with microwaves in their kitchens have a powerful weapon against *E. coli*, *Salmonella* and other bugs at the root of increasing incidents of potentially deadly food poisoning and other illnesses.

"Basically what we find is that we could knock out most bacteria in two minutes," said Gabriel Bitton, a UF professor of environmental engineering. "People often put their sponges and scrubbers in the dishwasher, but if they really want to decontaminate them and not just clean them, they should use the microwave."

Mr. Bitton, an expert on wastewater microbiology, co-authored a paper about the research that appears in the December issue of the *Journal of Environmental Health*. The other authors are Richard Melker, a UF professor of anesthesiology, and Dong Kyoo Park, a UF biomedical engineering doctoral student.

Foodborne illnesses afflict at least 6 million Americans annually, causing at least 9,000 deaths and $4 billion to $6 billion in medical costs and other expenses. Home kitchens are a common source of contamination, as pathogens from uncooked eggs, meat and vegetables find their way onto countertops, utensils and cleaning tools. Previous studies have shown that sponges and dishcloths are common carriers of the pathogens, in part because they often remain damp, which helps the bugs survive, according to the UF paper.

Mr. Bitton said the UF researchers soaked sponges and scrubbing pads in raw wastewater containing a witch's brew of fecal bacteria, viruses, protozoan parasites and bacterial spores, including *Bacillus cereus* spores.

Like many other bacterial spores, ***Bacillus cereus*** spores are quite resistant to radiation, heat and toxic chemicals, and they are notoriously difficult to kill. The UF researchers used the spores as surrogates for cysts and oocysts of disease-causing parasitic protozoa such as Giardia, the infectious stage of the protozoa. The researchers used bacterial viruses as a substitute for disease-causing foodborne viruses, such as noroviruses and hepatitis A virus.

The researchers used an off-the-shelf microwave oven to zap the sponges and scrub pads for varying lengths of time, wringing them out and determining the microbial load of the water for each test. They compared their findings with water from control sponges and pads not placed in the microwave.

The results were unambiguous: Two minutes of microwaving on full power mode killed or inactivated more than 99 percent of all the living pathogens in the sponges and pads, although the *Bacillus cereus* spores required four minutes for total inactivation.

Mr. Bitton said the heat, rather than the microwave radiation, likely is what proves fatal to the pathogens. Because the microwave works by exciting water molecules, it is better to microwave wet rather than dry sponges or scrub pads, he said.

"The microwave is a very powerful and an inexpensive tool for sterilization," Bitton said, adding that people should microwave their sponges according to how often they cook, with every other day being a good rule of thumb.

Spurred by the trend toward home health care, the researchers also examined the effects of microwaving contaminated syringes. Mr. Bitton said the goal in this research was to come up with a way to sterilize syringes and other equipment that, at home, often gets tossed in the household trash, winding up in standard rather than hazardous waste landfills.

The researchers also found that microwaves were effective in decontaminating syringes, but that it generally took far longer, up to 12 minutes for *Bacillus cereus* spores. The researchers also discovered they could shorten the time required for sterilization by placing the syringes in heat-trapping ceramic bowls.

Mr. Bitton said preliminary research also shows that microwaves might be effective against bioterrorism pathogens such as anthrax, used in the deadly, still-unsolved 2001 postal attacks.

Using a dose of *Bacillus cereus* dried on an envelope as a substitute for mail contaminated by anthrax spores, Mr. Bitton said he found he could kill 98 percent of the spores in 10 minutes by microwaving the paper – suggesting, he said, one possible course of action for people who fear mail might be contaminated. However, more research is needed to confirm that this approach works against actual anthrax spores, he said.

Space-age Tools Boost Food Safety, Quality

Portable inspection devices that detect food safety and quality problems are being developed by Agricultural Research Service

(ARS) scientists. Recent food safety outbreaks highlight the need for "space-age" ways to prevent such problems at every step in the food production process from farm field to grocery store or restaurant.

Scientists led by Yud-Ren Chen at the ARS Instrumentation and Sensing Laboratory, Beltsville, MD, are designing such portable inspection devices by adapting optical technology used for remote sensing of Earth.

Prototypes include binoculars with lenses that detect fecal matter on meat, produce or processing equipment, as well as diseases or quality defects. A camera/light combination can be helmet-mounted or used in a hand-held device to expose fecal matter as white specks on an eyewear-mounted computer display.

The portable devices are the next stage for a team that recently handed industry a prototype of an on-line imaging system for chicken inspection. Next will be a similar system for inspecting fruits and vegetables.

Team member Stephen Delwiche, working with colleagues at the ARS Grain Marketing and Production Research Center, Manhattan, KS, has succeeded with high-speed optical inspection of wheat and other grains, detecting protein content as well as mold.

At the ARS Sugarbeet and Bean Research Unit, East Lansing, MI, Renfu Lu's team uses laser beams to judge taste, firmness and other quality aspects of fresh produce.

Machine vision nicely supports human inspection because its instruments shine light on every single fruit, vegetable, grain kernel, or meat or poultry product that speeds along the processing line. It also gives inspectors an extra pair of eyes for scanning equipment and processing areas for contamination invisible to the naked eye.

Purdue Researchers Develop New Technique to Screen Food

Researchers have shown that a new low-cost system to quickly identify bacteria by analyzing scattered laser light can accurately distinguish between different strains of *E. coli*, a potentially valuable way to screen the food supply.

The technique, which works by passing a laser beam through bacterial colonies growing on a nutrient medium, also promises to have future applications in medicine and homeland security, identifying dangerous organisms far more quickly and at much lower cost than conventional technologies, said E. Daniel Hirleman, a professor and William E. and Florence E. Perry Head of Purdue's School of Mechanical Engineering. Laser light passing through and around the colony is redirected by the bacteria and produces a scattering pattern. This light-scatter pattern is recorded and analyzed to identify the types of bacteria growing in colonies.

"We have learned that slight genetic differences between strains of *E. coli* create subtle differences in the micro- and macrostructure of the respective colonies," Hirleman said. "Our scattering instrument, in effect, amplifies these slight differences to produce remarkably different scattering phenomena."

The light-scattering project was initiated by Hirleman, working with Arun K. Bhunia, a professor of food microbiology in the Department of Food Science, and other researchers, including J. Paul Robinson, a professor in the Weldon School of biomedical engineering.

Hirleman has specialized in research to develop new types of sensors that work by analyzing light scattering off objects for applications such as detecting impurities on silicon wafers in computer chip manufacturing and measuring the size and speed of burning fuel droplets in jet engines.

A major motivation for the bacteria-detection research is to reduce the time it takes to identify harmful organisms in food processing. The industry generally collects food samples or swabs, places them first in a nutrient broth and then on a plate coated with solid nutrient to allow the bacterial growth to reach detectable levels. *E. coli* bacterial cultures take about 18–24 hours to grow. Then, subsequent biochemical analyses and other time-consuming and expensive techniques, such as polymerase chain reaction, take four to seven days to complete the bacteria identification.

The light-scattering method works immediately after the colony is grown. "Within a second after the colony is full grown we can identify by its scattering fingerprint a certain strain of *E. coli*, for example," Hirleman said. "Or we might see a new scattering fingerprint and only be able to say that something is growing on the same growth medium as *E. coli*. We've never seen it before, but there is something here. That means we are warned within seconds instead of days."

A mass-produced system based on the technology would consist of inexpensive, off-the-shelf hardware, such as computers, red lasers and low-resolution digital cameras available at consumer electronics stores, and likely would cost less than $10,000. Instruments used for conventional methods can exceed 10 times that cost, Hirleman said.

Another advantage is that the light-scattering fingerprints of bacteria can be added to a library for quick reference in future outbreaks of foodborne pathogens.

One conventional approach requires sophisticated methods to "label" the bacterium with antibodies that attach a fluorescent dye to the target.

"But that means you have to use a designer antibody specifically suited for the strain of *E. coli* in question," Hirleman said. "What if food is contaminated with, say, a new strain of *E. coli*? You won't see it because the label will not attach to it."

The light-scattering technique, however, would enable researchers to detect bacterial contaminants they were not specifically looking for, making it less likely to miss an unsuspected culprit.

"Our team has done experiments where we've spiked ground beef and spinach with known pathogens, found those but also found another bacterium that was not in our library," Hirleman said. "So then we went back to the colony and did further analyses to find out what it was."

The researchers have studied growth characteristics of bacterial colonies and the corresponding evolution of the scattering patterns for a wide variety of pathogens relevant to food safety, developing a mathematical model that predicts the light-scattering signatures for given pathogens.

"We have found that different strains generally have unique forward scattering fingerprints, and those fingerprints can be used for rapid detection and classification of the bacteria," Hirleman said. "The light-scattering method has high sensitivity and speed and shows great promise for identifying bacterial colonies of a wide range of organisms relevant to infectious disease, homeland security and food safety."

This research was supported through a cooperative agreement with the Agricultural Research Service of the US Department of Agriculture and Purdue's Center for Food Safety Engineering.

A provisional patent has been filed for the data-processing technique, and a full patent is pending on the underlying light-scattering technology.

Health Canada Reminds Canadians about the Risks in Eating Sprouts

With the release of its new policy on sprouts, Health Canada is reminding Canadians that raw or undercooked sprouts should not be eaten by children, the elderly or those with weakened immune systems.

Sprouts, including mung bean and alfalfa sprouts, continue to be a popular choice for Canadians as a low-calorie, healthy ingredient in many dishes.

These foods, however, may carry harmful bacteria such as *Salmonella* and *E. coli* O157:H7, which can lead to serious illness. Fresh produce can sometimes be contaminated with harmful bacteria while in the field or during storage or handling. This is particularly a concern with sprouts. Many outbreaks of *Salmonella* and *E. coli* infections have been linked to contaminated sprouts. The most recent in Canada was in the fall of 2005, when more than 648 cases of *Salmonella* were reported in Ontario. Children, the elderly and those with weakened immune systems are particularly vulnerable to these bacteria and should not eat any raw sprouts at all. They should also avoid eating cooked sprouts unless they can be sure the sprouts have been thoroughly cooked.

Healthy adults who choose to eat sprouts should take precautions to reduce their risk of exposure to sprout-borne bacteria. When purchasing sprouts, always select crisp ones that have been refrigerated and avoid those that appear dark or smell musty. Always use tongs or a glove to place the sprouts in a plastic bag. If possible, when eating in a restaurant always make sure that the sprouts are fully cooked.

Symptoms from *Salmonella* usually occur 12 to 36 hours after eating contaminated food while symptoms from *E. coli* O157:H7 can occur within two to 10 days. Symptoms can include vomiting, stomach cramps, and fever. People who experience these symptoms should contact a doctor immediately. In extreme cases, *E. coli* O157:H7 can lead to acute kidney failure or even death. Health Canada and the Canadian Food Inspection Agency continue to work with producers to develop and implement best practices that will reduce the chances of sprouts becoming contaminated. Health Canada's new Policy on Managing Health Risks Associated with the Consumption of Sprouted Seeds and Beans was recently released with this in mind.

More information, including Health Canada's new policy on sprouts, can be found on Health Canada's Sprouts Information Page (http://www.hc-sc.gc.ca/fn-an/securit/ill-intox/info/sprouts-pousses_e.html).

INDUSTRY PRODUCTS

Biohit Inc.

New eLINE Dispenser from Biohit

The unique TipGuide suggests to the user the most suitable tip size thus eliminating the chance of improper tip selection.

Just set the desired volume and number of dispensings. The TipGuide will display the correct tip size for the task at hand.

The eLINE Dispenser offers six operating modes The unit is especially convenient for dispensings in long series or with viscous and high vapor pressure liquids.

The eLINE Dispenser is engineered/designed to fit in all existing eLINE charging stands or carousels.

Additional features include electronic tip ejection, simple programming with the easy-to-use keypad and contamination-free design.

The volume range of the dispenser is from 1 µl to 50 ml.

Biohit Inc.
800.922.0784
Neptune, NJ
www.biohit.com

Biolog Announces New OmniLog® Combo System

Biolog announces a new system capable of both microbial identification and kinetic characterization of cellular functions.

Core laboratories in university settings and industry are often pursuing research projects such as strain characterization, detailed comparisons between pathogenic and non-pathogenic strains of bacteria, or product contamination studies where access to both technologies in a single analytical system will be extremely beneficial. The company's proprietary method for microbial identification allows laboratories to easily identify and characterize a wide range of gram-negative and gram-positive bacteria across diverse fields of microbiology. With the added capabilities of Phenotype MicroArray™ technology for elucidation and kinetic quantitation of phenotypes, researchers are able to measure cell pathway activities and phenotypes by analyzing cells under thousands of culture conditions. This provides data and insight essential to understanding variations among bacterial strains, correlating genotypes to phenotypes, discovering new targets for antimicrobial compounds, improving and optimizing bioprocesses, and more.

Biolog microbial identification is based on the use of 95 different carbon compounds contained in a convenient pre-filled microtiter format to measure metabolic reactions. This diverse set of tests enables the system to identify microorganisms other kit-based methods do not recognize or often misidentify. After inoculation and incubation, a characteristic metabolic pattern or "fingerprint" is generated by the organism and compared to hundreds of on-board profiles to interpret and confirm a species identification with a demonstrated level of accuracy that is comparable to molecular methods.

Phenotype MicroArrays provide a comprehensive overview of cellular pathways and phenotypes in a single experiment. Utilizing panels of up to 1,920 phenotypic tests, researchers are able to evaluate cell changes under thousands of physiological states and culture conditions in a simple, rapid, efficient and cost-effective manner to expand their understanding of cellular physiology and species diversity.

The OmniLog Combo System includes an OmniLog Reader, multimedia computer, printer, LCD flat panel monitor, and bioinformatics software capable of handling both microbial identification and Phenotype MicroArray assays. Consumables, organism databases and other accessories are purchased separately depending on user needs.

Biolog, Inc.
800.284.4949
Hayward, CA
www.biolog.com

MWH Labs Meet New EPA Water Monitoring Requirement

MWH Labs, a US water-testing laboratory, has announced that it has been certified by the EPA as an Unregulated Contaminant Monitoring Rule 2 (UCMR2) approved laboratory for all required analytical methods (521, 535, 527, 529, and 525). UCMR2 is a new EPA water-monitoring program that requires public water systems to be screened for up to 25 chemicals between 2008 and 2010.

MWH Labs is one of a limited number of laboratories nationwide that has demonstrated the capability for doing both assessment and screening monitoring under the UCMR2 program. This allows MWH Labs to perform assessment and screening monitoring for any impacted public water utility.

"Being fully approved by the EPA as a UCMR2 laboratory is a significant achievement, and allows MWH Labs to remain the leader in providing a broad set of drinking water testing services to our clients," said Dr. Andrew Eaton, vice president and laboratory director for MWH Labs. "We look forward to helping utilities meet this important new requirement that further safeguards the best public water quality in the world."

Under the UCMR2 program, laboratories proposing to conduct the testing must submit complete data packages to the EPA for review. Following acceptance of the data packages, the lab is eligible to participate in proficiency testing to gain final approval for conducting testing under the new regulation.

Utilities that need to perform UCMR2 monitoring must provide EPA's SDWARS system with its contact information by April 4, 2007. Monitoring schedules and inventory of sample sites must be finalized in SDWARS by August 2, 2007. If a utility is proposing a "representative ground water monitoring plan," that plan must be submitted to EPA for approval by May 4, 2007.

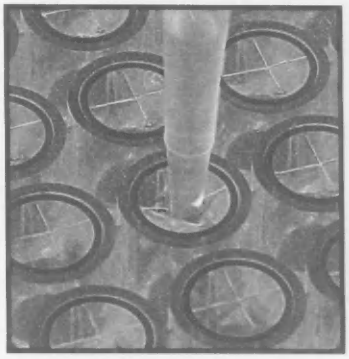
Beginning in January, 2008, surface water systems must conduct four consecutive rounds of sampling on a quarterly basis and groundwater systems must conduct two rounds of sampling, five to seven months apart. All systems serving more than 100,000 people must conduct both assessment and screening monitoring, and all systems serving over 10,000 people must conduct assessment monitoring.

Additionally, a subset of 10,000-100,000 population systems must conduct screening monitoring. A number of systems serving fewer than 10,000 people will do either assessment and screening or assessment only monitoring under a separate contract managed by the EPA.

MWH Laboratories
800.566.5227
Monrovia, CA
www.mwhlabs.com

Excel Scientific Precut Pierceable Films for Automation

Excel Scientific has introduced their new Patented X-Pierce™ Sealing Film. X-Pierce supports automation and robotic applications. The vinyl films with a thin adhesive layer protect samples in 96-well microplates from evaporation and contamination.



Excel Scientific, Inc.

A precut hairline "X" pattern over each well creates four flaps that bend easily when pushed by a pipet tip or robotic probe.

This patented design permits access to samples without coring from penetrating the film or fouling from contacting adhesive. Flaps return to their original position after sampling for continued protection.

Two removable end tabs and 96 printed well guides assist in positioning the film rapidly on the plate. X-Pierce Films are available sterile or non-sterile.

Excel Scientific, Inc.
760.249.6371
Wrightwood, CA
www.excelscientific.com

FMC FoodTech Introduces New Product Lines

"Processors today are facing increasing demands in terms of quality, productivity and safety.

For that reason, we've thoroughly examined our product lines and made major improvements that will give processors the capabilities they need for success," said Marshall Coleman, North American sales manager for FMC FoodTech.

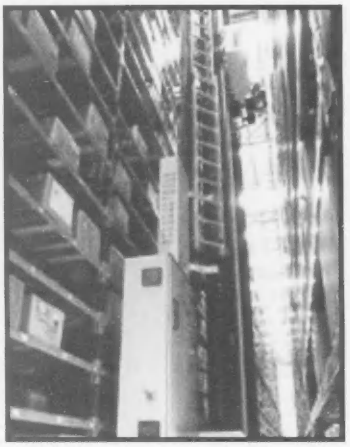
Universal Coating Line: The new coating line consists of a breader/preduster, batter applicator and programmable batter mixer. Designed with input from processors in Asia, Europe, Latin America and North America, the new line features major advancements to meet the increasingly demanding requirements in food processing plants worldwide.

M10 Tight Curve Spiral Freezer: With the same footprint as previous models, the new M10 TC has nearly 50 percent greater capacity and longer run-times with less downtime and turnaround time.

TFF-IV Fryer: The new fryer was designed to address the trend towards non trans fat oils, and is built specifically with the flexibility and sensitivity to handle these more volatile, unstable oils.

GCO-II Oven: This new oven offers higher yields and throughput, while significantly reducing maintenance costs. Better steam containment, an improved mesh belt design, enhanced vertical airflow, and a high-performance supplementary impingement section give food manufacturers greater flexibility in cooking a broader range of products in higher volumes at a faster pace.

FMC FoodTech
312.861.6000
Chicago, IL
www.fmcfoodtech.com



FKI Logistex

FKI Logistex Introduces Advanced Automated Replenishment

FKI Logistex® announces the launch of its new automated replenishment system for less-than-full-case picking, ideal for retail distribution and manufacturing. The new system uses FKI Logistex mini-load cranes to reduce the high manual labor cost of split-case picking by providing continuous, automated, demand-based replenishment to increase order fulfillment speed and accuracy.

"Manually replenishing SKUs for less-than-full case picking is expensive and time-consuming for large retail and manufacturing operations," says Ken Matson, executive vice president, FKI Logistex North America. "The FKI Logistex automated replenishment system employs the efficiency of mini-load cranes to ensure that if inventory is in the building, it is available as soon as it needs to be picked."

By ensuring that pick faces are continuously restocked, the FKI Logistex system eliminates replenishment downtime that frequently occurs in manual systems. The use of dynamic slotting logic in the FKI Logistex system minimizes the number of flow lanes required to service orders. Fewer flow lanes mean lower costs and shorter pick paths for increased pick rates.

The ability of the mini-load crane to automatically reconfigure pick faces on-demand as SKUs change makes the system ideal for handling short-run and seasonal products and for large retail DCs that have more SKUs than pick faces. All SKUs — high-velocity and low-velocity items — are handled with the same system and replenished and stored automatically.

When pallets are delivered in a typical FKI Logistex automated replenishment system, the trash and dunnage is removed and the product is immediately sorted and placed directly into plastic totes. A tote-based system eliminates the buildup of trash through the picking process and provides consistency when compared with systems that transport SKUs in their original boxes, which can vary in size. A conveyor routes the totes to the rack system, where mini-load cranes move the totes to static rack locations for storage as general inventory.

At the beginning of each wave, the FKI Logistex control system reassigns pick faces based on immediate demand to support customer orders or replenish store inventory. The mini-load crane automatically retrieves totes from the rack and fills up the necessary slots. The logic built into the system maintains a balance of static locations — fast-moving SKUs that can be changed to follow seasonality — and dynamic locations, which can be reassigned wave after wave to

present SKUs needed for the next round of orders.

A combination of FKI Logistex EASYpick® GoKart™, pick-to-light, and pick-to-voice order fulfillment systems are used for picking totes, which are placed on a takeaway conveyor for routing to shipping and sortation. Empty totes are placed back on the same conveyer and are diverted downstream for automatic stacking, staging, and routing to tote filling for new SKUs.

The FKI Logistex mini-load crane is a rail-running crane designed for automatic storage of non-palletized loads such as cartons, trays and totes at elevations up to 71 feet (21.7 meters). With up to 99.99 percent inventory accuracy achievable, the mini-load crane is used for automated storage and retrieval, automatic flow lane replenishment for order picking systems, load buffering between production cells, multi-elevation and multi-position load delivery, and fully dynamic load sortation and staging.

The top-guidance, all-electric mini-load crane offers curved-rail aisle changes and features direct AC-powered hoist and traction, a steel-cable-reinforced, toothed-belt hoist system, laser positioning, PLC control, and IR and RF communication. Available in single- or double-mast configurations with multiple load-handling devices, the crane can handle items up to 500 pounds (227 kilograms).

The automated replenishment system integrates a wide range of FKI Logistex technologies, including pick-to-light, EASYpick GoKart, RF devices, industry-leading Accuzone® 24-volt conveyors, and the Warehouse Optimizer™ warehouse control system (WCS). A new FKI Logistex automated fulfillment system can be implemented in under a year and provides a high ROI by helping companies reduce square-footage expansion or greenfield construction costs.

FKI Logistex automated replenishment capabilities featuring a fully operational mini-load crane will be on display at the FKI Logistex ProMat 2007 booth (1203/1503) in an integrated equipment loop showcasing a number of FKI Logistex products and technologies. Also featured are the company's next-generation sorters — the LS-4000CB cross-belt and the LS-4000E tilt-tray — as well as the new UniSort® MXT™ software module — a patent-pending sortation subsystem that dramatically increases sorter throughput.

FKI Logistex
877.935.4564
St. Louis, MO
www.fkilogistex.com

Pacific Ozone Technology Launches Element Ozone, Light Commercial and Consumer Ozone Products

Pacific Ozone Technology, a supplier of ozone systems to industry, launches Element Ozone, a sister company supplying ozone technology for light commercial and consumer applications.

Pacific Ozone Technology provides engineered ozone application solutions to the municipal water, agriculture and food processing, bottled water, industrial process and environmental industries, among others. Ozone, the world's most powerful commercial disinfectant, quickly oxidizes contaminants and destroys bacteria and viruses, decomposing to natural oxygen in the process.

Ozone is a natural antimicrobial agent effective at eliminating *Salmonella* and *E. coli* and all known bacteria, fungi, yeast, and protozoa. Ozone's widespread use by suppliers of the food service industry has been growing due to its effectiveness at sanitizing and disinfecting water, produce, meats and equipment. Since ozone is approved and recommended by the US Food and Drug Administration for sanitizing food supplies of all type, many companies are replacing chemical treatments with ozone systems or limiting their liability by adding an additional, more effective barrier against contamination.

The revolutionary counter-top ozone product from Element Ozone engineers the power of industrial ozone systems into a simple and compact package that puts industrial-strength disinfection and sanitation technology in the hands of food service operators. Restaurant operators and consumers will now have access to a more effective technology to fight *Salmonella* and *E. coli* and other foodborne illnesses onsite, protecting their customers and limiting the risk of contamination.

The Element FS2180 counter-top ozone generator produces ozonated water for the following purposes: disinfecting foods, sanitizing food surface areas and equipment to prevent cross contamination, and convenient hand washing.

Element Ozone
707.747.9600
Benicia, CA
www.elementozone.com

Ivan Parkin Lecture

Sunday, July 8
6:00 p.m.

Mr. Carl S. Custer
USDA-FSIS-OPHS-MD-MIB
Bethesda, Maryland

Mr. Carl Custer started his food microbiology career in 1966 as a tech, then as a graduate student for Dr. Carl Vanderzant at Texas A&M. In 1972, he joined the APHIS microbiology laboratory in Maryland rising to run the special projects laboratory where his primary projects were on *Clostridium botulinum*.

In 1980, promotion led Mr. Custer to Washington, D.C., working on the microbiological aspects of regulatory development. This exposed him to the interactions of politics and science in food safety regulatory promulgation. His primary contributions, with the aid of ARS, were in policies and standards for stabilization and inactivation.

Inheriting trichina projects exposed Mr. Custer to ninetieth century regulatory policy and hazard analysis. Trichina also opened up the world of uncooked ready-to-eat ethnic and traditional meat products. His primary contributions, with the support of ARS and academics, were in fermented sausages, dry-cured hams, jerky, and basturma.

Mr. Custer's experience with traditional food processes led AFDO in recruiting him to assist in developing their retail processing manual and its subsequent versions. He also helped present the AFDO retail processing workshops. Mr. Custer has also trained FSIS inspectors on sampling listeriae and the FSIS hotline staff on microbiology.

Mr. Custer has served on various IAFP Committees and Professional Development Groups (PDGs) and is a past chair of the Meat and Poultry Safety and Quality PDG. He is currently chair of the Nominating Committee and serves as Affiliate Council Secretary.

After 34 years of federal service, Mr. Custer is retiring in March 2007. In addition to part-time consulting, he will be pursuing his other interests including motorcycle restoration and touring, gardening, woodworking, cooking, and fine alcoholic beverages.

John H. Silliker Lecture

Wednesday, July 11

4:00 p.m.

Dr. Terry A. Roberts
Food Safety and Hygiene Consultant
Reading, England

A Fellow of the Institute of Food Science and Technology (FIFST), and Officer of the British Empire (OBE), Dr. Terry Roberts earned his B.A. (1957) and Ph.D. (1961) in Pharmacy from the University of London, and later his M.A. (1967) from the University of Cambridge. Retired since 1994, his growing list of contributions to food safety began during his tenure with the Institute of Food Research (IFR) now centralized in Norwich, England. Initially appointed to IFR's former Low Temperature Research Station in Cambridge, Dr. Roberts moved with the station to the Meat Research Institute in Langford (Bristol), where he became head of microbiology and spent the remainder of his IFR career at the Reading Laboratory.

Dr. Roberts was a member of the International Commission on Microbiological Specifications for Foods (ICMSF) for more than two decades, serving as Chairman his last nine years while co-editing five books in the ICMSF series "Microorganisms in Foods." He was a two-term consultant for both the World Health Organization and the International Atomic Energy Agency. In 1995, Dr. Roberts' committee involvement expanded to the UK Advisory Committee on Microbiological Safety of Foods and the EU Scientific Committee for Veterinary Measures Related to Public Health. His work with the European Food Safety Authority Panel on Biological Hazards continues today.

Published research by Dr. Roberts encompasses the topics of food irradiation; slaughterhouse hygiene; death and survival in relation to food safety; food preservation and spoilage; botulism in animals; microbiological safety of foods with emphasis on *C. botulinum*; the role of sodium nitrite in controlling *C. botulinum*; molecular and genetic inter-relationships of the *C. botulinum* group; and developing predictive modeling of microbial pathogens.

IAFP 2007 Symposia and Roundtables

Symposia:

Foodborne Disease Update

Vaccination Strategies to Control Foodborne Pathogens from Farm to Table

Food Defense Research and Application

Outreach Programs to Promote Dairy Products and Their Safety Around the World

Measuring and Motivating Safe Food Handling Practices at Home, Retail and Food Service

Long-term Sequelae of Pathogens with Recognized or Potential Transmission by Food

The DaVinci Code of Auditing: Reaching the Holy Grail of One Global Standard

What's the Future of Foodborne Pathogen Detection?

The Impact of Emerging Food Trends on Food Safety

Food Allergies: A Growing Food Safety Concern

The Wrath of Vibrio's "Past, Present and Future"

Pre-Harvest Food Safety: Another Critical Consideration for Assuring the Safety of the Food Supply

Critical Issues in the Investigation of Outbreaks of Foodborne Illness Involving Food Workers

Balancing Cultural and Religious Norms and Food Safety

Microbial Biofilms and Biofilm Control

Lettuce and Leafy Greens: Problems, Actions and Issues

Preparing Scientists for the Legal Aspects of a Crisis: Step into an Interactive Mock Trial and Learn How to Become an Expert Witness

Applications of "omics" Technologies for Food Safety and Security

Spoilage and Its Control in Meat Products

Mitigating Spoilage Risks in Ready-to-Drink Beverages

Recent Pivotal Decisions of the National Conference on Interstate Milk Shipments

Emerging Issues Affecting Dairy Product Quality and Safety

A Mystery Outbreak–What to Do When It Happens to You!

Roundtables:

Using HACCP to Innovate New Processes in Retail Food Operations

The Management and Control of Chemical Hazards in Food

Water Emergencies: Too Much, Too Little, Too Late, and What is the Plan?

With Over 100 Years of Experience in Food Safety, We Think…

Panel on the Science Behind Temperature Control of Potentially Hazardous and High Risk Food

IAFP 2007
Networking Opportunities

IAFP FUNCTIONS

AFFILIATE EDUCATIONAL SESSION
Saturday, July 7 • 4:00 p.m. – 5:00 p.m.

Affiliate Officers and Delegates plan to arrive in time to participate in this educational session. Watch for additional details.

WELCOME RECEPTION
Saturday, July 7 • 5:00 p.m. – 6:30 p.m.

Reunite with colleagues from around the world as you socialize and prepare for the leading food safety conference. Everyone is invited!

COMMITTEE MEETINGS
Saturday, July 7 • 3:00 p.m. – 4:30 p.m.
Sunday, July 8 • 7:00 a.m. – 5:00 p.m.

Refreshments sponsored by Springer

Committees and Professional Development Groups (PDGs) plan, develop and institute many of the Association's projects, including workshops, publications, and educational sessions. Share your expertise by volunteering to serve on committees or PDGs. Everyone is invited to attend.

STUDENT LUNCHEON
Sunday, July 8 • 12:00 p.m. – 1:30 p.m.

Sponsored by Texas A&M Agriculture, Department of Animal Science, Food Safety

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

EDITORIAL BOARD RECEPTION
Sunday, July 8 • 4:30 p.m. – 5:30 p.m.

Editorial Board Members are invited to this reception to be recognized for their service during the year.

OPENING SESSION AND IVAN PARKIN LECTURE
Sunday, July 8 • 6:00 p.m. – 7:00 p.m.

Join us to kick off IAFP 2007 at the Opening Session. Listen to the prestigous Ivan Parkin Lecture delivered by Carl S. Custer.

CHEESE AND WINE RECEPTION
Sunday, July 8 • 7:00 p.m. – 9:00 p.m.

Sponsored by Kraft Foods

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

IAFP JOB FAIR
Sunday, July 8 through Wednesday, July 11

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

COMMITTEE AND PDG CHAIRPERSON BREAKFAST (By invitation)
Monday, July 9 • 7:00 a.m. – 9:00 a.m.

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

EXHIBIT HALL LUNCH
Monday, July 9 • 12:00 p.m. – 1:00 p.m.

Sponsored by JohnsonDiversey

Tuesday, July 10 • 12:00 p.m. – 1:00 p.m.

Sponsored by SGS North America

Stop in the Exhibit Hall for lunch and networking on Monday and Tuesday.

EXHIBIT HALL RECEPTIONS
Monday, July 9 • 5:00 p.m. – 6:30 p.m.

Sponsored by DuPont Qualicon

Tuesday, July 10 • 5:00 p.m. – 6:00 p.m.

Join your colleagues in the Exhibit Hall to see the most up-to-date trends in food safety techniques and equipment. Take advantage of these great networking receptions.

PRESIDENT'S RECEPTION (By invitation)
Tuesday, July 10 • 6:00 p.m. – 7:00 p.m.

Sponsored by Fisher Scientific

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

PAST PRESIDENTS' DINNER (By invitation)
Tuesday, July 10 • 7:00 p.m. – 9:30 p.m.

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

BUSINESS MEETING
Tuesday, July 10 • 12:15 p.m. – 1:00 p.m.

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

JOHN H. SILLIKER LECTURE
Wednesday, July 11 • 4:00 p.m. – 4:45 p.m.

The John H. Silliker Lecture will be delivered by Dr. Terry A. Roberts.

AWARDS BANQUET
Wednesday, July 11 • 7:00 p.m. – 9:30 p.m.

Bring IAFP 2007 to a close at the Awards Banquet. Award recipients will be recognized for their outstanding achievements and the gavel will be passed from Frank Yiannas, M.P.H. to Incoming President, Dr. Gary R. Acuff.

IAFP 2007
Event Information

EVENING EVENTS

American Adventure at *Epcot*®
Monday, July 9 • 6:30 p.m. – 10:00 p.m.

Travel backstage *Epcot*® where you will be escorted to the American Adventure Rotunda. Relive America's glorious past in the beautiful setting of a classic 18th century American Rotunda. A reception-style dinner will be offered as you enjoy the magnificent setting. The finale of the evening takes you outside to an exclusive dessert party in a viewing area overlooking the World Showcase Lagoon. Here, experience the premier night-time spectacular at *Epcot*®, *IllumiNations: Reflections of Earth*. This one-of-a-kind show tells its story and touches the spirit by combining video technology, water fountains, lasers, special lighting effects, and pyrotechnics, all programmed to an original musical score. A perfect finish to your *Epcot*® Adventure.

IAFP Foundation Fundraiser – Adventurers Club at Downtown Disney®
Tuesday, July 10 • 6:30 p.m. – 9:30 p.m.

This will be a night to remember! You will be transported to Downtown Disney® and escorted through the streets of Pleasure Island to the Adventurers Club. The entertainment here is outrageous as the world's most eccentric explorers welcome you to their legendary club of the 1930s. Swap tall tales with a marvelously mad professor, a dashing daredevil pilot, a frisky French maid, and other characters while you enjoy live shows featuring everything from talking masks and a floating head to a ghostly piano. A reception-style buffet will be offered while the show happens all around you. At the conclusion of the event you will have the option to remain at Downtown Disney® and experience all of the clubs of Pleasure Island or return to the *Contemporary* Resort.

GOLF TOURNAMENT

Golf Tournament at *Disney's Magnolia* Golf Course
Saturday, July 7 • 6:30 a.m. – 12:30 p.m.

Join your friends and colleagues for a relaxing round of golf before IAFP 2007. Step onto the first tee and into the shoes of champions. These beautifully manicured links, designed by Joe Lee, are named for an abundance of fragrant Magnolias. Elevated tees, spacious greens and tranquil water hazards immerse you in a natural setting fit for a fulfilling round of championship golf. Enhance your on-course experience with the latest GPS Technology in each golf cart. *Disney's Magnolia* has provided a backdrop for the PGA Tour's elite for over 30 years. A classic Florida golf course, complete with a Mickey Mouse bunker!

Price includes transportation, greens fees with cart, range balls, lunch and prizes.

DAYTIME TOURS

Kennedy Space Center
Saturday, July 7 • 8:30 a.m. – 4:30 p.m.

Each year, millions of visitors make the trek to Kennedy Space Center, NASA's launch headquarters, where many of mankind's greatest accomplishments take place. Your exploration starts with a world-renowned tour where you see many NASA landmarks, including the massive launch pads, the gigantic Vehicle Assembly Building, the awe-inspiring Apollo/Saturn V Center and the International Space Center. View 10-story high rockets from all eras of space exploration in the Rocket Garden, walk through a full-size Space Shuttle mock-up, enjoy IMAX Theater space films on gigantic five-story screens and see an actual Gemini program capsule on display. You will also have lunch with an astronaut. Share in the excitement of space exploration through the eyes and personal stories of one of NASA's best while enjoying a buffet meal. You will have an inspiring day at Kennedy Space Center!

NOTE: Government-issued photo identification is required.

Merritt Island Airboat Excursion
Sunday, July 8 • 9:00 a.m. – 3:00 p.m.

Merritt Island National Wildlife Refuge is certified as the greatest endangered wildlife experience in North America. Our first stop is at the visitors' center for a 20-minute orientation film. Then, take an easy one-hour nature walk through one of the diverse, critical hardwood hammock habitats. Infused with wildlife, more than 1,000 species of plants are found throughout the refuge. Enjoy a picnic lunch at the refuge before heading to the Manatee over-look area. Then it's off to St. John's River for refreshments and gator tail. Certified eco-guides and Coast Guard captains will then take you on a 30-minute airboat tour through central Florida's everglades. Binoculars will be supplied for your viewing pleasure.

***Disney* Behind-the-Scenes Tour – Innovation in Action**
Monday, July 9 • 9:00 a.m. – 12:00 p.m.

When most people hear the name "Walt Disney," they think of *Mickey Mouse*, classic movies, and theme parks. What they often don't think of, or even know about, are his many innovative ideas that eventually led to the creation of the *Walt Disney World*® Resort. Innovation in action highlights Walt's many accomplishments and takes you on an unforgettable journey where you will see, first-hand, how Disney makes "magic"! Tour places most Guests never get to see including:

- *The Walt Disney World*® Nursery and Tree Farm – See how Disney horticulturists create world-famous topiaries.
- Textile Services – Visit the new state-of-the-art laundry facility, one of the largest in the world.
- Main Street, U.S.A.® – Discover how Walt's life and film career heavily influenced this turn-of-the-century location.
- The "Utilidor" System – Journey beneath the *Magic Kingdom*® Park to visit support systems located in the "tunnel."

NOTE: You must be 16 years old and carry a government-issued photo identification. There is walking involved, so comfortable shoes are recommended and attire should be suitable for current weather conditions.

***Disney* Behind-the-Scenes Tour – Gardens of the World**
Tuesday, July 10 • 9:00 a.m. – 12:00 p.m.

Everywhere you look at the *Walt Disney World*® Resort, the trees, shrubs and flowers play a vital role in setting the stage for recreation, entertainment, and beauty. Disney landscaping has become a recognized show in itself, providing color and enjoyment throughout the year. Your horticulture instructor turns *Epcot*® into a living classroom, using facilities "on stage" to describe the basic process of plant design and how it is incorporated in the landscape for the World Showcase pavilions. In addition, you will learn how you can apply many of these design elements to theme your home garden.

NOTE: You must be 16 years old and carry a government-issued photo identification. There is walking involved, so comfortable shoes are recommended and attire should be suitable for current weather conditions.

FIELD TOURS

Food Safety is Magical, But It Doesn't Magically Happen
Saturday, July 7 or Thursday, July 12
9:00 a.m. – 12:00 p.m.

During this tour, you will learn about the world-class food safety program at the *Walt Disney World*® Resort. This tour will include a presentation on the theory and operational aspects of Disney's food safety program, followed by a walking tour of one of the largest food service operations on property to illustrate the application of principles.

Behind the Seeds Tour
Saturday, July 7 or Thursday, July 12
9:00 a.m. – 12:00 p.m.

Get "up close and personal" with plants, insects and fish to explore and discover how scientists are working on innovative technology to support the future of food production. You will learn about the use of aquaculture in production of fish and shellfish, innovative plant-growing techniques and the use of predator insects to control pests.

Reedy, Set, Go – Behind the Scenes of Environmental Services
Thursday, July 12 • 9:00 a.m. – 12:00 p.m.

Go behind the scenes of the Reedy Creek Improvement District Environmental Services lab. This tour will include an overview of the history of the Reedy Creek Improvement District, a discussion of the essential role they play in monitoring the environment on and around the *Walt Disney World*® Resort property and a tour of the environmental services laboratory operations.

Food Irradiation Facility Tour
Thursday, July 12 • 8:30 a.m. – 11:30 a.m.

This is your opportunity to tour the Food Technology Service, Inc. facility. Food Tech was constructed as the nation's first commercial food irradiation company. Since 1992, the facility has been the leader in processing irradiated produce, poultry, and meat products for processors, retailer, and foodservice companies.

Food Tech has a long history of partnering with its customers to educate, introduce and implement irradiation as a food safety tool. Don't miss this exciting opportunity to see a working gamma food irradiation plant and learn more about this technology.

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

MEETING INFORMATION

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

Full Registration includes:

- Technical Sessions
- Symposia
- Poster Presentations
- Ivan Parkin Lecture
- John H. Silliker Lecture
- Exhibit Hall Lunch (Mon.-Tues.)
- Awards Banquet
- Exhibit Hall Admittance
- Cheese and Wine Reception
- Exhibit Hall Reception (Mon.-Tues.)
- Program and Abstract Book

4 EASY WAYS TO REGISTER

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

Online: www.foodprotection.org

Fax: 515.276.8655

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

Phone: 800.369.6337; 515.276.3344

The early registration deadline is June 5, 2007. After this date, late registration fees are in effect.

CANCELLATION POLICY

Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by June 22, 2007. No refunds will be made after June 22, 2007; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after July 16, 2007.

Event and tour tickets purchased are nonrefundable.

International Association for Food Protection®

EXHIBIT HOURS

Sunday, July 8, 2007	7:00 p.m. – 9:00 p.m.
Monday, July 9, 2007	10:00 a.m. – 6:00 p.m.
Tuesday, July 10, 2007	10:00 a.m. – 6:00 p.m.

DAYTIME EVENTS

Saturday, July 7, 2007	8:30 a.m. – 4:30 p.m.
Kennedy Space Center (Lunch included)	
Sunday, July 8, 2007	9:00 a.m. – 3:00 p.m.
Merritt Island Airboat Excursion (Lunch included)	
Monday, July 9, 2007	9:00 a.m. – 12:00 p.m.
Disney Behind-the-Scenes Tour–Innovation in Action	
Tuesday, July 10, 2007	9:00 a.m. – 12:00 p.m.
Disney Behind-the-Scenes Tour–Gardens of the World	

EVENING EVENTS

Sunday, July 8, 2007	
Opening Session	6:00 p.m. – 7:00 p.m.
Cheese and Wine Reception *Sponsored by Kraft Foods*	7:00 p.m. – 9:00 p.m.
Monday, July 9, 2007	
Exhibit Hall Reception *Sponsored by DuPont Qualicon*	5:00 p.m. – 6:00 p.m.
Monday Night Social – American Adventure at *Epcot*®	6:30 p.m. – 10:00 p.m.
Tuesday, July 10, 2007	
Exhibit Hall Reception	5:00 p.m. – 6:00 p.m.
IAFP Foundation Fundraiser – *Disney's* Adventurers Club	6:30 p.m. – 9:30 p.m.
Wednesday, July 11, 2007	
Awards Banquet Reception	6:00 p.m. – 7:00 p.m.
Awards Banquet	7:00 p.m. – 9:30 p.m.

FIELD TOURS

Saturday, July 7, 2007 (Limited number of tickets available)	
Food Safety is Magical, But It Doesn't Magically Happen	9:00 a.m. – 12:00 p.m.
Behind the Seeds Tour	9:00 a.m. – 12:00 p.m.
Thursday, July 12, 2007 (Limited number of tickets available)	
Food Safety is Magical, But It Doesn't Magically Happen	9:00 a.m. – 12:00 p.m.
Behind the Seeds Tour	9:00 a.m. – 12:00 p.m.
Reedy, Set, Go – Behind the Scenes of Environmental Services	9:00 a.m. – 12:00 p.m.
Food Irradiation Facility Tour	8:30 a.m. – 11:30 a.m.

GOLF TOURNAMENT

Saturday, July 7, 2007	
Golf Tournament at *Disney's Magnolia* Golf Course	6:30 a.m. – 12:30 p.m.

HOTEL INFORMATION

Hotel reservations can be made online at **www.foodprotection.org**.

IAFP 2007 Registration Form

International Association for Food Protection
2200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337 • 515.276.3344
Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

Member Number: _____

First name (as it will appear on your badge) _____ Last name _____

Employer _____ Title _____

Mailing Address (Please specify: ❒ Home ❒ Work) _____

City _____ State/Province _____ Country _____ Postal/Zip Code _____

Telephone _____ Fax _____ E-mail _____

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

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

PAYMENT MUST BE RECEIVED BY JUNE 5, 2007 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES:	MEMBERS	NONMEMBERS	TOTAL
Registration	$ 405 ($ 455 late)	$ 615 ($ 665 late)	_____
Association Student Member	$ 80 ($ 90 late)	Not Available	_____
Retired Association Member	$ 80 ($ 90 late)	Not Available	_____
One Day Registration* ❒ Mon. ❒ Tues. ❒ Wed.	$ 220 ($ 245 late)	$ 340 ($ 365 late)	_____
Spouse/Companion* (Name): _____	$ 60 ($ 60 late)	$ 60 ($ 60 late)	_____
Children 15 & Over* (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			
Additional Awards Banquet Ticket – Wednesday, 7/11	$ 50 ($ 60 late)	$ 50 ($ 60 late)	_____
Student Luncheon – Sunday, 7/8	$ 10 ($ 15 late)		_____

DAYTIME EVENTS		# OF TICKETS	
Golf Tournament – Saturday, 7/7 (Lunch included)	$ 165 ($ 175 late)	_____	_____
Kennedy Space Center – Saturday, 7/7 (Lunch included)	$ 99 ($ 109 late)	_____	_____
Merritt Island Airboat Excursion – Sunday, 7/8 (Lunch included)	$ 110 ($ 120 late)	_____	_____
Disney Behind-the-Scenes Tour–Innovation in Action – Monday, 7/9	$ 105 ($ 115 late)	_____	_____
Disney Behind-the-Scenes Tour–Gardens of the World – Tuesday, 7/10	$ 104 ($ 114 late)	_____	_____

EVENING EVENTS			
Monday Night Social – American Adventure at *Epcot*® – Monday, 7/9	$ 45 ($ 55 late)	_____	_____
IAFP Foundation Fundraiser – *Disney*'s Adventurers Club – Tuesday, 7/10	$ 150 ($ 160 late)	_____	_____

FIELD TOURS			
Saturday, 7/7 (Limited number of tickets available)			
Food Safety is Magical, But It Doesn't Magically Happen	$ 10 ($ 20 late)	_____	_____
Behind the Seeds Tour	$ 10 ($ 20 late)	_____	_____
Thursday, 7/12 (Limited number of tickets available)			
Food Safety is Magical, But It Doesn't Magically Happen	$ 10 ($ 20 late)	_____	_____
Behind the Seeds Tour	$ 10 ($ 20 late)	_____	_____
Reedy, Set, Go – Behind the Scenes of Environmental Services	$ 10 ($ 20 late)	_____	_____
Food Irradiation Facility Tour	$ 10 ($ 20 late)	_____	_____

PAYMENT OPTIONS: ❒ VISA ❒ MasterCard ❒

❒ Check Enclosed

Credit Card #_____

Expiration Date _____

Name on Card _____

Signature _____

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

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

Refunds subject to cancellation policy

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

EXHIBITORS DO NOT USE THIS FORM

Contribute to the Tenth Annual IAFP Foundation Silent Auction Today!

The Foundation of the International Association for Food Protection will hold its Annual Silent Auction during IAFP 2007, the Association's 94th Annual Meeting in Lake Buena Vista, FL, July 8–11, 2007. The Foundation supports:

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

Support the Foundation by donating an item today. A sample of items donated last year included:

- Taste of Chicago Gift Card
- New York Maple Syrup
- Galileo Thermometer
- Team Canada Hockey Jersey
- Ipod Shuffle
- Waterford Crystal Wine Bottle Coaster
- Purdy's Chocolates Gift Basket
- *Food Microbiology: An Introduction*
- Ontario Ice Wine
- "Six Nations" Rugby Shirt
- Cow Parade Figurines
- Brazil Vacation Package

Complete the form and send it in today.

Description of Auction Items _____

Estimated Value _____

Name of Donor _____

Company (if relevant) _____

Mailing Address _____

(Please specify: ❒ Home ❒ Work)

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-mail _____

Return to:

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

International Association for Food Protection®

COMING EVENTS

APRIL

- **3–4, Hands-On HACCP Workshop,** University of Georgia Food Science Outreach Program, Athens, GA. For more information, contact Marian at 706.542.2574; E-mail: marianw@uga.edu.
- **4–6, Missouri Milk, Food and Environmental Health Association Annual Educational Conference,** Stoney Creek Inn, Columbia, MO. For more information, contact Gala Jaramillo at 573.893.3066; E-mail: galaj@socket.net.
- **11, The Society for Applied Microbiology Spring Meeting,** Manchester Metropolitan University, London. For more information, call 44.(0) 1234.326661 or go to www. sfam.org.uk/springmeeting.html.
- **12, Metropolitan Association for Food Protection Spring Seminar,** Cook College Campus Center, New Brunswick, NJ. For more information, contact Carol Schwar at 908.689.6693; E-mail: cschwar@co.warren.nj.us.
- **17–18, 12th Annual Milk Processing Technology Short Course,** Cal Poly Dairy Products Technology Center, San Luis Obispo, CA. For more information, go to www.calpoly.edu/~dptc.
- **24–25, AIB Food Plant GMP/Sanitation Workshop,** Sheraton Gateway Hotel, Atlanta Airport, Atlanta, GA. For more information, call 800.633.5137 or go to www.aibonline.org.
- **26–27, AIB HACCP Workshop,** Sheraton Gateway Hotel, Atlanta Airport, Atlanta, GA. For more information, call 800.633.5137 or go to www.aibonline.org.
- **26–28, United Fresh Tech,** Palm Springs Convention Center, Palm Springs, CA. For more information, call 202.303.3400 or go to www.unitedfresh.org.
- **27, Eleventh Annual Symposium on Industrial and Fermentation Microbiology,** Radisson Center, LaCrosse, WI. For more information, contact Dr. S. N. Rajagopal at 608.785.6976; E-mail: rajagopa.s@uwlax.edu.

MAY

- **5–8, United Fresh Marketplace,** McCormick Place Convention Center, Chicago, IL. For more information, call 202.303.3400 or go to www.unitedfresh.org.
- **5–10, The 31st National Conference on Interstate Milk Shipments,** Little America Hotel, Salt Lake City, UT. For more information, contact Leon Townsend at 502.695.0253; E-mail: ltownsend@ncims.org.
- **12–14, Interbake China 2007,** Guangzhou International Convention and Exhibition Center, Guangzhou, China. For more information, go to www.interbakechina.com.
- **15–16, Pennsylvania Association of Milk, Food and Environmental Sanitarians 68th Annual Conference,** University Park, PA. For more information, contact PSU at 814.865.8301; E-mail: shortcourse@psu.edu.
- **15–17, Fresh-cut Produce Hands-on HACCP Workshop,** University of Georgia Food Science Outreach Program, Athens, GA. For more information, contact Marian at 706.542.2574; E-mail: marianw@uga.edu.
- **16–17, Associated Illinois Milk, Food and Environmental Sanitarians Spring Meeting,** Bloomington, IL. For more information, contact Steve DiVincenzo at 217.785.2439; E-mail: sdivince@idph.state.il.us.
- **21–24, 3-A Sanitary Standards, Inc. Annual Meeting,** Milwaukee, WI. For more information, call 800.633.5137 or go to www.3-a.org.

JUNE

- **4–6, Texas Association for Food Protection's 26th Annual Meeting,** Omni Southpark, Austin, TX. For more information, contact Howard Depoy at 936.756.6455; E-mail: hwdepoy@milkproductslp.com.
- **7–8, Food Mycology 2007: Emerging Mold Problems and Spoilage in Food and Beverages,** Westin Key West, Key West, FL. For more information, contact BCN Research Laboratories at 800.236.0505; E-mail: emilia.rico@bcnlabs.com.
- **15–22, XXVII International Workshop/Symposium on Rapid Methods and Automation in Microbiology,** Kansas State University, Manhattan, KS. For more information, contact Daniel Y.C. Fung at 785.532.1208; E-mail: dfung@ksu.edu.
- **26–27, In-Plant Control of Microbial Contamination in Refrigerated and Processed Foods,** University of Georgia, Athens, GA. For more information, contact Marian at 706.542.2574; E-mail: marianw@uga.edu.

JULY

- **6–7, IAFP 2007 Workshops,** See page 167 of this issue.
- **8–11, IAFP 2007,** *Disney's Contemporary* Resort, Lake Buena Vista, FL. For more information, contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org. See our registration form on page 207.
- **10–12, Meat and Poultry Marination Short Course,** University of Georgia Food Science, Athens, GA. For more information, contact Marian at 706.542.2574; E-mail: marianw@uga.com.
- **28–Aug. 1, Institute of Food Technologists Annual Meeting and Food Expo,** Chicago, IL. For more information, call 312.782.8424; E-mail: info@ift.org.

IAFP UPCOMING MEETINGS

JULY 8-11, 2007
Lake Buena Vista, Florida

AUGUST 3-6, 2008
Columbus, Ohio

JULY 12-15, 2009
Grapevine, Texas

ADVERTISING INDEX

Journal of Food Protection®

ISSN: 0362-028X
Official Publication

International Association for Food Protection

Reg. U.S. Pat. Off.

Vol. 70 | February 2007 | No. 2

Letter to the Editor

Articles

Research Notes

Review

* Asterisk indicates author for correspondence.

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

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

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

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

For the past 37 years, DPC's primary mission has been the development and distribution of educational guidelines directed to proper and improved sanitation practices in the production, processing, and distribution of high quality milk and milk products.

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

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

If purchased individually, the entire set would cost $367.00. We are offering the set, packaged in five looseleaf binders for $265.00.

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

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

Please enclose $265 plus $17 shipping and handling for each set of guidelines within the U.S. Outside U.S., shipping will depend on existing rates. Payment in U.S. $ drawn on a U.S. bank or by credit card.

Name Phone No.

Company

Street Address

City, State/Province, Code

VISA/MC/AE No. Exp. Date

AUDIOVISUAL LIBRARY ORDER FORM

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

International Association for Food Protection®
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344;
Fax: 515.276.8655
E-Mail: info@foodprotection.org
Web Site: www.foodprotection.org

Member # _____

First Name _____ M.I. ____ Last Name _____

Company _____ Job Title _____

Mailing Address _____

Please specify: ❒ Home ❒ Work

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-Mail _____ Date Needed _____

PLEASE CHECK BOX NEXT TO YOUR VIDEO CHOICE

(Allow 4 weeks minimum from date of request.)

DAIRY

- ❒ D1010 The Bulk Milk Hauler: Protocol & Procedures
- ❒ D1030 Cold Hard Facts
- ❒ D1031 Dairy Plant
- ❒ D1040 Ether Extraction Method for Determination of Raw Milk
- ❒ D1050 Food Safety: Dairy Details
- ❒ D1060 Frozen Dairy Products
- ❒ D1070 The Gerber Butterfat Test
- ❒ D1080 High-Temperature, Short-Time Pasteurizer
- ❒ D1090 Managing Milking Quality
- ❒ D1100 Mastitis Prevention and Control
- ❒ D1105 Milk Hauling Training
- ❒ D1110 Milk Plant Sanitation: Chemical Solution
- ❒ D1120 Milk Processing Plant Inspection Procedures
- ❒ D1125 Ohio Bulk Milk Hauling Video
- ❒ D1130 Pasteurizer: Design and Regulation
- ❒ D1140 Pasteurizer: Operation
- ❒ D1150 Processing Fluid Milk
- ❒ D1180 10 Points to Dairy Quality

ENVIRONMENTAL

- ❒ E2012 Better TEDs for Better Fisheries
- ❒ E3010 The ABC's of Clean – A Handwashing and Cleanliness Program for Early Childhood Programs
- ❒ E3020 Acceptable Risks?
- ❒ E3030 Air Pollution: Indoor
- ❒ E3031 Allergy Beware
- ❒ E3040 Asbestos Awareness
- ❒ E3055 Effective Handwashing – Preventing Cross-Contamination in the Food Service Industry
- ❒ E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- ❒ E3070 EPA Test Methods for Freshwater Toxicity Tests (Using Fathead Minnow Larva)
- ❒ E3075 EPA: This is Super Fund
- ❒ E3080 Fit to Drink
- ❒ E3110 Garbage: The Movie
- ❒ E3120 Global Warming: Hot Times Ahead
- ❒ E3125 Good Pest Exclusion Practices
- ❒ E3128 Integrated Pest Management (IPM)
- ❒ E3150 Kentucky Public Swimming Pool and Bathing Facilities
- ❒ E3151 Key Pests of the Food Industry
- ❒ E3153 Physical Pest Management Practices
- ❒ E3155 Plastics Recycling Today: A Growing Resource
- ❒ E3140 Putting Aside Pesticides
- ❒ E3150 Radon
- ❒ E3160 RCRA-Hazardous Waste
- ❒ E3161 The Kitchen Uncovered: Orkin Sanitized EMP The New Superfund: What It Is and How It Works
- ❒ E3170 Tape 1 – Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements
- ❒ E3180 Tape 2 – Changes in the Removal Process: Removal and Additional Program Requirements
- ❒ E3190 Tape 3 – Enforcement & Federal Facilities
- ❒ E3210 Tape 4 – Emergency Preparedness & Community Right-to-Know
- ❒ E3220 Tape 5 – Underground Storage Tank Trust Fund & Response Program
- ❒ E3230 Tape 6 – Research & Development/Closing Remarks
- ❒ E3235 Regulatory and Good Manufacturing Practices
- ❒ E3236 Rodent Control Strategies
- ❒ E3240 Sink a Germ
- ❒ E3245 Wash Your Hands
- ❒ E3250 Waste Not: Reducing Hazardous Waste
- ❒ E3251 Would Your Restaurant Kitchen Pass Inspection?
- ❒ E3260 Swabbing Techniques for Sampling the Environment and Equipment

FOOD

- ❒ F2005 A Lot on the Line
- ❒ F2007 The Amazing World of Microorganisms
- ❒ F2008 A Recipe for Food Safety Success
- ❒ F2009 Basic Personnel Practices
- ❒ F2010 Close Encounters of the Bird Kind
- ❒ F2011 Available Post Harvest Processing Technologies for Oysters
- ❒ F2013 Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments
- ❒ F2014 Controlling Food Allergens in the Plant
- ❒ F2015 Controlling *Listeria*: A Team Approach
- ❒ F2016 Bloodborne Pathogens: What Employees Must Know
- ❒ F2020 Egg Handling and Safety
- ❒ F2021 Egg Production
- ❒ F2030 "Egg Games" Foodservice Egg Handling & Safety
- ❒ F2035 Fabrication and Curing of Meat and Poultry Products
- ❒ F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef
- ❒ F2057 Cooking and Cooling of Meat and Poultry Products
- ❒ F2039 Food for Thought – The GMP Quiz Show
- ❒ F2040 Food Irradiation
- ❒ F2045 Food Microbiological Control
- ❒ F2050 Food Safe-Food Smart – HACCP and Its Application to the Food Industry (Part 1 & 2)
- ❒ F2060 Food Safe Series I (4 videos)
- ❒ F2070 Food Safe Series II (4 videos)
- ❒ F2080 Food Safe Series III (4 videos)
- ❒ F2081 Food Safety Begins on the Farm
- ❒ F2090 Food Safety: An Educational Video for Institutional Food Service Workers
- ❒ F2095 Food Safety for Food Service Series I: Now You're Cooking
- ❒ F2100 Tape 1 – Food Safety for Food Service: Cross Contamination
- ❒ F2101 Tape 2 – Food Safety for Food Service: HACCP
- ❒ F2102 Tape 3 – Food Safety for Food Service: Personal Hygiene
- ❒ F2103 Tape 4 – Food Safety for Food Service: Time and Temperature Controls
- ❒ F2104 Food Safety for Food Service Series II Tape I – Basic Microbiology and Foodborne Illness
- ❒ F2105 Tape 2 – Handling Knives, Cuts, and Burns
- ❒ F2106 Tape 3 – Working Safely to Prevent Injury
- ❒ F2107 Tape 4 – Sanitation
- ❒ F2110 Food Safety is No Mystery
- ❒ F2111 Controlling *Salmonella*: Strategies That Work
- ❒ F2120 Food Safety: For Goodness Sake Keep Food Safe
- ❒ F2121 Food Safety the HACCP Way
- ❒ F2125 Food Safety Zone Video Series Tape 1 – Food Safety Zone: Basic Microbiology
- ❒ F2126 Tape 2 – Food Safety Zone: Cross Contamination
- ❒ F2127 Tape 3 – Food Safety Zone: Personal Hygiene
- ❒ F2128 Tape 4 – Food Safety Zone: Sanitation
- ❒ F2129 Food Technology: Irradiation
- ❒ F2130 Food Safety: You Make the Difference
- ❒ F2131 Fruits, Vegetables, and Food Safety: Health and Hygiene on the Farm
- ❒ F2133 Food Safety First
- ❒ F2134 Food Safety: Fish and Shellfish Safety
- ❒ F2135 Get with a Safe Food Attitude
- ❒ F2136 GLP Basics: Safety in the Food Micro Lab
- ❒ F2137 GMP Basics: Avoiding Microbial Cross-Contamination
- ❒ F2140 GMP Basics: Employee Hygiene Practices
- ❒ F2145 GMP Basics: Guidelines for Maintenance Personnel
- ❒ F2147 GMP Basics: Process Control Practices
- ❒ F2148 GMP – GSP Employee
- ❒ F2150 GMP: Personal Hygiene and Practices in Food Manufacturing
- GMP Food Safety Video Series
- ❒ F2151 Tape 1 – Definitions
- ❒ F2152 Tape 2 – Personnel and Personnel Facilities
- ❒ F2153 Tape 3 – Building and Facilities
- ❒ F2154 Tape 4 – Equipment and Utensils
- ❒ F2155 Tape 5 – Production and Process Controls
- ❒ F2160 GMP: Sources and Control of Contamination during Processing
- GMPs for Food Plant Employees: Five-volume Video Series Based on European Standards and Regulations
- ❒ F2161 Tape 1 – Definitions
- ❒ F2162 Tape 2 – Personnel and Personnel Practices
- ❒ F2163 Tape 3 – Building and Facilities
- ❒ F2164 Tape 4 – Equipment and Utensils
- ❒ F2165 Tape 5 – Production/Process Controls
- ❒ F2168 HACCP Advantage – Good Manufacturing Practices
- ❒ F2169 HACCP: Training for Employees – USDA Awareness
- ❒ F2170 The Heart of HACCP
- ❒ F2171 HACCP: The Way to Food Safety
- ❒ F2172 HACCP: Training for Managers
- ❒ F2175 Inside HACCP: Principles, Practices and Results
- ❒ F2175 Inspecting for Food Safety – Kentucky's Food Code
- ❒ F2180 HACCP: Safe Food Handling Techniques
- ❒ F2190 Is What You Order What You Get? Seafood Integrity
- ❒ F2191 Microbial Food Safety: Awareness to Action
- ❒ F2210 Northern Delight – From Canada to the World
- ❒ F2220 Proper Handling of Peracidic Acid
- ❒ F2230 Purely Coincidental
- ❒ F2240 On the Front Line
- ❒ F2250 On the Line
- ❒ F2260 100 Degrees of Doom. The Time and Temperature Caper
- ❒ F2265 A Day in the Deli: Service, Selection, and Good Safety
- ❒ F2266 HACCP: A Basic Understanding
- ❒ F2270 Pest Control in Seafood Processing Plants
- ❒ F2271 Preventing Foodborne Illness
- ❒ F2280 Principles of Warehouse Sanitation
- ❒ F2290 Product Safety and Shelf Life
- ❒ F2310 Safe Food: You Can Make a Difference
- ❒ F2320 Safe Handwashing
- ❒ F2321 All Hands on Deck
- ❒ F2322 The Why, The When, and The How Video
- ❒ F2325 Safe Practices for Sausage Production
- ❒ F2330 Sanitation for Seafood Processing Personnel
- ❒ F2340 Sanitizing for Safety
- ❒ F2341 Science and Our Food Supply
- ❒ F2342 Seafood HACCP Alliance Internet Training Course
- ❒ F2350 ServSafe Steps to Food Safety
- ❒ F2350–1 Step One: Starting Out with Food Safety
- ❒ F2350–2 Step Two: Ensuring Proper Personal Hygiene
- ❒ F2350–3 Step Three: Purchasing, Receiving and Storage
- ❒ F2350–4 Step Four: Preparing, Cooking and Serving
- ❒ F2350–5 Step Five: Cleaning and Sanitizing
- ❒ F2350–6 Step Six: Take the Food Safety Challenge: Good Practices, Bad Practices – You Make the Call
- ❒ F2370 Supermarket Sanitation Program – Cleaning and Sanitizing
- ❒ F2380 Supermarket Sanitation Program: Food Safety
- ❒ F2390 Take Aim at Sanitation
- ❒ F2391 Understanding Foodborne Pathogens
- ❒ F2410 Wide World of Food Service Brushes
- ❒ F2420 Your Health in Our Hands, Our Health in Yours
- ❒ F2430 Smart Sanitation: Principles and Practices for Effectively Cleaning Your Food Plant
- ❒ F2440 Cleaning and Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!
- ❒ F2450 A Guide to Making Safe Smoked Fish
- ❒ F2451 A HACCP-based Plan Ensuring Food Safety in Retail Establishments
- ❒ F2460 Safer Processing of Sprouts
- Fast Track Restaurant Video Kit
- ❒ F2500 Tape 1 – Food Safety Essentials
- ❒ F2501 Tape 2 – Receiving and Storage
- ❒ F2502 Tape 3 – Service
- ❒ F2503 Tape 4 – Food Production
- ❒ F2504 Tape 5 – Warewashing
- Worker Health and Hygiene Program for the Produce Industry
- ❒ F2505 Manager Guide to Worker Health and Hygiene: Your Company's Success May Depend on It!
- ❒ F2506 Worker Health and Hygiene: Your Job Depends on It!
- ❒ F2600 Food Industry Security Awareness: The first Line of Defense

OTHER

- ❒ M4010 Diet, Nutrition and Cancer
- ❒ M4020 Eating Defensively: Food Safety Advice for Persons with AIDS
- ❒ M4030 Ice: The Forgotten Food
- ❒ M4050 Personal Hygiene and Sanitation for Food Processing Employees
- ❒ M4060 Psychiatric Aspects of Product Tampering
- ❒ M4070 Tampering: The Issue Examined
- ❒ M4071 Understanding Nutritional Labeling Processing Employees

Visit our Web site at www.foodprotection.org for detailed tape descriptions

BOOKLET ORDER FORM

SHIP TO:

Member # _____

First Name _____ M.I. ____ Last Name _____

Company _____ Job Title _____

Mailing Address _____

Please specify: ☐ Home ☐ Work

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-Mail _____

BOOKLETS:

QUANTITY	DESCRIPTION	MEMBER OR GOV'T PRICE	NON-MEMBER PRICE	TOTAL
	Procedures to Investigate Waterborne Illness—2nd Edition	$12.00	$24.00	
	Procedures to Investigate Foodborne Illness—5th Edition	12.00	24.00	

SHIPPING AND HANDLING – $3.00 (US) $5.00 (Outside US) Each additional booklet $1.50 — Shipping/Handling

Multiple copies available at reduced prices.
Phone our office for pricing information on quantities of 25 or more. — Booklets Total

OTHER PUBLICATIONS:

QUANTITY	DESCRIPTION	MEMBER OR GOV'T PRICE	NON-MEMBER PRICE	TOTAL
	*International Food Safety Icons CD	$ 25.00	$25.00	
	Pocket Guide to Dairy Sanitation (minimum order of 10)	$ .75	$1.50	
	Before Disaster Strikes…A Guide to Food Safety in the Home (minimum order of 10)	.75	1.50	
	Before Disaster Strikes… *Spanish language version* – (minimum order of 10)	.75	1.50	
	Food Safety at Temporary Events (minimum order of 10)	.75	1.50	
	Food Safety at Temporary Events – *Spanish language version* – (minimum order of 10)	.75	1.50	
	*Annual Meeting Abstract Book Supplement (year requested _____)	25.00	25.00	
	*IAFP History 1911-2000	25.00	25.00	

SHIPPING AND HANDLING – per 10 – $2.50 (US) $3.50 (Outside US) — Shipping/Handling

*Includes shipping and handling — Other Publications Total

TOTAL ORDER AMOUNT

Prices effective through August 31, 2007

PAYMENT:

Payment must be enclosed for order to be processed • US FUNDS on US BANK

☐ **Check or Money Order Enclosed** ☐ VISA ☐ MasterCard ☐

CREDIT CARD # _____

EXP. DATE _____

SIGNATURE _____

International Association for Food Protection®

4 EASY WAYS TO ORDER

PHONE	FAX	MAIL	WEB SITE
800.369.6337; 515.276.3344	515.276.8655	6200 Aurora Ave., Suite 200W Des Moines, IA 50322-2864, USA	www.foodprotection.org

MEMBERSHIP APPLICATION

Prefix (❑ Prof. ❑ Dr. ❑ Mr. ❑ Ms.)

First Name _____ M.I. ____ Last Name _____

Company _____ Job Title _____

Mailing Address _____

Please specify: ❑ Home ❑ Work

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-Mail _____

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

MEMBERSHIPS		US	Canada/Mexico	International
❑ **IAFP Membership** (Member dues are based on a 12-month period and includes the *IAFP Report*)		**$ 50.00**	**$ 50.00**	**$ 50.00**
Optional Benefits:				
❑ *Food Protection Trends*	Add	$ 60.00	$ 75.00	$ 90.00
❑ *Journal of Food Protection*	Add	$150.00	$170.00	$200.00
❑ *Journal of Food Protection* Online	Add	$ 36.00	$ 36.00	$ 36.00
❑ All Optional Benefits – ***BEST VALUE!***	Add	$200.00	$235.00	$280.00
❑ **Student Membership** (Full-time student verification required)		**$ 25.00**	**$ 25.00**	**$ 25.00**
Optional Benefits:				
❑ Student Membership with *FPT*	Add	$ 30.00	$ 45.00	$ 60.00
❑ Student Membership with *JFP*	Add	$ 75.00	$ 95.00	$125.00
❑ Student Membership with *JFP* Online	Add	$ 18.00	$ 18.00	$ 18.00
❑ All Optional Benefits – ***BEST VALUE!***	Add	$100.00	$135.00	$180.00

SUSTAINING MEMBERSHIPS

Recognition for your organization and many other benefits.

❑ **GOLD**	$5,000.00
❑ **SILVER**	$2,500.00
❑ **SUSTAINING**	$ 750.00

Contact the IAFP office for more information on the Sustaining Membership Program.

Payment must be enclosed for order to be processed • US FUNDS on US BANK

❑ **Check Enclosed** ❑ VISA ❑ MasterCard ❑ Discover

TOTAL MEMBERSHIP PAYMENT $ _____

CREDIT CARD # _____

EXP. DATE _____

SIGNATURE _____

All prices include shipping and handling
Prices effective through August 31, 2007

International Association for Food Protection®

4 EASY WAYS TO JOIN

PHONE	FAX	MAIL	WEB SITE
800.369.6337; 515.276.3344	515.276.8655	6200 Aurora Ave., Suite 200W Des Moines, IA 50322-2864, USA	www.foodprotection.org

RESERVE YOUR PLACE SOON!

Food Mycology 2007: Emerging Mold Problems and Spoilage in Food and Beverages

Symposium for the Food and Beverage Industry

Date: June 7-8, 2007

Where: Westin Key West, Key West, FL

Register before May 7

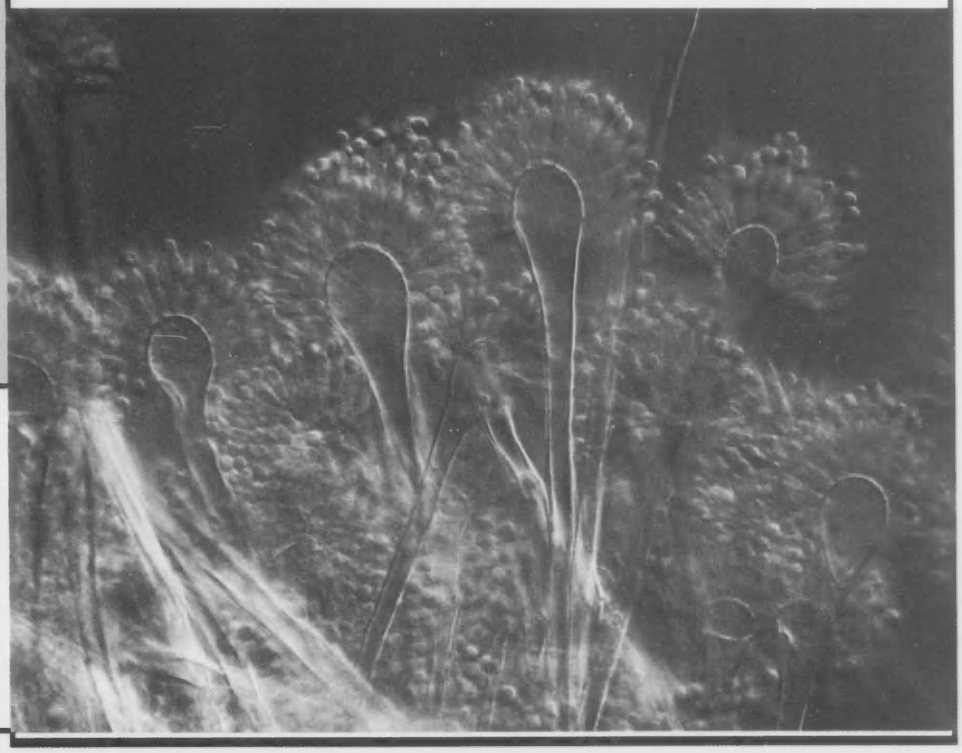
IUMS

Organized by the IUMS International Commission of Food Mycology (ICFM)

The International Commission of Food Mycology (ICFM) is organizing a special symposium for the food and beverage industry. An internationally recognized group of mycologists will present topics of interest concerning emerging problems with molds and yeast.

Registration includes:
- Technical Sessions
- Welcome Reception and Cocktails
- Program and Abstract Book

For additional information and registration go to www.foodmycology2007.com



IN THE U.S. CONTACT:

BCN Research Laboratories
P.O. Box 50305
Knoxville, TN 37950-0305

Phone: 800-236-0505
Fax: 865-584-3203
E-mail:
emilia.rico@bcnlabs.com

The picture is clearer. Doubt has been diminished. The food testing revolution has begun.

BAX SYSTEM Q7 THE POWER TO DO MORE

1-800-863-6842 Qualicon.com

powered by Applied Biosystems

DUPONT

The miracles of science