VOL. 25, NO. 6
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

JUNE 2005

International Food Safety Icons

Available from International Association for Food Protection®

Handwashing

Potentially Hazardous Food

Cooking

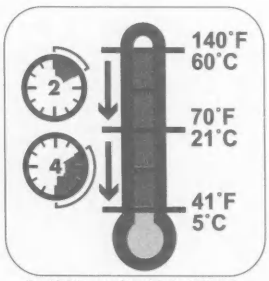
Do Not Work If Ill

Cross Contamination

Wash, Rinse, and Sanitize

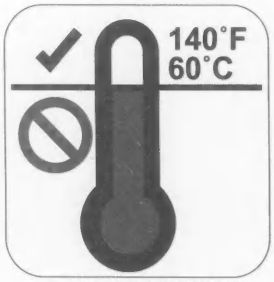
No bare hand contact

Cooling

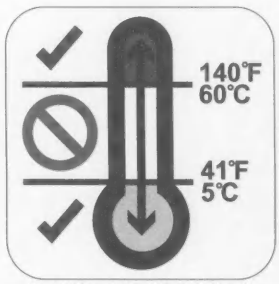


Refrigeration/Cold holding

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

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

IAFP Foundation FUND

Advancing Food Safety Worldwide®

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

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

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

- Student Travel Scholarships
- Ivan Parkin Lecture
- Travel support for exceptional speakers at the Annual Meeting
- Audiovisual Library
- Developing Scientist Student Competition
- Shipment of volumes of surplus *JFP* and *FPT* journals to developing countries through FAO in Rome

Donate Today!

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

International Association for Food Protection

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

International Association for Food Protection

FOOD PROTECTION TRENDS

VOLUME 25, NO. 6

ARTICLES

ASSOCIATION NEWS

DEPARTMENTS

EXTRAS

Thank you for your support of the Foundation Fund!

- Aisha Abushelaibi
- David W. Acheson
- Gary R. Acuff
- Nikki Adams
- Ulf Ahlin
- Sonia Akbarzadeh
- Luis Vivas Alegre
- Christine M. Aleski
- Michael Ambrosio
- Lita V. Amigleo
- S. R. Amin
- Brian J. Anderson
- Elizabeth L. Andress
- Douglas L. Archer
- David Armstrong
- Henry V. Atherton
- Donna A. Bahun
- J. Stan Bailey
- Peter J. Bailey
- Farid M. Balaa
- Kristina E. Barlow
- Patricia Bauer
- Michael B. Bayoud
- DeAnn L. Benesh
- Lenore Bennett
- Reginald W. Bennett
- Dane Bernard
- Sabah P. Bidawid
- Roy Biggs
- Lee E. Blakely
- Barbara Blakistone
- Zeb E. Blanton, Jr.
- Leslie Bluhm
- Dennis Bogart
- Lisa A. Borgmann
- Robert E. Brackett
- Mindy Brashears
- Don M. Breiner
- Christy T. Brennan
- Robert W. Brooks
- Steven K. Brown
- John C. Bruhn
- John Buchanan
- Stephen Buck
- Lucy Buczek
- Brian J. Burnish
- Bob Burns
- Margaret Burton
- Francis F. Busta
- Caitriona M. Byrne
- Sid Camp
- Stephen G. Campano
- Robert E. Campbell
- Barbara Cassens
- Donna M. Christensen
- Todd A. Clark
- Dean O. Cliver
- L. Darrell Cochran
- Mildred M. Cody
- Stefano Colombo
- Ricki J. Combs
- Roger L. Cook
- Joe Cordray
- Carl S. Custer
- Randall Daggs
- Richard L. Daise
- Lidia D'Andrea
- Michelle D. Danyluk
- Dean C. Davidson
- P. Michael Davidson
- Valerie Davidson
- Lieven De Zutter
- R. H. Deibel
- Joss Delves-Broughton
- Patricia Desmarchelier
- Nancy K. Dick
- Ralph DiGiacomo
- Joseph Disch
- Francis Doleans
- Ed Donnell
- Warren Dorsa
- Mary Ann Dowd
- Michael P. Doyle
- Ray Dyke
- Ruth Eden
- Ginny Edleman
- Peter Esko
- Harold R. Ewell
- Rhonda L. Ezell
- Alfred R. Fain
- Jeffrey M. Farber
- Jozsef Farkas
- Robert E. Farmer
- Hamid R. Farzi
- Trevor Fawcett
- Wilbur S. Feagan
- Mary Ferluga
- Denise M. Foley
- John Foster
- Bernadette D.G.M. Franco
- Wendy Franke
- Susan M. Freund
- Leslie Fuhrmann
- Ryan Galasso
- Santos Garcia-Alvarado
- Jill Gebler
- Constantin Genigeorgis
- Gary E. Gensler
- Ifigenia Geornaras
- Jock Gibson
- Agustin A. Girard
- Kathleen A. Glass
- Marc Glogovsky
- Farrah Goering
- Catherine H. Goldsmith
- Leon G. M. Gorris
- Richard F. Graham
- Lone Gram
- Sarah E. Grant
- Jeff Greenblatt
- Judy D. Greig
- Randy L. Groff
- Paul E. Guenther
- Jack J. Guzewich
- Sang-Do Ha
- Grace Hall
- Paul A. Hall
- Joy D. Haller
- Linda J. Harris
- Mark A. Harrison
- Renee A. Hart-Thakur
- Gordon Hayburn
- Joe M. Heidenreich
- Ron Heistek
- Brian K. Heldt
- Norma L. Heredia
- Montserrat Hernandez Iturriaga
- Manuela Hernandez-Herrero
- Irvin N. Hirshfield
- Serhiy Hlamazda
- Kai-Lai Grace Ho
- Jane Homan
- Dave Horowitz
- Lisa K. Hovey
- Yun-Hwa P. Hsieh
- Randy Huffman
- Denise Hughes
- Janis M. Hughes
- William T. Huntley
- Michael Hutchison
- Deng-Fwu Hwang
- Kyle-Mitchell Hyde
- Yasuhiro Inatsu
- Kenji Isshiki
- Ross W. Jabaay
- LeeAnne Jackson
- Alex Janssen
- Gala Jaramillo
- Dong-Kwan Jeong
- Fernando Jimenez
- Elizabeth M. Johnson
- Jennifer L. Johnson
- Giselle Julien-Davis
- Fumiko Kasuga
- Tom Keel
- James E. Kennedy
- Joo-Sung Kim
- C. Harold King
- Pieter M. Klapwijk
- Stephen J. Knabel
- Wayne E. Knudson
- Eugenia M. Konopka
- Jeffrey L. Kornacki
- Tony Kortleve-Snider
- Dave Kramer
- D. H. Kropf
- William S. LaGrange
- Anna M. Lammerding
- Kathleen A. Lang
- Gisele LaPointe
- Alison Larsson
- Loralyn Ledenbach
- Judy Lee
- Y. Jennifer Lee
- J. David Legan
- Vickie Lewandowski
- Norman C. Lim
- Chia-Min Lin
- Les Lipschutz
- Trish M. Lobenfeld
- Thomas I. Lovey
- Jim Lowder
- John B. Luchansky
- Jeanette B. Lyon
- Elizabeth A. MacDougall
- Ellen MacGran
- Wendy Maduff
- Howard Malberg
- Caterina Mammina
- Toni Manning
- Ted Markakis
- Douglas L. Marshall
- Kristin M. Marshall
- LouAnn Marshman
- Rosario Martin
- Jaime Martinez-Urtaza
- William E. McCullough
- Shelagh McDonagh
- Jennifer E. McEntire
- Jill E. McGregor
- Kevin M. McHugh
- Tom McMeekin
- Pattie A. McNiel
- Richard J. Meldrum
- Indaue G. Mello-Hall
- Larry Mendes
- Michael A. Mensah-Wilson
- Manfred Metzler
- Barry S. Michaels
- Ronald Miller
- Ryan T. Mills
- Hye-Kyung Moon
- Lydia Mota De La Garza
- S. Mpuchane
- Brendan G. Murphy
- Steven C. Murphy
- Melanie G. Nable
- Gabriela Najera-Sanchez
- M. Nazarowec-White
- Christopher B. Newcomer
- Melissa Newman
- Ranzell Nickelson II
- Jun Nishibu
- Catherine Nnoka
- Serve Notermans
- Uzor Nwoko
- David O'Beirne
- Gurpreet K. Oberoi
- William J. Oda
- Kathleen O'Donnell
- David A. Olds
- Karl E. Olson
- Leopoldo Orozco Ramirez
- Steve Otwell
- Glenda Overfelt
- Mary S. Palumbo
- Chorng-Liang Pan
- Mickey E. Parish
- Jong-Hyun Park
- Ki-Hwan Park
- Thakor R. Patel
- Anthony T. Pavel
- Janet Penniman
- Maria Jose Peris Andres
- Judy Perry
- Ruth L. Petran
- Alton H. Pfeifer
- Rena M. Pierami
- Helen M. Piotter
- Constantinos Piroccas
- Terri A. Pontious
- Laurie Post
- Morris E. Potter
- Charles Price
- Kailash S. Purohit
- Nancy J. Rachman
- Vincent J. Radke
- K. T. Rajkowski
- Ana Ramos
- Agustin M. Ramos Piza
- Keith Refsnider
- Fred Reimers
- Michael C. Robach
- Jena Roberts
- Victor J. Robles Olvera
- David Rodriguez-Lazaro
- Greg Rood
- Regina M. Rudawski
- Harold R. Russell
- Scott Russell
- Gerard P. Ruth
- Hidetoshi Sakai
- Mansour Samadpour
- Javier San Juan
- Robert Sanderson
- Elaine Santi
- Lilia M. Santiago
- Robert A. Savage
- Traci L. Sayer
- Allen R. Sayler
- Thomas L. Schwarz
- Joseph Scolaro
- Jenny Scott
- Gail C. Seed
- Shlomo Sela
- L. A. Shelef
- Patricia Sigler
- Panagiotis Skandamis
- Gaylord B. Smith
- Madeleine P. Smith
- Richard K. Smith
- Joseph M. Smucker
- O. Peter Snyder
- Nikolaos D. Soultos
- Stephanie A. Sparks
- William S. Sparks
- William H. Sperber
- Anna D. Starobin
- Gerard N. Stelma
- Roger Stephan
- Bruce N. Stewart-Brown
- Krista M. Sturm
- Katherine MJ Swanson
- Gloria I. Swick-Brown
- Hong Liong Tan
- Nobumasa Tanaka
- Peter J. Taormina
- Rodrigo Tarte
- Sita R. Tatini
- Fausto Tejeda-Trujillo
- Carl Teravainen
- David W. Tharp
- Donald W. Thayer
- Peter D. Tips
- Ewen Todd
- R. B. Tompkin
- Marcello Trevisani
- Lisbeth Truelstrup Hansen
- Melissa Tucker
- Erdal U. Tuncan
- Mika J. Tuomola
- Aaron R. Uesugi
- Hiroshi Urakami
- Londa S. Vander Wal
- Ferenc Varga
- Myrna Ver Ploeg
- Alecia A. Viera
- Patti Waller
- Isabel Walls
- John Walshe
- Fred Weber
- Lisa M. Weddig
- Ronald Weiss
- Thomas R. Weschler
- David M. Westcott
- Richard C. Whiting
- John Williams
- Smith J. Williams
- Steven Wilson
- Gun L. Wirtanen
- Charlene E. Wolf-Hall
- Sharon P. Wood
- Dorothy M. Wrigley
- Mizuo Yajima
- Jim Yonker
- Devon Zagory
- Claudio Zweifel

- BioSys, Inc.
- Florida Association for Food Protection
- Kraft Foods, Inc.
- Ontario Food Protection Association
- Wisconsin Association for Food Protection

International Association for Food Protection.

The above list represents individual contributors to the Association Foundation Fund during the period May 1, 2004 through April 29, 2005. In addition, a portion of the Sustaining Member dues are allocated to support this Fund. Your contribution is welcome. Call the Association office at 800.369.6337 or 515.276.3344 for more information on how you can support the Foundation.

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

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

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

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

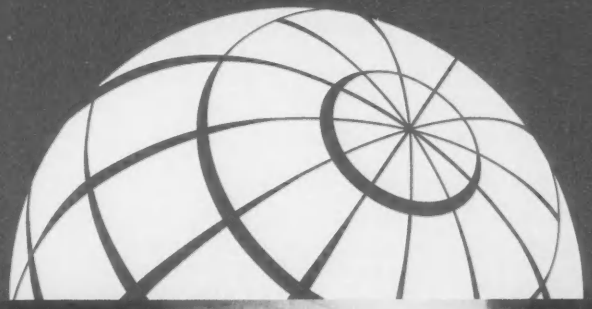
Postmaster: Send address changes to ***Food Protection Trends,*** 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2864, USA.

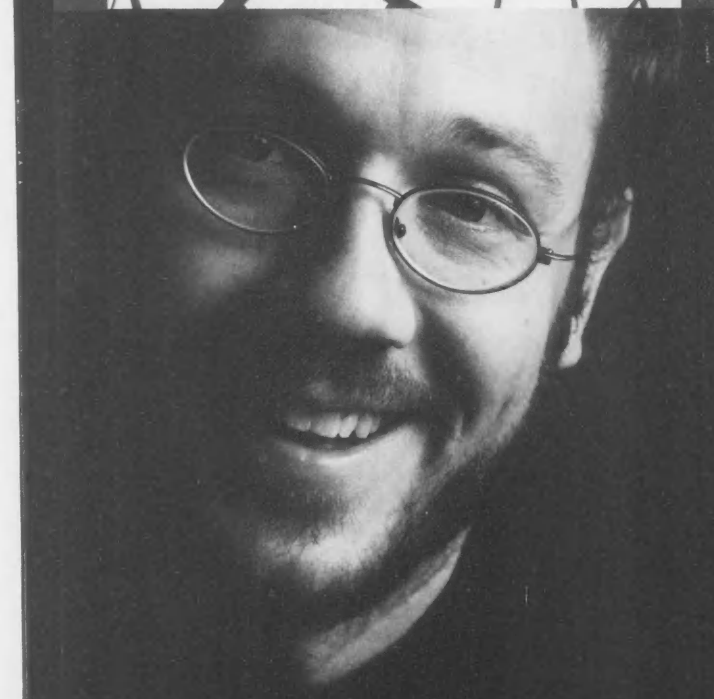
Food Protection Trends is printed on paper that meets the requirements of ANSI/NISO 239.48-1992.

Searching for smarter

engineering solutions?

Think Worldwide Food Expo.





October 26-29, 2005
McCormick Place
Chicago, Illinois USA

Start by seeing what's new, and who's doing what. Scan the innovations of more than 1,200 suppliers —from receiving and blending through processing and packaging, to material handling and distribution. New this year: Super Sessions, technical programs for continuing education credits; and pavilions on product development, distribution, and refrigeration and freezing. All geared to better operations, smarter teams, higher profits and happier customers. Use your head. Don't miss the show!

Brought to you by:

IDFA IAFIS AMI

www.worldwidefood.com

FUTURE ANNUAL MEETINGS

IAFP 2005

AUGUST 14-17

Baltimore Marriott
Waterfront Hotel
Baltimore, Maryland

IAFP 2006

AUGUST 13-16

Telus Convention Centre
Calgary, Alberta, Canada

IAFP 2007

JULY 8-11

Disney's Contemporary Resort
Lake Buena Vista, Florida

IAFP 2008

AUGUST 3-6

Hyatt Regency Columbus
Columbus, Ohio

International Association for Food Protection

FOOD PROTECTION TRENDS

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

FPT EDITORIAL BOARD

SUSTAINING MEMBERS

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 that might not otherwise be possible. Organizations who lead the way in new technology and development join IAFP as Sustaining Members.

GOLD

bioMérieux, Inc.
Hazelwood, MO
800.638.4835

DuPont Qualicon
Wilmington, DE
302.695.5300

Ecolab
St. Paul, MN
800.392.3392

Kraft Foods North America
Glenview, IL
847.646.3678

SILVER

BD Diagnostics
Sparks, MD
410.316.4467

F & H Food Equipment Co.
Springfield, MO
417.881.6114

MATRIX MicroScience, Inc.
Golden, CO
303.277.9613

Orkin Commercial Services
Atlanta, GA
404.888.2241

Quality Flow Inc.
Northbrook, IL
847.291.7674

Roche Applied Science
Indianapolis, IN
317.521.7569

Silliker Inc.
Homewood, IL
708.957.7878

Warnex Diagnostics Inc.
Laval, Quebec, Canada
450.663.6724

Weber Scientific
Hamilton, NJ
609.584.7677

SUSTAINING MEMBERS

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

Capitol Wholesale Meats, Chicago, IL; 773.890.0600

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

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

DonLevy Laboratories, Merrillville, IN; 219.736.0472

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

Dynal Biotech, Inc., Brown Deer, WI; 800.638.9416

EMD Chemicals Inc., Gibbstown, NJ; 856.423.6300

ESC/Entegris, South Beloit, IL; 815.389.2291

Evergreen Packaging, Division of International Paper, Cedar Rapids, IA; 319.399.3236

Fisher Scientific, Pittsburgh, PA; 412.490.4488

Food Lion, LLC, Salisbury, NC; 704.633.8250

Food Processors Institute, Washington, D.C.; 800.355.0983

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

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

FoodHandler, Inc., Westbury, NY; 800.338.4433

Foss North America, Inc., Eden Prairie, MN; 952.974.9892

Hygiena LLC, Camarillo, CA; 805.388.8007

IBA, Inc., Millbury, MA; 508.865.6911

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

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

International Fresh-cut Produce Association, Alexandria, VA; 703.299.6282

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

JohnsonDiversey, Sharonville, OH; 513.956.4889

Kellogg Company, Battle Creek, MI; 269.961.6235

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

Medical Wire & Equipment Co., Wiltshire, United Kingdom; 44.1225.810361

Michelson Laboratories, Inc., Commerce, CA; 562.928.0553

Micro-Smedt, Herentals, Belgium; 32.14230021

MVTL Laboratories, Inc., New Ulm, MN; 800.782.3557

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

The National Food Laboratory, Inc., Dublin, CA; 925.828.1440

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

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

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 Fruit & Vegetable Association, Washington, D.C.; 202.303.3400

VWR International, West Chester, PA; 610.429.2876

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

West Agro, Inc., Kansas City, MO; 816.891.1558

WestFarm Foods, Seattle, WA; 206.286.6772

Wilshire Technologies, Carlsbad, CA; 760.929.7200

Zep Manufacturing Company, Atlanta, GA; 404.352.1680

"A VIEW FROM WISCONSIN"

By **KATHLEEN A. GLASS**
PRESIDENT

"We invite you to participate in what we expect will be the largest meeting in our Association's history"

Welcome to IAFP 2005! In just two short months, that will be our greeting to all the attendees at our Annual Meeting in Baltimore, Maryland. We invite you to participate in what we expect will be the largest meeting in our Association's history. We anticipate over 1,600 attendees for the 2005 conference, compared with half that number just a decade ago. But, even though our Annual Meeting continues to grow each year, our numbers are still small enough to make this an "intimate" conference compared with the much larger meetings of our sister associations, such as the American Society for Microbiology and Institute for Food Technologists. Please review the program which is highlighted in this issue or visit our Web site for details and registration information. If you haven't made your hotel reservation yet, I encourage you to do so soon because rooms are limited at the conference hotel, the Baltimore Marriott Waterfront. Don't miss out on being part of the premier food safety meeting.

On a more personal basis, my co-workers and I are looking forward to this year's meeting for many reasons, including the keynote lectures, the symposia and technical sessions, visiting with the exhibitors, meeting friends, and making new contacts with colleagues from around the world. This year's program features "Bookend Lectures" opening the meeting on Sunday evening with Dr. Douglas Archer, who will present the Ivan Parkin Lecture, and concluding the Wednesday afternoon program with Dr. Michiel van Schothorst providing the John H. Silliker Lecture. In between, our educational programming includes tracks for dairy, meat, produce, retail, water, toxicology, epidemiology and public health, and food safety for the future (e.g., novel detection methodology, risk analysis, predictive models; emerging pathogens). As David Tharp pointed out in his March commentary, we are experimenting with rearranging our agenda so that we can expand our exhibit hall hours to give you more opportunities to meet with supply and service providers and to maximize attendance at all our symposia, technical oral sessions, and poster presentations. We look forward to your comments about the success of these changes.

In addition to the scientific programming, I invite you to join in one of the many opportunities to meet with your colleagues during any of the open meetings for the Professional Development Groups (PDGs) and other committees on Sunday. The week has options for various social activities as well. Get in early and take advantage of the Saturday Welcome to Washington Tour to experience the sights of the United States capital. Golfers and baseball fans have the chance to begin the IAFP 2005 festivities with a round of golf and/or attend the Baltimore Orioles vs. Toronto Blue Jays game on Saturday. Other evening social events include a cruise on the Baltimore Harbor on Monday or a walking tour and dinner in Little Italy on Tuesday night. As always, our meeting will close with the Awards Banquet when we will honor our colleagues for their dedication to IAFP and to our mission to promote food safety.

Although IAFP membership is only 3,000 strong, it is represented by a multitude of professional sectors: academia, producers, processed food manufacturers, retail, food service, local and national regulatory officials and public health professionals. As you can see from carefully reviewing our Annual Meeting program, we try to ensure that each group is represented and that the range in food protection topics presented mirrors the diversity among our attendees.

Furthermore, we are sensitive to the issue that many of our attendees "wear more than one hat" and that IAFP may be their primary, and perhaps only, source for up-to-date information. Therefore, we need to provide the latest facts and discussion on a wide variety of topics such as regulatory changes, laboratory methods, water quality and safety, toxicology, and epidemiology, as well as sanitation and other microbiological issues.

Also, we recently recognized the need to improve the level of "applied" programming at the Annual Meeting to provide critical food safety information to quality assurance, plant personnel, and inspectors. We anticipate this year's conference to reflect this evolution in programming by providing practical solutions to food safety concerns. It is indeed a challenge to serve all our constituents without growing too large, but we have strong commitment to be efficient in our time and resources.

I would be remiss if I didn't thank all the symposia organizers, speakers, and technical presenters for volunteering their ideas and their time. Your contributions provide the backbone for our meeting. The Program Committee has the unenviable job of choosing the best of-the-best submissions and in ensuring our program is balanced. It may be hard to believe, but our members will start planning the 2006 meeting in Calgary before we even open the 2005 meeting. If you are interested in submitting a symposia or workshop for consideration, please review the guidelines available in this issue or online. For your convenience, we have also provided an electronic copy of the submission form in the Annual Meeting section of our Web site. We encourage PDGs and other volunteers to begin their discussions before the August meeting in order to identify and fine-tune potential topics and suggested speakers.

I hope to see you in Baltimore in August. Please encourage your co-workers, your students, and other food safety professionals you know who may not be familiar yet with IAFP, to join our organization and to attend our Annual Meeting. It will be a meeting they wouldn't want to miss.

As always, I welcome your ideas and comments. Please feel free to email me at kglass@wisc.edu and let me know your view.

"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR

By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"We are fortunate to have active Affiliate organizations like CAFPA who are ready to assist IAFP in conducting the Annual Meeting"

Planning and coordinating the IAFP Annual Meeting is a year-round activity with the buildup of work taking place over the four to six months preceding the meeting itself. It takes coordination of so many people; volunteers to help at registration and with social events, students to help as session monitors, speakers and presenters, exhibitors, sponsors, award recipients, hotel staff, tour and social event guides, and the list goes on and on! One of the groups that I have the privilege of working closely with is the Local Arrangements Committee (LAC). This month, I want to expand on the work that the LAC volunteers perform.

Recently, I attended a meeting of the Capital Area Food Protection Association (CAFPA) at the FDA offices in College Park, Maryland. The meeting was their most successful to date with more than 80 attendees and the topic was outstanding! Four expert speakers gave presentations on "Defense of the US Food Supply" as the audience intently listened. CAFPA also incorporated a social time (break) to allow attendees to interact and ended the afternoon with a lively panel discussion where the speakers answered audience questions. Congratulations to CAFPA on this very successful meeting. We hope you will build on this success for future successes!

I mention the CAFPA meeting because it is this group who will serve as the LAC volunteers for IAFP 2005. Under the direction of Jill Snowdon, the Local Arrangements Chairperson, the LAC volunteers will help welcome attendees to our meeting in August. Following CAFPA's meeting, the 20 or so volunteers who make up the "core" LAC met to keep projects on their planning timeline up to date. I was able to sit in on this meeting to answer questions for LAC members and to give suggestions on how tasks have been accomplished in years past.

This year's LAC is an enthusiastic group who want to make your experience at IAFP 2005 the "best ever" and the most memorable for you! The group is working on preparing a fabulous "welcome pack" of items to present to you upon your arrival in Baltimore. Sometimes I think that attendees do not recognize the amount of work that LAC members put forth on their behalf. Much of the work is done prior to the meeting and behind the scenes, such as the welcome pack. The logistics of distributing a welcome pack become overwhelming: receiving items for the welcome packs, storing the items until assembly, then assembling and packing for transport to the hotel, transporting, delivering to the hotel, storing at the hotel, and lastly, distributing to attendees!

A responsibility of LAC similar to the welcome pack is the distribution of dairy products in the exhibit hall. In this case, the LAC solicits local dairies for contributions of ice cream novelties and single-serving milk and juice. Then again, they must coordinate delivery to the hotel and transfer to coolers in the exhibit hall. This is a very big undertaking for most LACs and one that is appreciated by attendees.

Other more visible areas that attendees see the LAC in action are at the registration desk, on tours and at social events, assisting with the Foundation's Silent Auction, and in the Audiovisual Library room. Coordination of the volunteer's schedule becomes a large project in itself. Most volunteers will serve 2-hour or 4-hour "shifts" with many of them serving multiple shifts. Normally, one person serves as a staffing coordinator so as to keep all shift requests straight. Somewhere between 40 and 70 volunteers will be "put to work" as volunteers over the conference week.

We are fortunate to have active Affiliate organizations like CAFPA who are ready to assist IAFP in conducting the Annual Meeting. It is fun to work with the LAC group in preparing for each Annual Meeting and this year is no exception. We look forward to seeing you at IAFP 2005 and CAFPA looks forward to welcoming you in Baltimore!

THE Black Pearl AWARD

RECOGNITION FOR CORPORATE EXCELLENCE IN FOOD SAFETY AND QUALITY

The Black Pearl Award is presented annually to a company for its efforts in advancing food safety and quality through consumer program, employee relations, educational activities, adherence to standards and support of the goals and objectives of the International Association for Food Protection. We invite you to nominate your company for this prestigious recognition. Contact the Association office for nomination information.

Presented by

The International Association for Food Protection

Proudly sponsored by

Wilbur S. Feagan and F&H Food Equipment Company

Black Pearl Recipients

2005 DuPont
Wilmington, Delaware

2004 Jack in the Box Inc.
San Diego, California

2003 Wegmans Food Markets Inc.
Rochester, New York

2002 Darden Restaurants
Orlando, Florida

2001 Walt Disney World Company
Lake Buena Vista, Florida

2000 Zep Manufacturing Company
Atlanta, Georgia

1999 Caravelle Foods
Brampton, Ontario, Canada

1998 Kraft Foods, Inc.
Northfield, Illinois

1997 Papetti's of Iowa Food Products, Inc.
Lenox, Iowa

1996 Silliker, Inc.
Homewood, Illinois

1995 Albertson's Inc.
Boise, Idaho

1994 H-E-B Grocery Company
San Antonio, Texas

ARTICLES

Food Protection Trends, Vol. 25, No. 6, Pages 438–441

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

International Association for Food Protection

Incidence of *Listeria* and *Listeria monocytogenes* on Processed Aquacultured Channel Catfish Fillets

STEPHENIE DRAKE and DOUGLAS L. MARSHALL*
Department of Food Science, Nutrition, and Health Promotion
Mississippi Agricultural and Forestry Experiment Station
Mississippi State University, Box 9805
Mississippi State, MS 39762-9805 USA

SUMMARY

Wholesale purchase decisions of aquacultured channel catfish are increasingly relying on microbial testing for the genus *Listeria* in raw products. The goal of the present work was to determine whether *Listeria* incidence correlates with *Listeria monocytogenes* incidence on catfish fillets. A secondary objective was to compare two different methods (biochemical based vs. fatty acid based) for their ability to identify *L. monocytogenes*. One hundred channel catfish fillets were obtained from a commercial processing facility and 100 fillets were obtained from 4 local retail facilities. The incidence of *Listeria* species (ELISA method) and *Listeria monocytogenes* (ELISA plus either a biochemical screen or gas chromatography-fatty acid methyl ester (GC-FAME) analysis) was determined on each fillet. Although the ELISA-Biochemical method had more false positives (5%) *L monocytogenes* identifications than the ELISA-GC-FAME method (0%), both methods gave similar incidence levels, 42.5 and 37.5%, respectively. The incidence of *Listeria* and *L. monocytogenes* on processing plant fillets (58% and 2%) was lower than on retail fillets (91% and 73%). Genus testing for *Listeria* was not a reliable indicator for the presence of *L. monocytogenes* on processing plant sourced fillets.

INTRODUCTION

Revenue from catfish production is very important to the economic health of the United States Deep South. Four states (Alabama, Arkansas, Louisiana, and Mississippi) account for 95% of the catfish production in the US, with Mississippi alone accounting for 70% of this production. One of the challenges to catfish processors is the presence of the bacterium *Listeria monocytogenes* on finished raw product. Food service and retail buyers are increasingly demanding raw catfish products with lower contamination levels, of pathogens including *L. monocytogenes*. Of the several available processing interventions that may control *L. monocytogenes* on catfish, none are in widespread use *(2, 8, 9, 11, 16)*. Because *L. monocytogenes* is widespread in nature, it can be brought into the processing plant in and on fish *(3, 6, 13, 15, 17, 18)*. Buyer demand is for *L. monocytogenes*-free raw catfish, even though catfish consumption has not been associated with human listeriosis outbreaks.

Because raw catfish has a short shelf life, processors rely on rapid test kits for detection of the genus *Listeria*. Process management and purchasing decisions are based on the results of these presence/

A peer-reviewed article

*Author for correspondence: 662.325.8722; Fax: 662.325.8728
E-mail: microman@ra.msstate.edu

absence genus-specific analyses. However, there remains the important question of whether the presence of the genus *Listeria* correlates with the presence of *L. monocytogenes*. The one-week traditional *Listeria* species identification method is too time consuming for use by food companies supplying a fresh commodity, hence the reliance on more rapid *Listeria* genus testing. Methods have been developed to more rapidly detect *L. monocytogenes* in seafoods (*4*).

The goal of the present work was two-fold. First, because of the reliance on genus testing, we were interested in whether *Listeria* incidence correlated with *L. monocytogenes* incidence on catfish fillets. To test this question we looked at both genus and species incidence levels in fillets obtained from a processing plant and retail stores. A secondary objective of this study was to compare biochemical-based and fatty acid-based methods with regard to their ability to identify *L. monocytogenes*.

MATERIALS AND METHODS

Catfish source

Process line aquacultured channel catfish (*Ictalurus punctatus*) fillets from a regional commercial processor and fillets from four local retail outlets were examined. Twenty fillets were randomly obtained from the processing facility on 5 separate occasions over the course of 3 months, for a total of 100 fillets. An additional 100 channel catfish fillets were randomly selected from 4 local retail facilities over the same time period. The average weight of the fillets was approximately 110 g. All fillets were transported (< 30 minutes) to the laboratory in sterile bags packed in ice and were analyzed on the day of collection

Detection of *Listeria*

Twenty-five grams were aseptically excised from the middle of each fillet and added to 100 ml Buffered *Listeria* Enrichment Broth (TECRA International Pty Ltd, French Forest, New South Wales, Australia), which was then homogenized for 2 min in a stomacher and incubated for 24 to 26 hours at 35°C (*1, 10, 14*). ELISA-based kits (TECRA Unique Listeria) that detect the genus *Listeria* were used to test the enrichment broths according to manufacturer's directions.

Detection of *L. monocytogenes*

Incubated enrichment broths were spread plated on Modified Oxford Agar plates (BD Diagnostic Systems, Sparks, MD, USA), which were incubated at 35°C for 24 to 48 hours. After incubation, one black colony from each plate was transferred to a Trypticase Soy Broth (BD Diagnostic Systems) tube, which was incubated at 35°C for 24 hours. After incubation, each broth tube was streaked onto 3 Trypticase Soy Agar (BD Diagnostic Systems) plates, using sterile cotton swabs, and the plates were incubated for 48 hours at 28°C. Confluent bacterial growth from the 3 plates were combined (approximately 40 mg), and subjected to gas chromatography – fatty acid methyl ester (GC–FAME) analysis and biochemical reaction analysis for *L. monocytogenes* identification.

For GC–FAME analysis, all chemicals were HPLC grade and sourced from Sigma Chemical Co. (St. Louis, MO, USA). The 40 mg of bacterial growth was resuspended by vortexing in 1 ml of a saponification solution consisting of 45 g of NaOH, 150 ml of methanol, and 150 ml of deionized distilled water. Suspensions were transferred into test tubes with Teflon-lined caps, which were heated in a boiling water bath for 5 minutes, at which time the tubes were vigorously vortexed for 5 to 10 seconds and returned to the water bath for 25 minutes additional heating. Tubes were cooled in cold tap water and uncapped; 2 ml of methylation solution, consisting of 325 ml of 6 N HCl and 275 ml of methanol, was added. After recapping, the tubes were heated for 10 minutes at 80°C and cooled rapidly. Addition of 1.25 ml of extraction solution (consisting of 200 ml of hexane and 200 ml of methyl-tert butyl ether) to the cooled tubes was followed by recapping and gentle tumbling on a clinical rotator for 10 minutes. The tubes were uncapped and the aqueous (lower) phase was pipetted out and discarded. Three ml of base washing solution consisting of 10.8 g of NaOH dissolved in 900 ml of deionized distilled water was added to the organic phase remaining in the tubes. The tubes were recapped and tumbled for 5 minutes. Following uncapping, 2/3 of the organic phase was pipetted into a vial that was capped and ready for analysis. Fatty acid methyl esters (FAME) were analyzed on a Hewlett-Packard Model 6890 gas chromatograph (Wilmington, DE, USA) equipped with a split capillary injector and a flame ionization detector. Separations were obtained by use of a Hewlett Packard Ultra 2 cross-linked 5% PHME siloxane column (25 m × 0.2 mm × 0.33 µm-film thickness). Temperature program was ramped from 170°C to 270°C at 5°C per minute, hydrogen was used as carrier gas, and flow rate was 30 ml/minute. MIDI Sherlock Microbial Identification System (MIDI Inc., Newark, DE, USA) was used for analyzing fatty acid profiles.

Select biochemical reactions of the isolates were measured using API Listeria test kits (bioMérieux, Hazelwood, MO, USA). Growth from the TSA plates was used to inoculate the kits, following manufacturer's directions. Results from these reactions were used for *Listeria* species identification. Hemolytic activity of each isolate was determined on blood agar (BD Diagnostic Systems) plates incubated for 24 hours at 35°C.

Statistical analysis

All data were subjected to frequency analysis using the chi square test (PROC FREQ) of the Statistical Analysis System (SAS STAT User's Guide, Version 6, 4th ed., Vol. 2, SAS Institute, Inc., Cary, NC, USA).

RESULTS AND DISCUSSION

There was a significant difference ($P < 0.05$) in the incidence of *Listeria* species on processing plant fillets compared to retail fillets as measured by TECRA (Fig. 1). Fifty-eight percent of the processing plant fillets, but 91% of the retail fillets, tested positive for *Listeria*. *Listeria* is generally not isolated from the internal meat of fish fillets except when cross contamination occurs and where preexisting bruises are present (*5*). According to Leung et al. (*12*), *Listeria* counts are higher in fish viscera, which if mishandled during removal could lead to cross-contamination of fillets. The low incidence on processing plant-origin fillets observed in the present study may be due to the fact that specimens were taken immediately after filleting, before further contamination could occur. In addition, greater postmortem age of retail fillets could contribute to growth of *Listeria* that could increase incidence (*7*). Another possibility for higher incidence on retail fillets is the increased opportunity for temperature abuse and cross contamination from the retail environment.

Across all fillets (processing plant and retail fillets results combined), no correlation ($P > 0.05$) was observed between

FIGURE 1. Incidence of *Listeria* (ELISA) and *Listeria monocytogenes* (ELISA plus GC-FAME) on processing plant and retail outlet catfish fillets

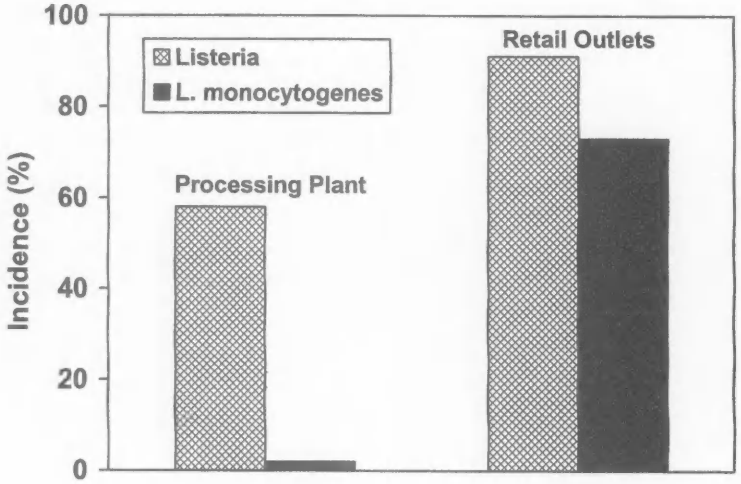
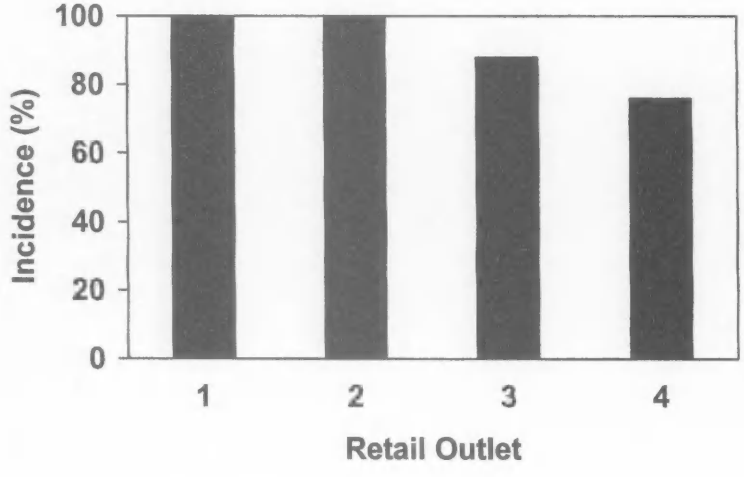


FIGURE 2. Incidence of *Listeria monocytogenes* (ELISA plus GC-FAME) on catfish fillets obtained from four retail outlets



the incidence of *Listeria* species and the incidence of *L. monocytgenes*. TECRA detected 78% *Listeria* incidence, of which API identified 42.5% as *L. monocytogenes* positive, while GC-FAME identified 37.5% as *L. monocytogenes* positive. There was good agreement between API and GC-FAME in identifying *L. monocytogenes*, although 5% of the samples that were positive for *L. monocytogenes* by API were negative by GC-FAME analysis. Conversely, there were no samples positive for *L. monocytogenes* by GC-FAME that were not also positive by API. The isolates that were positive by API but negative by GC-FAME were negative for hemolytic activity, which suggests they were not *L. monocytogenes* (5% false positives).

L. monocytogenes incidence was significantly lower ($P < 0.05$) on processing plant fillets (5% by API and 2% by GC-FAME) than on retail samples (80% by API and 73% by GC-FAME) (Fig. 1). Processing plant fillets had a lower incidence of *L. monocytogenes*, perhaps because of the lower incidence of *Listeria*. There was a significant difference ($P < 0.05$) in the incidence of *L. monocytogenes* positive samples among the 4 retail outlets (Fig 2). At stores 1 and 2, all fillets tested positive, while at stores 3 and 4, 88% and 76% of fillets respectively tested positive. These results demonstrate a uniformly high incidence of *L. monocytogenes* on retail level fillets.

The present data indicate that *L. monocytogenes* contamination was low on processing plant fillets, which suggests that the plant followed good manufacturing practices (GMPs) and had effective sanitary standard operating procedures (SSOPs). Adherence to GMPs and SSOPs should contribute to low levels and low incidence of *L. monocytogenes* on outgoing fillets. Because we did not investigate other processing plant samples, we are not certain that these results are reflective of industry norms.

CONCLUSIONS

Because there was no correlation between the presence of *Listeria* and presence of *L. monocytogenes* on either processing plant or retail level fillets, a positive *Listeria* result would not necessarily indicate the presence of *L. monocytogenes*. Therefore, it does not seem prudent to use only *Listeria* test results as a reflection of safety and for purchasing decisions. API and GC-FAME methods gave very similar *L. monocytogenes* identification results. Unlike the GC-FAME method, the API method was less time consuming, and did not require either expensive equipment or extensive training. However, the API method had a higher false positive rate. The analyst must decide whether time, convenience, and cost advantages outweigh the false positive disadvantage when choosing between the two methods. Because of the much higher *L. monocytogenes* incidence on retail fillets than on processing plant fillets, post processing handling practices appear to be critical in controlling contamination of the product.

ACKNOWLEDGMENTS

We thank Dr. Patrick Gerard for statistical help. This work was supported in part by a USDA-ARS Food Safety Cooperative Agreement No. 58-6202-5-083 and by the Mississippi Agricultural and Forestry Experiment Station under project MIS-371071. Approved for publication as Journal Article No J-10229 of the Mississippi Agricultural and Forestry Experiment Station.

REFERENCES

1. Anderson, M. E., H. E. Huff, H. D. Naumann, R. T. Marshall, J. Damare, R. Johnston, and M. Pratt. 1987. Evaluation of swab and tissue excision methods for recovering microorganisms from washed and sanitized beef carcasses. J. Food Prot. 50:741–743.
2. Bal'a, M. F. A., and D. L. Marshall. 1998. Organic acid dipping of catfish fillets: effect on color, microbial load, and *Listeria monocytogenes*. J. Food Prot. 61:1470–1474.
3. Buchanan, R. L., H. G. Stati, M. M. Benxivengo, and F. Del Corral. 1989. Comparison of lithium chloride-phenyl ethanol-moxalactam and modified Vogel Johnson sugars for detection of *Listeria* spp. in retail-level meats, poultry, and seafood. Appl. Environ. Microbiol. 55:599–603.
4. Duarte, G., M. Vaz-Velho, C. Capell, and P. Gibbs. 1999. Efficiency of four secondary enrichment protocols in differentiation and isolation of *Listeria* spp. and *Listeria monocytogenes* from smoked fish processing chains. Int. J. Food Microbiol. 52:163–168.
5. Eklund, M. W., F. T. Poysky, R. N. Paranjpye, L. C. Lashbrook, M. E. Peterson, and G. A. Pelroy. 1995. Incidence and sources of *Listeria monocytogenes* in cold-smoked fishery products and processing plants. J. Food Prot. 58:502–508.
6. Farber, J. M. 1991. *Listeria monocytogenes* in fish products. J. Food Prot. 54:456–924, 934.
7. Fernandes, C. F., G. J. Flick, and T. B. Thomas. 1998. Growth of inoculated psychrotrophic pathogens on refrigerated fillets of aquacultured rainbow trout and channel catfish. J. Food Prot. 61:313–317.
8. Kim, J., and D. L. Marshall. 2001. Effect of lactic acid on *Listeria monocytogenes* and *Edwardsiella tarda* attached to catfish skin. Food Microbiol. 18:589–596.
9. Kim. J., and D. L. Marshall. 2002. Influence of catfish skin mucus on trisodium phosphate inactivation of attached *Salmonella* Typhimurium, *Edwardsiella tarda*, and *Listeria monocytogenes*. J. Food Prot. 65:1146–1151.
10. Klinger, I., D. Basker, and B. J. Juven. 1981. Sampling for precise microbiological plate counts on broiler chicken carcasses. Poult. Sci. 60:575–578.
11. Kozempel, M. F., D. L. Marshall, E. R. Radewonuk, O. J. Scullen, N. Goldberg, and M. F. A. Bal'a. 2001. A rapid surface intervention process to kill *Listeria innocua* on catfish using cycles of vacuum and steam. J. Food Sci. 66:1012–1016.
12. Leung, C. K., Y. W. Huang, and O. C. Pancorbo. 1992. Bacterial pathogens and indicators in catfish and pond environments. J. Food Prot. 55:424–427.
13. Motes, M. L. 1991. Incidence of *Listeria* spp. in shrimp, oysters, and estuarine waters. J. Food Prot. 54:170-173.
14. Nedoluha, P. C., S. Owens, E. Russek-Cohen, and D. C. Westhoff. 2001. Effect of sampling method on the representative recovery of microorganisms from the surfaces of aquacultured finfish. J. Food Prot. 64:1515–1520.
15. Noah, C. W., J. C. Perez, N. C. Ramos, C. R. McKee, and M. V. Gipson. 1991. Detection of *Listeria* spp. in naturally contaminated seafoods using four enrichment procedures. J. Food Prot. 54:174–177.
16. Verhaegh, E. G. A., D. L. Marshall, and D. H. Oh. 1996. Effect of monolaurin and lactic acid on *Listeria monocytogenes* attached to catfish fillets. Int. J. Food Microbiol. 29: 403–410.
17. Weagant, S. D., P. N. Sado, K. G. Colburn, J. D. Torkelson, F. A. Stanley, M. H. Krane, S. C. Shields, and C. F. Thayer. 1988. The incidence of *Listeria* species in frozen seafood products. J. Food Prot. 51:655–657.
18. Wong, H. C., W. L. Chao, and S. J. Lee. 1990. Incidence and characterization of *Listeria monocytogenes* in foods available in Taiwan. Appl. Environ. Microbiol. 56:3101–3104.

Food Protection Trends, Vol. 25, No. 6, Pages 442–449
nternational Association for Food Protection
6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2864

Evaluation of Thermometers for Measuring the Cooking Temperature of Meat

DENYSE I. LEBLANC,[1]* BERNADETTE GOGUEN,[1] RÉJEANNE DALLAIRE,[2] MARY TAYLOR,[3] DAN RYAN,[4] and MARK KLASSEN[5]

[1]Agriculture and Agri-Food Canada, Université de Moncton, Moncton, New Brunswick, Canada E1A 3E9; [2]École des sciences des aliments, de nutrition et d'études familiales, Université de Moncton, Moncton, New Brunswick, Canada E1A 3E9; [3]Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Centre, Kentville, Nova Scotia, Canada B4N 1J5; [4]Department of Mathematics and Statistics, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada C1A 4P3; [5]Beef Information Centre, 215 – 6715 8th NE, Calgary, Alberta, Canada T2E 7H7

SUMMARY

Six models of fork thermometers / indicators and six models of digital instant-read probe-style thermometers, available to consumers in Canadian department stores, were evaluated to determine their accuracy in measuring a safe end-point temperature when cooking meat. The study found that both fork and probe-style thermometers are accurate in estimating the cooking temperature of meat, as long as they are properly used.

Fork thermometers that show a doneness level rather than a digital temperature may lead consumers to overcook the meat to ensure that the required temperature has been reached. Also, the temperature range associated with each doneness level varies considerably from one model to another and does not always match the recommended temperatures generally associated with each doneness level. This can lead to confusion. Finally, some models of fork thermometers cannot be easily stored, as their tines are too long or too large, or the device is too long, or the handle is too large.

Digital probe thermometers are suitable for all foods and are easy to read. Because the probe is smaller than the fork thermometer tines, the response time of digital probe-style thermometers is shorter and the temperature readings are more accurate. The fact that they are shorter than the fork thermometers may be a disadvantage when the temperature of meat on the barbeque grill is being measured.

INTRODUCTION

Consumers are encouraged to use food thermometers when cooking beef to be sure that a high enough temperature is achieved to ensure food safety without overcooking, which can result in a loss of palatability and consumer satisfaction. Meat thermometers are the only reliable means of determining doneness, because factors related to product age, lighting, seasonings, spices and handling make color-based methods completely unreliable *(1, 3)*. Canadian and US research has shown that thermometer use by consumers is very limited *(2, 6)*. Accordingly, the usability of thermometers, in addition to their precision and reliability, is another important factor to consider.

Several types of temperature measuring devices are readily available to consumers (instant-read bimetallic-coil dial thermometers, fork thermometers, fork indicators, digital instant-read probe-style thermometers and single use thermometers). This project was undertaken to determine which types of devices could be recommended to consumers as reliable tools for accurate measurement of safe end-point temperatures when cooking meat. The objective of this project was

A peer-reviewed article

*Author for correspondence: Phone: 506.851.3842; Fax: 506.858.4540
E-mail: LeBlancDIM@agr.gc.ca

Atlantic Food and Horticulture Research Centre Contribution No. 2292

FIGURE 1. Schematic diagram showing position of pairs (S1 and S2) of fork thermometers (F1 to F7) and digital probe thermometers (D1 to D7) in a water bath

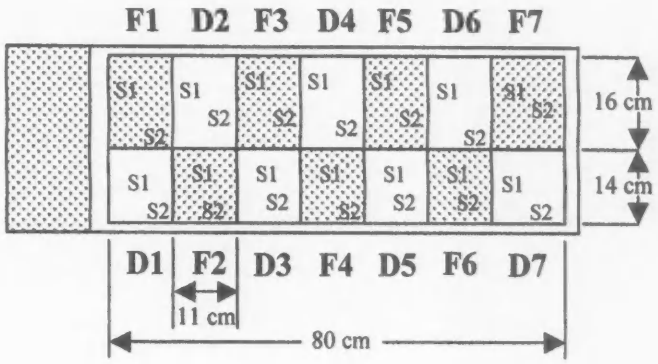
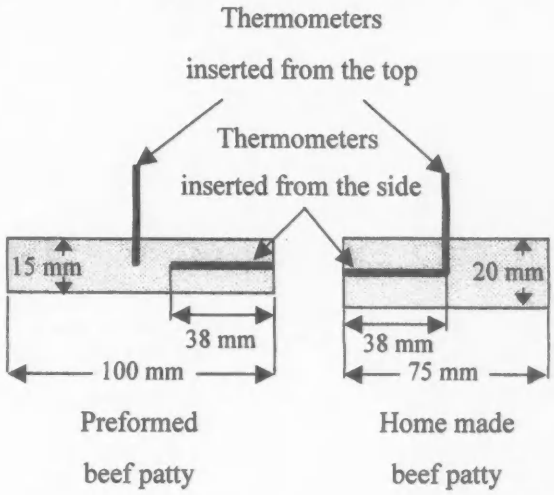


FIGURE 2. Cross section of a preformed beef patty (left) and a home made beef patty (right) comparing depth of insertion of temperature measuring devices inserted from the side versus from the top



to determine the precision, repeatability and ease of use of various temperature measuring devices. The strengths and potential limitations of each type of device were evaluated subjectively.

Bimetallic-coil dial type thermometers have been found to be inaccurate food temperature measuring devices except in foods in which the temperature is uniform (e.g., within 0.6°C or 1.1°F) along the length of the thermometer stem *(4, 5)*. This condition is not generally met for meats during cooking; therefore, these devices have not been included as part of this evaluation. The results presented herein are limited to the evaluation of fork thermometers or indicators and digital instant-read probe thermometers. The evaluation of single use thermometers is the subject of a subsequent research note.

MATERIALS AND METHODS

Six units per model of six models of fork thermometers / indicators and six models of digital instant-read probe-style thermometers were purchased from various Canadian department stores. All six models of probe-style thermometers and two of the six models of fork thermometers indicated a digital temperature. The other four models of fork thermometers indicated a level of "doneness" (e.g., rare, medium rare, medium, medium well, well) when the product temperature reached a point pre-set by the manufacturer. The precision and repeatability of the different models were compared in three mediums: in a temperature-controlled water bath, in beef patties cooked on a grill, and in oven-cooked roasts.

Evaluation in a water bath

Taken two units at a time, all six models of both the fork and digital probe thermometers were tested at the same time in each of three replicate runs in a water bath (Model MW-1130A-1, Linderberg / Blue M, Fisher Scientific, Nepean, ON) set at either 60°C (140°F), 65°C (149°F) or 70°C (158°F). In addition, two pairs of type-T thermocouples (Model Hyp2-21-1 1/2-T-G-48-SMP-M, Omega Engineering Inc., Stamford, CT, USA) were included in each test to provide a reference water bath temperature. Hardware cloth (pliable metal mesh with openings of 10 mm × 10 mm) was fastened to the top of the water bath to support the devices in a vertical position. The cloth was divided into 14 sections as illustrated in Fig. 1. Each section had two positions (S1 and S2) to accommodate the two units of each model. Six pairs of fork thermometers / indicators (two units of each model) along with one pair of the reference thermocouples were randomly assigned to the sections labeled F1 to F7 (Fig. 1). The six pairs of digital probe thermometers (two units of each model) and the other pair of reference thermocouples were randomly assigned to the sections labeled D1 to D7 (Fig. 1). The forks and digital probe thermometers were inserted through the holes of the hardware cloth into the water so that at least 2.5 cm to 5 cm of the tine or probe was immersed in the water.

The water bath was preheated to the required temperature for each test, before the 14 pairs of temperature measuring devices were placed in their assigned position. The temperature of the water bath was recorded with two thermocouples connected to a data logger (Doric Digitrend 235, Intertechnology Inc., Don Mills, ON). After the water bath temperature was stable for a period of at least 5 minutes, the temperature or doneness shown on each fork or digital probe thermometer was noted. In addition, the temperature on the handheld thermocouple reader (Model HH21, Omega Engineering Inc, Stamford, CT, USA), to which the reference thermocouples were connected, was also noted. It could take 10 to 15 minutes to properly insert all temperature measuring devices in the water bath and to wait for the water bath temperature to stabilize afterwards. Therefore, some forks and probe thermometers may have been in the water bath for 10 to 15 minutes by

FIGURE 3. Three beef patties on a grill. A reference thermocouple is inserted in the two patties that have already been flipped

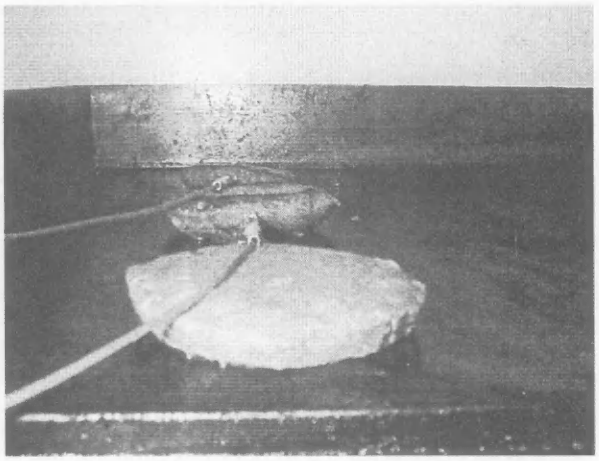
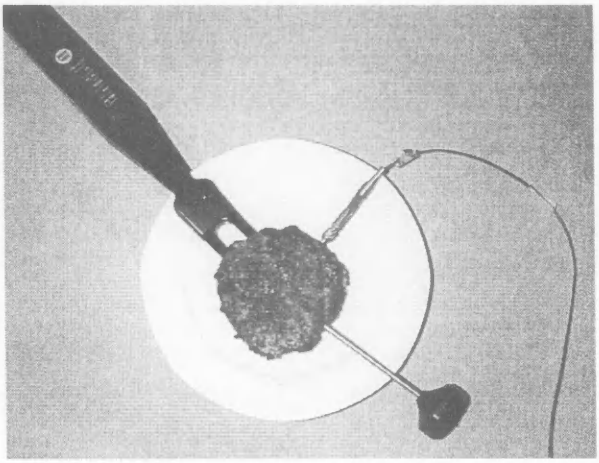


FIGURE 4. Positioning of temperature measuring devices in beef patty after cooking



the time the temperature or doneness shown on their indicator was read.

Based on the evaluation done with the devices in the water bath, the four models of fork thermometers / indicators and four models of digital probe thermometers found to be the most accurate or reliable were selected for further testing in the beef patties and the roasts.

Evaluation in hamburger patties

Preliminary tests were conducted to determine the most reliable method for measuring the temperature of the cold spot in beef patties (i.e., the geometric center of the patty). The temperatures obtained with a thermometer inserted from the side and a thermometer inserted from the top were compared to temperatures obtained with a thermocouple inserted from the side (Fig. 2). These preliminary tests were conducted with preformed beef patties (weighing 113.6 g and measuring 100 mm diameter × 15 mm thick) as well as with homemade beef patties (weighing 113.6 g and measuring 75 mm diameter × 20 mm thick) to determine if the thicker burgers allowed more accurate temperature measurements.

These preliminary tests were conducted with fork thermometers / indicators, digital probe thermometers and thermocouples. An accurate temperature reading could not be obtained during any of the tests in which the device was inserted from the top of the patties. Temperature readings obtained by inserting the devices vertically in the patty were at least 10°C (18°F) below those readings obtained with a thermocouple inserted from the side. When the thermometer was inserted from the top, the depth of insertion was much less than ten times the diameter of the probe or of the fork tine; therefore, heat was conducted along the probe or tine, resulting in an error in the temperature measurement. As a result of these preliminary tests, all experiments were conducted with the temperature measuring devices inserted sideways into the beef patties.

The following protocol was used for cooking the preformed beef patties. Beef patties were placed on a grill (Garland Canada) preheated to 177°C (350°F). The patties were flipped after 5 minutes and a thermocouple was inserted from the side into the center of the patty (Fig. 3) to provide a reference temperature for comparison. The patty was considered cooked when the temperature recorded with this thermocouple reached 71°C.

Sixteen batches of nine beef patties were cooked. When each beef patty reached a center temperature of 71°C (160°F), it was removed from the grill and placed on a clean plate, to make it easier to insert the thermometers without burning ourselves. The reference thermocouple inserted during cooking remained in the patty. Two units of each of nine devices (four fork models, four digital probe models and one thermocouple) were randomly assigned to one of the burgers in each batch. The two temperature measuring devices were inserted into the side of the patty (Fig. 4) in the order specified in the experimental plan. Once the first device inserted in the patty had equilibrated to the temperature of the patty, the temperature or doneness shown on both devices and the reference thermocouple were noted. Generally, the temperature of the patty was recorded within 30 to 45 s of its removal from the grill. Because six units of each of the nine devices were being tested, each unit was used five or six times to measure the temperature of beef patties.

Because of the variability in cooking time of the individual beef patties, the removal of the patty from the grill once it had reached 71°C (160°F) ensured that the thermometers were measuring patties of similar temperature. The temperature read with each temperature measuring

TABLE 1. Mean temperature difference between the temperature measuring devices and the water bath temperature

Model no.	Device type	Mean temperature difference[a]	Standard deviation
F006	Fork	-1.7°C (-3.1°F)[a]	2.01°C (3.62°F)
F002	Fork	-0.1°C (-0.2°F)[b]	0.91°C (1.64°F)
D006	Probe	0.4°C (0.7°F)[c]	0.44°C (0.79°F)
D004	Probe	0.8°C (1.4°F)[d]	0.31°C (0.56°F)
D002	Probe	0.8°C (1.4°F)[de]	0.50°C (0.90°F)
D001	Probe	0.9°C (1.6°F)[de]	0.17°C (0.31°F)
D003	Probe	1.0°C (1.8°F)[e]	0.26°C (0.47°F)
D005	Probe	1.9°C (3.4°F)[f]	0.23°C (0.41°F)
	Thermocouple	0.3°C (0.5°F)[bc]	0.46°C (0.83°F)

Note: [a]Means with a same letter are not significantly different ($P > 0.05$)

TABLE 2. Accuracy of the doneness[a] response for fork thermometers tested in a water bath

	Number of responses			
Model number	Showing correct doneness[a]	Overestimating temperature	Underestimating temperature	Not responding
F005	18	0	0	0
F001	15	0	3	0
F003	10	0	8	0
F004	9	5	1	3

Note: [a]Doneness = Indication displayed on fork thermometers (e.g., rare, medium rare, medium, medium well, well) when product temperature reaches a point pre-set by manufacturer

device was compared to the temperature read with the reference thermocouple at the same moment. The temperature difference between the temperature measuring devices and the reference thermocouples was statistically analyzed.

Evaluation in roasts

Cylindrical-shaped roasts weighing on average 2.5 kg and measuring approximately 14 cm in diameter and 19 cm in length were placed lengthwise on a cooking rack in individual roasting pans. A type-T thermocouple (Model Hyp3-16-1 1/2-T-G-48-SMP-M, Omega Engineering Inc., Stamford, CT, USA) was inserted vertically from the top into the geometric center of each roast. Water to a depth of approximately 1 cm was added to each roasting pan. Each roast was placed uncovered in a preheated 260°C (500°F) oven for 30 minutes, after which time the temperature of the oven was reduced to 140°C (275°F). The roast was left in the oven until the thermocouple located in the center of the roast indicated 68°C (155°F). A total of five roasts were cooked.

After roasts were removed from the oven, three temperature-measuring devices (i.e. a fork, a thermocouple and a digital probe thermometer) were inserted to a depth of 3 cm, along one of the four measuring axes of the roast (Fig. 5). The temperature or doneness indicated on each device was noted before the devices were removed from the roast, at which time the next three measuring devices were inserted into the roast along one of the remaining three axes. This process continued until the temperature had been measured along all four axes, and all models and units had been tested.

Although the temperatures measured with the different devices were not measured at the center of the roast, they were all measured at the same depth. Therefore, we can assume that the temperature of the meat was comparable for each group of devices tested together.

RESULTS AND DISCUSSION

Comparison of the temperature-measuring devices in a water bath

To compare the accuracy of the different models of forks and digital probe thermometers in the water bath, the temperature differences between the readings

TABLE 3. Accuracy of the doneness[c] response for fork thermometers, and mean temperature difference between each temperature measuring device model and the reference thermocouple probes, in beef patties

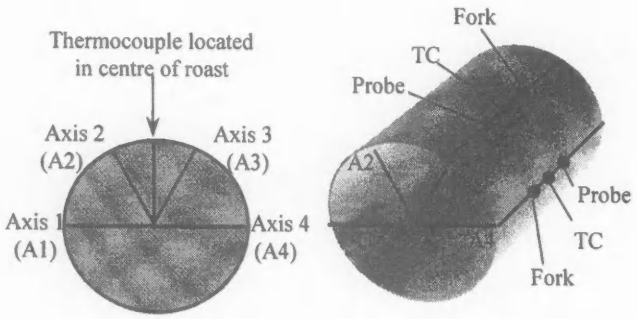
Model number	Device type	Number of responses: Showing correct doneness[a]	Overestimating temperature	Underestimating temperature	Mean temperature difference[b]
F001[c]	Fork	10	0	18	-10.5°C (-18.9°F)[a]
F003[c]	Fork	17	0	11	-8.5°C (-15.3°F)[ab]
F005[c]	Fork	5	5	18	-6.3°C (-11.3°F)[bd]
F002	Fork				-2.5°C (-4.5°F)[cf]
D001	Probe				-4.8°C (-8.6°F)[de]
D004	Probe				-4.4°C (-7.9°F)[def]
D006	Probe				-3.6°C (-6.5°F)[ce]
D002	Probe				-1.9°C (-3.4°F)[c]
S.E. (n = 224, DF = 91)					0.86°C (1.55°F)

Note: [a]Doneness = Indication displayed on fork thermometers (e.g., rare, medium rare, medium, medium well, well) when product temperature reaches a point pre-set by manufacturer

[b]Means with a same letter are not significantly different ($P > 0.05$)

[c]The mean for this device was calculated with the lowest temperature of the range for each doneness level

FIGURE 5. Diagram showing the position of the temperature measuring devices in a roast: left – cross section showing the axes where devices were positioned; right – perspective view showing position of devices along the length of the roast



on the devices and the set point of the water bath were compared.

The mean temperature difference obtained for all devices indicating a temperature is presented in Table 1. All devices indicating a temperature were measuring within ± 2°C (± 3.6°F) of the set point of the water bath. The fork thermometers were indicating a lower temperature than the digital probe thermometers. The variability of the digital probe thermometers (as indicated by the standard deviation in Table 1) was similar to the variability of the reference thermocouples, while the variability of the fork thermometers was larger.

The accuracy of the doneness reading shown on the four models of fork thermometers that did not indicate a temperature varied considerably (Table 2). Only fork model F005 gave an accurate reading for all of its units at all three water bath set points. The doneness indicated with the other fork thermometers may have varied more because the set points of the water bath fell between adjacent ranges of doneness. For example, the 60°C and 65°C water bath temperatures were borderline temperatures for three adjacent doneness ranges of fork models F001 and F003: Medium was from 54.6°C to 59.5°C; Medium-Well was from 59.6°C to 64.5°C, and Well was from 64.5°C to 79°C.

When a particular doneness is displayed on a fork thermometer, it is not known whether the temperature has reached the bottom, middle or top of the temperature range. We can only be certain that the lowest temperature of the indicated doneness range has been reached; we cannot know if a specific temperature (e.g., 71°C / 160°F for beef patties) has been reached, especially when that temperature is in the middle of the doneness range (e.g., Medium-Well on fork model F005 is for temperatures between 67.8°C / 154°F and 73.3°C / 164°F).

Based on the evaluation done with use of the water bath, four models of fork thermometers / indicators and four models of digital probe thermometers were selected for further testing in beef patties and roasts. The two fork thermometers

TABLE 4. Accuracy of the doneness[a] response for fork thermometers, in roasts, and mean temperature of roasts measured with each model of temperature measuring device

Model number	Device type	Number of responses: Showing correct doneness[a]	Overestimating temperature	Underestimating temperature	Mean temperature[b]
F001[c]	Fork	4	0	1	61.4°C (142.5°F)[a]
F003[c]	Fork	5	0	0	64.6°C (148.3°F)[ac]
F005[c]	Fork	3	0	2	65.3°C (149.5°F)[ac]
F002	Fork				66.5°C (151.7°F)[bc]
D001	Probe				66.2°C (151.2°F)[bc]
D002	Probe				67.6°C (153.7°F)[bc]
D006	Probe				68.2°C (154.8°F)[bcd]
D004	Probe				69.5°C (157.1°F)[bd]
Thermocouple					70.9°C (159.6°F)[d]
S.E. for forks and probes (n = 60, DF = 32)					1.50°C (2.70°F)
S.E. for thermocouples (n = 60, DF = 32)					0.92°C (1.66°F)

Note:[a]Doneness = Indication displayed on fork thermometers (e.g., rare, medium rare, medium, medium well, well) when product temperature reaches a point pre-set by manufacturer

[b]Means with a same letter are not significantly different ($P > 0.05$)

[c]The mean for this device was calculated with the lowest temperature of the range for each doneness level

that were eliminated following the water bath test were models F004 and F006, both of which had a defective unit. The F004 model had one unit that did not work at all and one unit that stayed on all the time and gave a constant reading of Rare. The F006 model had one unit that would not give any reading at all. The two digital probe thermometers that were eliminated were those that gave the largest mean temperature differences compared to the water bath temperature, e.g., models D005 and D003.

Comparison of the temperature-measuring devices in beef patties

The mean temperature differences between each model of temperature-measuring devices and the reference thermocouples are presented in Table 3. To compare the response of fork thermometers that showed doneness only, the doneness reading was converted to the lowest temperature of the range shown. For example, "Well" shown on fork model F001 was converted to 64.5°C (148.1°F), since "Well" represents a temperature range between 64.5°C (148.1°F) and 79.0°C (174.2°F). The individual models of fork thermometers underestimated the temperature of the beef patties by 3°C (5.4°F) to 11°C (19.8°F), on average, while the digital probe thermometers underestimated the temperature by 2°C (3.6°F) to 5°C (9°F). The large deviation found with the fork thermometers seems to be the result of the doneness method for estimating cooking temperatures.

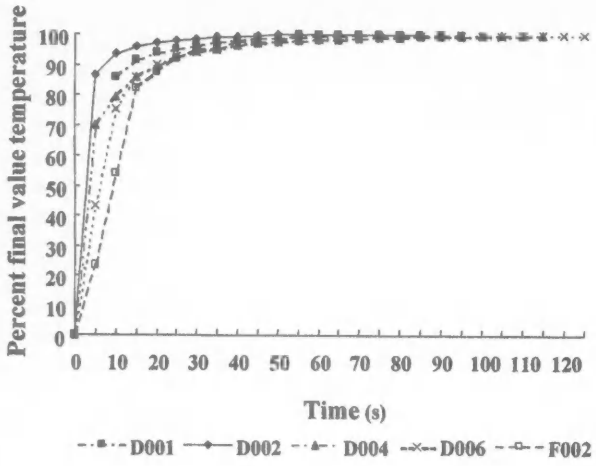
The three fork thermometers that underestimated the temperatures of the beef patties the most were models that did not show a temperature but only a doneness value (models F001, F003 and F005). Of these three fork thermometer models, F003 showed the largest proportion of correct doneness. When the incorrect doneness was displayed on models F001 and F003, the temperature was always being underestimated; therefore, the use of these models would generally result in slightly overcooked meat. Although model F005 underestimated the temperature of beef patties approximately 60% of the time, it overestimated the temperature approximately 20% of the time. This overestimation could result in meat patties not reaching a high enough temperature to ensure food safety.

The temperature measured with the fork model F002 is similar to three of the four digital probe thermometers tested (models D004, D006 and D002). Model F002 is the only fork thermometer tested in beef patties that gave a digital temperature reading rather than a doneness value.

Comparison of the temperature-measuring devices in roasts

As shown in Table 4, the individual models of fork thermometers underestimated the temperature of the roasts by 4°C (7.2°F) to 10°C (18°F), on average, while the digital probe thermometers underestimated the temperature by 1°C (1.8°F) to 5°C (9°F). The three fork thermometers that underestimated temperature the most were models that did not show a temperature but only a doneness value (F001, F003 and F005). The larger difference between these fork thermometers and the reference thermocouple is probably the result of the conversion of the doneness to a temperature by use of the lowest temperature of the doneness range. However, model F003 indicated the correct doneness every time it was used, whereas models F001 and F005 indicated an incorrect doneness on one and two occasions, respectively. Whenever an incorrect doneness was displayed, it always underestimated the temperature of the meat. Therefore, the meat could be slightly

FIGURE 6. Comparison of the response time of various temperature measuring devices inserted to a depth of 3 cm in a cooked roast



overcooked when these models were used. The accuracy of the doneness response is quite different when roasts rather than beef patties are tested.

The temperature read with fork model F002 is similar to that read with all four digital probe thermometers tested, and F002 is the only fork model that indicates a temperature reading rather than a doneness value. Only two of the digital probe thermometers (D004 and D006) gave mean temperature values that were not significantly different from the temperature of the reference thermocouples.

The mean temperature difference between each temperature measuring device and the reference thermocouple is similar in the roasts and in the hamburger patties. The smaller differences between the temperatures measured with the fork and digital probe thermometers and those measured with the reference thermocouples in the water bath are probably due in part to the response time of the different device models. The devices were in the beef patties and roasts for 30 to 45 seconds before the temperatures shown on the device were noted. However, the devices were in the water bath for close to 15 minutes before the temperature was recorded. The temperature shown on the display of the devices increases very rapidly in the first 5 to 10 seconds but then takes much longer to stabilize to the actual temperature of the medium being measured. In the water bath, the stabilization of the temperature shown on the display had plenty of time to occur.

Consumers will probably be noting the temperature within 10 to 15 seconds after having inserted the temperature measuring device in hamburgers or roasts. However, based on the results of this evaluation, most temperature measuring devices available to consumers will be underestimating the temperature and consumers will probably be slightly overcooking their meat.

By plotting the percent of final value temperature as a function of time for all temperature measuring devices, the response time of the different models could be compared. As seen in Fig. 6, there is a slight difference in response times of the different device models. The D002 model seemed to respond the most rapidly while the F002 responded the most slowly. After 30 to 45 s in the meat, the device showed a temperature within 94 to 98% of the total temperature increase.

Based on this quick evaluation of the response time of the different temperature measuring devices, it is evident that the devices should remain in the meat for 30 to 45 s before the temperature is noted.

RECOMMENDATIONS

To obtain accurate temperature measurements with fork and digital probe thermometers, the devices must be used properly. This means:

- The thermometers must be inserted from the side in thin cuts of meat to ensure that at least 3 to 4 cm of the probe or of the fork tine are in the meat;
- The temperature must be measured within 1 min of removal from the heat, if the meat must be removed from the heat source for safety of inserting the fork or the probe;
- The thermometers must be left in the meat for at least 30 s before the temperature is read.

These instructions on the proper use of thermometers should be included on the packaging material of all fork or probe thermometers to ensure that consumers obtain accurate temperature measurements.

When meat is cooked on the grill, the time required to reach 71°C (160°F) varies significantly from patty to patty even though they may all be the same size and weight. Therefore, the temperature of each patty being cooked must be measured to make sure that all patties have reached the required temperature.

The ideal fork thermometer needs to have a digital temperature display and tines that are approximately 6 cm long and less than 0.5 cm diameter in order to be a useful tool for measuring the cooking temperature of hamburger patties as well as larger cuts of meat. The total length of the device should not exceed 30 cm. None of the fork thermometers tested met all these criteria.

To be a useful tool, digital instant-read probe style thermometers should have a probe length of at least 8 cm and a diameter of less than 0.5 cm. These dimensions are required to ensure that they can easily be inserted from the side in beef patties as well as in roasts. All probes tested during this study met these conditions.

The response time of the thermometers should be as short as possible to ensure that consumers accurately measure meat temperatures. This can be achieved by designing fork or probe thermometers with small diameter tines or probes.

While safety is ensured through correct use of the digital fork and probe thermometers tested, palatability and consumer satisfaction with meat products may suffer, as overcooking is likely to occur routinely. Because of the temperature ranges selected by manufacturers for the different doneness levels, many fork thermometer models with doneness indicators do not allow the user to know when 71°C (160°F) has been reached. These models of fork indicators are therefore not recommended for beef patties.

ACKNOWLEDGMENTS

This project was funded by Canadian Beef Producers through check-off funds. Special thanks to Professor Regina Robichaud for the use of the food preparation laboratory, where all cooking tests were carried out, and to Chantal Beaulieu for the use of the water bath during the preliminary screening tests. The efforts made by John Barker to prepare the roasts for tests and the assistance of Joyce Parslow and Lisa Kennedy are gratefully acknowledged. Also, special thanks to Robert Stark and Katherine Sanford for their suggestions during the initial review of the manuscript.

REFERENCES

1. Anonymous. 2003. Color of cooked ground beef as it relates to doneness. US Department of Agriculture, Food Safety and Inspection Service, Washington, D.C. http://www.fsis.usda.gov/oa/pubs/colortech.htm. (Accessed February 1, 2005).
2. Anonymous. 2000. Thermometers are key to safety. US Department of Agriculture, Food Safety and Inspection Service, Washington, D.C. http://www.fsis.usda.gov/oa/thermy/Research.pdf. (Accessed February 1, 2005).
3. Lyon, B. G. 1998. Lighting influences the perception of cooked color of ground beef patties. US Department of Agriculture, Agricultural Research Service, Quality Assessment Research Unit, Athens, GA. http://qaru.ars.usda.gov/burgcol/. (Accessed February 1, 2005).
4. Snyder, O. P. 1996. Limitation of bimetallic-coil thermometers in monitoring food safety in retail food operations. Dairy Food Environ. Sanit. 16(5):300–304.
5. Snyder, O. P. 1999. Food temperature variations along the stem of the bimetallic-coil thermometer. Dairy Food Environ. Sanit. 19(7): 477–483.
6. Thompson Lightstone. 2001. Food Safety Study. Study carried out for the Beef Information Centre, Calgary, Alberta.

Food Protection Trends, Vol. 25, No. 6, Pages 450–454

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

The Transmission of Surrogate Norwalk Virus – From Inanimate Surfaces to Gloved Hands: Is It a Threat?

DARYL S. PAULSON*
BioScience Laboratories, Inc., 300 North Willson Ave., Bozeman, MT 59715, USA

SUMMARY

The United States Food Code requires that workers wear gloves while working with ready-to-eat foods. However, it has been observed that those wearing gloves do not always adhere to good hygienic practices (e.g., wearing gloves while counting money, petting animals, and using the bathrooms and not subsequently changing the gloves before contacting food and/or food service utensils). There has been little focus on the transfer of viruses to gloved hands. The objective of this research was to determine the amount of virus transferred from contaminated surfaces to gloved hands. Results from this exploratory work showed that a significant viral load (4 to 5 logs) was transferable.

INTRODUCTION

There is much interest in foodborne illness from both epidemiological and antimicrobial perspectives, particularly with regard to ensuring that hand sanitizers and hard surface disinfectants are antimicrobially effective against a plethora of microorganisms *(14)*. Far less research has been reported concerning modeling the food service environment to discover how foodborne illnesses might actually be transmitted. One topical antimicrobial manufacturer has conducted bacterial transmission studies that evaluated hand-to-fish-to-hand, hand-to-chicken-to-hand, hand-to-lettuce-to-hand, and hand-to-food serving utensils-to-hand contamination. Through such efforts, important information has been presented to show that bacterial foodborne illnesses can be transferred to patrons in complex ways *(8, 9)*. This paper, however, is the first in a series of studies relative to foodborne illnesses caused by viruses.

Foodborne viral illnesses are caused by the Norovirus (Norwalk-like virus), as well as Rotavirus, Astrovirus, and Hepatitis A virus *(11, 13)*. Norwalk-like viruses are the number one cause of foodborne illness, accounting for much higher incidence than that of the two highest bacterial etiologies combined (Table 1).

In the food service industry, the potential for food handlers to contaminate the foods they prepare and serve is very real and an on-going threat *(15)*. The potential exists not only for infecting fellow workers but also for infecting patrons who eat food prepared or served by a virus-infected food staff member. Notorious contemporary examples are the highly publicized cruise ship Norovirus outbreaks *(2, 7)* (Table 2).

Although Rotaviruses are the most common cause of gastrointestinal infection of young children, by far the most common gastrointestinal foodborne infection in adults is caused by the Norwalk group of viruses *(11)*. In the United States, roughly one-third of all cases of gastroenteritis not involving children 2 to 6 years old are caused by Norwalk-like viruses *(4)*.

Norwalk viruses first came to recognition in the popular press as the result of a 1968 gastroenteritis outbreak at a school in Norwalk, Ohio *(11)*. Since that time, many similar outbreaks have been identified as Norovirus-initiated, including one in 1982 involving the transfer of

A peer-reviewed article

*Author for correspondence: Phone: 406.587.5735; Fax: 406.586.7930
E-mail: biosci@biosciencelabs.com

TABLE 1. Estimated foodborne illness and hospitalization per year in the United States: virus vs. bacterial infection

Viral Pathogen	Illnesses	Hospitalizations
Norwalk-like viruses	9,200,000	20,000
Rotavirus	39,000	500
Astrovirus	39,000	125
Hepatitis A Virus	4,170	90
Bacterial Pathogen	**Illnesses**	**Hospitalizations**
Campylobacter spp.	1,963,141	10,539
Salmonella (non-typhoid)	1,341,873	15,608

TABLE 2. Reported cruise ship Norovirus outbreaks

Year	Number of Vessels	Number of Outbreaks**
1994	1	1
1996	2	2
1997	2	4
1998	3	5
1999	1	5
2000	2	4
2001	4	4
2002	11	13
2003	14	18
2004	11	13**

*Cases still pending as of 09/20/2004

**Outbreak is defined as a cumulative percentage of reportable cases of gastrointestinal illness of ≥ 3 percent in either passenger or crew populations. A reportable case is 3 or more episodes of diarrhea in 24 hours or vomiting and one or more additional symptom (e.g., diarrhea, abdominal cramps, headache, muscle ache, or fever) in a 24-hour period, that are unrelated to a pre-existing medical condition.

virus from an infected baker to 3,000 patrons *(7)*. The Norwalk virus, a member of the Calicivirus family, is a single molecule of positive-sense, single-strand RNA with many copies of a single capsid protein. A great many strains of Norwalk virus exist, as well as at least two genogroups; they are collectively known as Norwalk-like viruses or Noroviruses *(7)*. The virus is human-specific and, to date, no in-vitro cell culture or animal model has been discovered that enables researchers to culture it.

Enteric virus, including the Noro-viruses, are shed in the feces and vomitus of infected individuals. An infected individual may exhibit symptoms of infection (e.g., fever, vomiting, nausea, diarrhea) or be asymptomatic. This state of asymptomatic infection can greatly enhance the spread of infection, because infected individuals do not even realize that they have a highly contagious illness from which they might wish to protect others. If foodhandlers contaminate their hands with their infected feces and then handle food or utensils with their hands, they can transmit the virus to consumers. Furthermore, such individuals may transmit infectious viruses onto foods and food utensils that are handled subsequently by other food workers who then may also infect consumers (Fig. 1). Shedding of Norovirus can occur for up to ten days after symptoms subside, and possibly longer *(12)*.

STUDY PURPOSE

The current food code requires foodhandlers to wear gloves when in direct contact with ready-to-eat food *(3)*. This assumes that gloves prevent transmission of foodborne pathogens acquired by fecal contamination of food servers' hands. But just how easy is it to "pick up" viruses directly onto the gloves from external sources? A simulation study was designed to determine to what extent virus would be transferred to vinyl foodhandler gloves worn by study participants from viral-seeded stainless steel surfaces, from fomites such as spatulas, forks, cutting boards, and door knobs, and from lettuce.

Over the course of one year, the author observed foodhandlers in the California cities of San Diego, Los Angeles, San Francisco, Barstow, and Berkeley. Other cities in which observations were made included Minneapolis and Rochester, Minnesota; Chicago, Illinois; New Orleans, Louisiana; Provo and Salt Lake City, Utah; Denver, Colorado; Las Vegas and Reno, Nevada; Washington, D.C.; Bozeman, Great Falls, and Billings, Montana; Sheridan, Wyoming; Idaho Falls and Twin Falls, Idaho; Minot, North Dakota; and Seattle, Washington. The observations were conducted in fast food restaurants, where candid observations are much more easily conducted than in up-scale restaurants. The vast majority of employees observed were young, approximately 18 to 25 years of age. Candid observations revealed gloved, food-handling employees counting change without washing their hands afterward and picking their noses or coughing into their gloved hands and then handling food. Several instances were observed in which male employees urinated and/or defecated while wearing foodhandler gloves, after which they returned to work without washing their hands or changing their gloves. Also, several gloved food handlers were noted taking an outdoor smoke break and petting dogs, and then returning to work without changing their gloves or washing their hands. These observations are not presented to condemn food service person-

FIGURE 1. Food Handler Transmission of Foodborne Illness

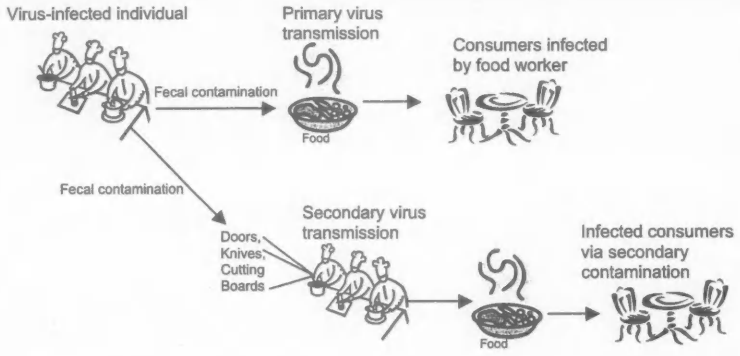


TABLE 3. Surface types and sampling methods

Standard Sampling Method	Alternate Sampling Method
Stainless Steel Coupon	Metal Fork
Spatula	Plastic Cutting Board
Lettuce*	Door Knob

*Approximately 2cm^2 piece placed directly into sampling solution

nel, but simply to point out that these practices occur and are perhaps not rare.

In the majority of the facilities visited, signs instructing employees to wash their hands and change their gloves were visible but were plainly unheeded by some. Our research question was, therefore, how easily are viruses transmitted to vinyl gloves by contaminated lettuce and utensils, and in what number?

MATERIALS/METHODS

Virus preparation

A surrogate Norwalk virus, Feline Calicivirus, Strain F9 (ATCC #VR-782) was used to simulate Norwalk virus contamination. Feline Calicivirus has physiochemical properties and a genome organization similar to those of the Norwalk-like viruses *(10)*. The virus was obtained from the American Type Culture Collection (ATCC) library and was propagated in Crandall's Feline Kidney Cells (ATCC #CCL-94), pooled, concentrated by means of ultra-centrifugation, and stored at ≤-70°C until needed. This method of virus concentration was chosen because of the ease with which the procedure yields high titer stock. However, the method can allow the formation of viral aggregates, which are known to react to disinfectants differently than do free virus. Upon data analysis, the standard deviations for baseline recoveries (Table 4) indicated that viral aggregates substantial enough to cause data skew did not form. Therefore, we conclude that this method of cultivation of viral stock provided appropriate test results.

A vial of Feline Calicivirus, Strain F9 (ATCC #VR-782) containing approximately 1×10^9 plaque-forming units (PFU)/ml was thawed at room temperature for 30 to 45 minutes. To mimic fecal contamination and the natural milieu of the virus, it was suspended in an artificial soil load comprising 1 mg/ ml mucin, 2.0 mg/mL bovine serum albumin, and 1.5 mg/ml tryptone to produce a viral suspension with an approximate titer of 1×10^8 plaque-forming units (PFU)/mL *(6)*.

Surface preparation

To remove dirt, oil, and any other superficial contaminants, the utensils, stainless steel surfaces plastic cutting board surfaces, and lettuce were hand-washed (gloved hands) with bland soap for 30 seconds, using tap water to produce lather, and then rinsed under tap water for 2 minutes to remove all soap residue. The test items then were placed on clean paper toweling in a laminar flow hood until dry and exposed to ultraviolet light to sterilize the surfaces. The test items were removed aseptically from the laminar flow hood and placed on clean paper toweling *(6)*.

Baseline measurements

The utensils, stainless steel surfaces, plastic cutting board, and lettuce were inoculated with 0.01 ml of the 1×10^8 PFU/ml viral suspension. The inoculum was spread in a circle approximately 0.25 cm^2 in area and allowed to air dry. Two dry times, 5 and 15 minutes, were used in this study, after which the surfaces were sampled. For some test items, a standard sampling was performed, using a 2.0 ml cryovial containing 1.0 ml of sampling solution (a mixture of Earle's Balanced Salt Solution, antibiotics to prevent bacterial contamination, and fetal bovine serum). The vial was pressed and held firmly against the contaminated area for 10 seconds, and then inverted consecutively 20 times to harvest the virus *(6)*. If the surface of a test item did not form a tight seal with the mouth of the cryovial, sampling was performed in an alternate way, by dispensing 0.5 ml of the sampling solution onto the contaminated area and pipetting it up and down 10 times to harvest the virus. The viral suspension was then transferred back into a 2.0 ml cryovial, and the procedure repeated again with a second 0.5 ml aliquot for a final collected volume of 1.0 ml. The sampling methods employed for each surface are listed in Table 3. All baseline sample vials were capped and stored at -70°C until enumeration. The above process was repeated twice to produce three *(3)* replicates for each test item.

Transfer from surface to glove

To determine the number of viral particles picked up on gloved hands, the test items were inoculated with 0.0l ml of the 1×10^8 PFU/ml viral suspension. The inoculum was spread in a circular manner over an area of approximately 0.25 cm^2 and allowed to air dry for 5 or 15 minutes. At the end of each dry time, a gloved fingertip was pressed lightly (approximately 0.2–0.4 kg/cm^2 of pressure) onto the contaminated area for 5–10 seconds without friction or rubbing (a pressure of 1 kg/cm^2 mimics the acts of grasping objects and opening doors [5]). The mouth of a 2.0 ml cryovial containing 1.0 ml of the sampling fluid was pressed and held against the contaminated fingerpad for 10

TABLE 4. Transmission from surfaces to vinyl gloves

Surface	Time	Average Baseline Log_{10} Values ± Standard Deviation	Log_{10} Transfer Values
Spatula	5 min.	5.9 ± 0.23	5.4 ± 0.03
Spatula	15 min.	5.8 ± 0.31	5.3 ± 0.15
Lettuce	5 min.	5.9 ± 0.23	5.1 ± 0.20
Lettuce	15 min.	5.8 ± 0.31	5.3 ± 0.04
Fork	5 min.	5.9 ± 0.23	5.3 ± 0.15
Fork	15 min.	5.8 ± 0.31	5.2 ± 0.23
Cutting Board	5 min.	5.9 ± 0.23	5.3 ±0.13
Cutting Board	15 min.	5.8 ± 0.31	5.2 ± 0.09
Door Knob	5 min.	5.9 ± 0.23	4.7 ± 0.07
Door Knob	15 min.	5.8 ± 0.31	4.9 ± 0.18
Stainless Steel Coupon	5 min.	5.9 ± 0.23	5.2 ± 0.11
Stainless Steel Coupon	15 min.	5.8 ± 0.31	4.9 ± 0.13

seconds and then inverted 20 times to harvest any transferred viral particles *(6)*. The process just described was repeated twice to produce three *(3)* replicates for each test item.

Recovery assay

Standard ten-fold serial dilutions were made from each sample into Earle's Balanced Salt Solution. Confluent monolayers of the CrFk cells were grown in 12-well plates and inoculated with the appropriate dilution or control. During the adsorption (attachment of the viral particles to the cells), the inoculated plates were incubated at 37 ± 2°C with 5.0% CO_2 for approximately 1 – 2 hours. After the adsorption, the monolayers were overlayed with agarose. The plates were re-incubated at 37 ± 2°C with 5.0% CO_2 until sufficient cytopathic effect was observed microscopically. The cells were fixed with 10% Formalin and stained with crystal violet solution, for enumeration of viral plaques.

RESULTS

The numbers of viral particles transferred from the various test items to gloved hands are presented in Table 4. The average of the virus baseline log_{10} values on the test items after the 5-minute dry times was 5.9 and after the 15-minute dry-times, 5.8. The log_{10} values for post-transfer recovered from gloved hands ranged from 4.7 to 5.4 after the 5-minute dry time and from 4.9 to 5.3 after the 15-minute dry time.

DISCUSSION

Norovirus outbreaks can occur in a variety of locations (e.g., schools, hospitals, restaurants, and long-term care facilities) and involve many vessels (e.g., produce, meats, fomites, and desserts). Some work addressed the question of survival of viruses on various surfaces under different environmental conditions, and it has been determined that under certain environmental conditions, human Rotovirus can survive for a number of days *(1)*. But more research must be conducted to address the matter of viral transfer via gloved hands.

Clearly, the results of this study show that a significant number of infectious viral particles can be transferred from inanimate objects to gloved hands. Considering that as few as ten to 100 viral particles may be sufficient to cause infection *(6)*, there is clearly a significant potential for secondary transmission of Norovirus to food consumers, by foodhandlers wearing food service gloves. However, questions remain to be answered. How long can the Norovirus remain on inanimate surfaces and still be infectious; and how much virus is transferred from the gloved hands to the food.

REFERENCES

1. Abad, F. S., R. M. Pintó, and A. Bosch. 1994. Survival of enteric viruses on environmental fomites. Appl. Environ. Microbiol. 60:3704–3710.
2. Anonymous. 2004. Outbreak List, National Center for Environmental Health Vessel Sanitation Program, Center for Disease Control. Atlanta.
3. Anonymous. 2001. Food Code. US Department of Health and Human Services, Food and Drug Administration, Center for Food Safety and Applied Nutrition. Washington, D. C.
4. Anonymous. 1992. Foodborne pathogenic microorganisms and natural toxins handbook, US Food and Drug Administration, Center for Food Safety and Applied Nutrition. Washington, D. C.
5. Ansari, S. A., S. V. Springthorpe, S. A. Sattar, S. Rivard, and M. Rahman. 1991. Potential role of hands in the spread of respiratory viral infections: Studies with human parainfluenza virus 3 and rhinovirus 14. J. Clin. Microbiol. 29:2115–2119.
6. Bidawid, S., N. Malek, O. Adebuhrin, S. A. Sattar, and J. M. Taber. 2004. Norovirus cross-contamination during food handling and interrup-

tion of virus transfer by hand antisepsis: experiments with Feline Calicivirus as a surrogate. J. Food Prot. 67:103–109.
7. Cliver, D. O., and S. M. Matsui. 2002. Viruses, p. 161–175. *In* D. O. Cliver and H. R. Riemann (eds.) Foodborne Disease, 2nd Edition. Academic Press. New York.
8. Fendler, E. J., M. J. Dolan, and R. S. Williams. 2003. Handwashing and gloving for food protection: examination of the evidence, p. 271–289. *In* D. S. Paulson, (ed.). Handbook of topical antimicrobials: Industrial applications in consumer products and pharmaceuticals. Marcel Dekker, Inc. New York.
9. Fendler, E. J., M. J. Dolan, and R. A. Williams. 2003. Handwashing and gloving for food protection: Effectiveness, p. 291–301. *In* D. S. Paulson (ed.), Handbook of topical antimicrobials: industrial applications in consumer products and pharmaceuticals. Marcel Dekker, Inc. New York.
10. Gulati, B. R., P. B. Allwood, C. W. Hedberg, and S. M. Goyal. 2001. Efficacy of commonly used disinfectants for the inactivation of calicivirus on strawberry, lettuce, and food contact surfaces. J. Food Prot. 64:1430–1434.
11. Hui, Y. H., J. R. Gorhma, K. D. Marrell, and D. O. Cliver. 1994. Foodborne Disease Handbook, Vol. I and II. Marcel Dekker, Inc. New York.
12. Koopmans, M., and E. Duizer. 2003. Foodborne viruses: An emergency problem. Internat. J. Food Microbiol. 90:23–41.
13. Mead, P. S., L. Slutsker, V. Dietz, L. F. McCaig, J. S. Bresse, C. Shapiro, P. M. Griffin, and R. V. Tauxe. 1999. Food-related illness and death in the United States. Emerg. Infect. Dis. 5:607–625.
14. Paulson, D. S. 2003. Handwashing, gloving, and disease transmission by the food preparer, p. 255–269. *In* D. S. Paulson (ed.), Handbook of topical antimicrobials: industrial applications in consumer products and pharmaceuticals. Marcel Dekker, Inc. New York.
15. Paulson, D. S. (ed.). 2003. Handbook of topical antimicrobials: industrial applications in consumer products and pharmaceuticals. Marcel Dekker, Inc. New York.

Highlights of the Executive Board Meeting
April 18-19, 2005
Des Moines, Iowa

Following is an unofficial summary of actions from the Executive Board Meeting held at the IAFP office conference center on April 18-19, 2005:

Approved the following:

- Minutes of January 23-24, 2005 Executive Board Meeting
- Minutes of January 23-24, 2005 Executive Board Meeting Executive Session
- To provide funding to write a white paper on Avian Influenza
- To provide additional options for Sustaining Memberships for non-exhibiting companies, universities and governmental entities
- Budget for fiscal year ending August 31, 2006

Discussed the following:

- E-mail votes taken since the last meeting
- Committee Member appointments for 2005-2006
- Un-cited material in *JFP* article
- Awards selection process
- Adding industry sanitarians to legibility list for Sanitarian Award
- Membership Committee responsibilities
- Changes to the IAFP Bylaws
- Annual Meeting planning progress
- Exhibit and sponsorship update
- Foundation Fund Committee – investment policy and new promotional materials
- Rapid Response Series – establish a task force
- University Speaker Program – Texas A&M University report, Iowa State University scheduled for fall 2005
- Student Travel Scholarship selection process and recipients
- Mentors for the Student Travel Scholarship recipients
- Dues restructure program
- Affiliate activity
- Possible new Affiliates
- Non-compliant Affiliates
- IAFP European Symposium
- Developing Scientist Competition – full-time students only to receive Membership certificate
- Food Research Coalition update
- AAAS membership
- WHO NGO update
- Annual goal setting for IAFP and Executive Director
- Assisting ICMSF & ILSI to conduct an October workshop
- 3-A Sanitary Standards, Inc.

Reports received:

- *Food Protection Trends*
- *Journal of Food Protection*
- IAFP Web site
- Membership update
- Advertising update
- Financial statements for period ending February 28, 2005
- Board Members attending Affiliate meetings
- Affiliate Newsletter
- Future Annual Meeting schedule
- Exhibiting (IAFP On the Road)
- Future Board meeting dates

Next Executive Board meeting, August 12, 2005.

GOLD SUSTAINING MEMBER PROFILE

BIOMÉRIEUX INDUSTRY

bioMérieux is a leading global company that specializes in the field of in vitro diagnostics for medical and industrial applications. bioMérieux designs, develops, manufactures and markets systems used in clinical applications for the diagnosis of infectious diseases and other pathologies, and in industrial applications for the microbiological analysis of food, pharmaceutical, cosmetic, platelets and some tissue-based products. Today bioMérieux has more than 5,300 employees worldwide and is present in more than 130 countries.

To understand bioMérieux's commitment to the public health sector, you first need to know its unique history. Marcel Mérieux, a chemist, trained with the father of microbiology, Louis Pasteur. Combining his strengths in chemistry and microbiology, Marcel Mérieux later founded the Institute of Mérieux where various animal and human vaccines were developed. His son, Charles Mérieux became a doctor of medicine and later built on his father's foundations with joint ventures and acquisitions including api, Vitek Systems and Organon Teknika, further strengthening bioMérieux's expertise in the diagnosis of infectious diseases. The strong partnerships of engineering and microbiology and the combination of service-oriented company philosophies helped set bioMérieux apart from other diagnostic companies.

From bioMérieux's beginning in the field of infectious disease diagnostics, it was only a matter of time before the company would dedicate resources to the development of products for the improvement of food safety and food quality hereby playing a critical role in ensuring the safety of the public health. A separate division, bioMérieux INDUSTRY, was created and has been providing food processors with innovative testing solutions for more than 20 years.

The full range of bioMérieux innovation encompasses prepared media and microbiology testing systems, including the VITEK® and VITEK® 2 Compact identification systems, api® manual identification systems, VIDAS® Automated Pathogen Detection Systems, BacT/ALERT® 3D Microbial Detection System and air IDEAL® environmental air sampling system. Innovations from bioMérieux INDUSTRY provide enhanced operational efficiency and help control the cost of manufacturing as well as ensure the highest level of product safety.

bioMérieux cannot remain competitive without investing in tomorrow. A consistent 12-13% of annual revenues are re-invested to support bioMérieux's commitment to the advancement of public health and safety. Our goal is to work with top leaders in the industry in an effort to create partnerships with microbial experts, universities and our customers to ensure that our products meet the highest expectations of the market. Such efforts have seen the introduction of the FoodExpert-ID®, bioMérieux's first molecular multi-detection test specific for food and feed analysis. Further commitment to the food industry is seen in the development of the TEMPO® system, the first automated solution for microbial enumeration. Our leading-edge research continues to broaden the realm of industrial microbiological control.

bioMérieux INDUSTRY's goal is to achieve complete customer satisfaction. Part of that commitment is through our Customer Service and Customer Support Hotlines along with a team of highly skilled Client Consultants and Field Service Engineers to train and support our customers' application and use of bioMérieux products.

Over the years, we have seen our relationships grow with our customers and with leaders in the food safety community such as that with IAFP. Today, we are a Gold Member sponsor and we are proud to promote IAFP in its endeavors as it provides a format of free technical exchange between suppliers like bioMérieux, food companies, and local, state and federal agencies. It is our goal not only to supply diagnostic tools for to the food industry but also to be partners and educators in their endeavors to ensure public safety through our food supply.

For more information about bioMérieux's food safety and quality solutions, visit www.foodsafetyandquality.com or call us at 1.800.634.7656.

GOLD SUSTAINING MEMBER PROFILE

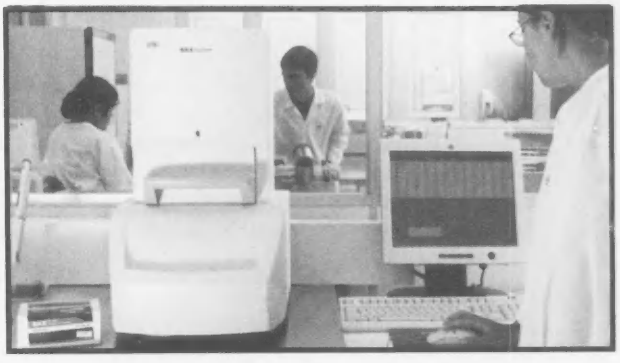
Through its commitment to providing the best science available and its heritage of DuPont innovation, DuPont Qualicon delivers practical solutions that help food, pharmaceutical and personal care companies around the world protect their products, productivity and brands. The experts at DuPont Qualicon use their vast knowledge of molecular methods and mastery of microbiology to give companies innovative diagnostic tools, such as the BAX® and RiboPrinter® systems.

DuPont Qualicon Helps Increase the Quality and Safety of Food, Pharmaceuticals and Personal Care Products

The DNA-based BAX® system is a fast, accurate way to detect bacteria in raw ingredients, finished food products and environmental samples. This award-winning product reduces false positives and minimizes re-testing. Tableted reagents, which enable minimal hands-on time using standard laboratory techniques, provide long shelf life and consistency. Optimized enrichment media shorten incubation times so that results are available more quickly. Although the automated system uses powerful polymerase chain reaction (PCR) and fluorescent detection technology, it requires no special operator skills and delivers clear, reliable "yes-no" answers without the need for expert interpretation.

The BAX® system is an AOAC Official Method℠ for detecting *Salmonella* and *Listeria monocytogenes* in food. The United States Department of Agriculture Food Safety and Inspection Service (USDA FSIS) has adopted the BAX® system to detect *Listeria monocytogenes* in the nation's meat and poultry supply, and to detect *Salmonella* in the nation's ready-to-eat meat, poultry, pasteurized eggs and raw food products. The BAX® system detection method has also received international approvals from AFNOR, NordVal, Health Canada, Brazil and Japan.

In addition to the BAX® system, DuPont Qualicon markets the patented RiboPrinter® system, the world's only automated DNA fingerprinting instrument that can be used to rapidly pinpoint sources of bacteria in pharmaceuticals, personal care products and food. Electronic linking provides microbial information and knowledge networking capabilities for public health agencies, industry, universities and research centers. This enables the sharing of "universal product codes" for organisms, making it faster and easier to help keep people safe in every corner of the world.



For more than 200 years, DuPont has been the leader in delivering science-based solutions that provide significant business value. DuPont Qualicon, a global leader in DNA-based diagnostic solutions, is part of that strong tradition. The BAX® and RiboPrinter® systems have proven to be a powerful part of the quality control and quality assurance processes for major food, pharmaceutical and personal care product companies around the world, providing them with a competitive edge today and well into the future.

For more information, visit www.qualicon.com or call 1.800.863.6842.

GOLD SUSTAINING MEMBER PROFILE

ECOLAB®

Ecolab Inc., based in St. Paul, Minnesota, is the leading global developer and marketer of premium cleaning, sanitizing, pest elimination, maintenance and repair products and services for the world's hospitality, institutional, food processing and food retail markets. Around the world, the company operates directly in 70 countries, employing more than 21,000 associates, and reaches customers in roughly 100 other countries through distributors, licensees and export operations.

Founded in 1923, Ecolab circles its customers with value-added cleaning, sanitation and service solutions through 10 complementary business units. This strategy translates directly into the company's ability to help customers achieve safer food, hygienic surfaces and clean, sanitary surroundings. Innovative solutions such as automated dispensing systems, specialized detergents and EPA-registered sanitizers combine with service excellence to provide customers with uncompromised cleanliness and operational efficiency.

Ecolab uses an integrated systems approach to food safety and brand protection issues, providing customers with intervention at multiple sites throughout the "farm to fork" continuum. Ecolab associates' expertise in agricultural production, food processing and foodservice, as well as its premium cleaning and sanitation products and programs, help reduce the risk of contamination throughout an operation and provide reliable and efficient methods for maximizing food safety and quality.

At the start of the food chain, Ecolab Food & Beverage associates provide customers with premium cleaning and sanitation products, programs and expertise in food production environments. For example, the Ecolab Livestock Disease Intervention™ (LDI) program is aimed at helping control cross-contamination within animal production facilities, between such facilities, and between production facilities and processing plants. Ecolab also provides complete udder health, hoof management and fly control programs for dairy production facilities.

Reducing pathogens and other microbial counts on food surfaces in the processing stage, meanwhile, improves the quality and shelf life of food products such as meat, poultry, seafood, fruits and vegetables. These patented food surface treatments are effective solutions for minimizing microbial contamination during processing.

Contamination at any point in a food processing operation can shut down plant operations, costing customers time and money. The Ecolab Pest Elimination Division, therefore, provides custom-designed programs to meet the individual needs of food and beverage processing plants, as well as foodservice and food retail businesses. The emphasis is on sanitation, structural concerns within a facility and preventative exclusion services in every aspect of the food production process.

Once the food supply reaches foodservice vendors, the Institutional and Kay divisions offer numerous high-quality, patented product solutions to help prevent many of the leading causes of foodborne illnesses. These include products to improve employee hygiene practices, sanitize kitchen equipment used to prepare or serve food, as well as high-performance detergents and cleansers to sanitize every surface within a facility.

In fact, Ecolab personnel hygiene programs provide comprehensive, worker-focused hygiene systems including hand cleaners and sanitizers, doorway sanitizing systems for food processors, state-of-the-art, no-touch dispensers and employee training.

The last phase of food safety and brand protection deals with a comprehensive intervention program that focuses on compliance. EcoSure℠ Advanced QA Services, an Ecolab quality assurance food safety management program, helps customers establish a routine program of self-inspection, provide comprehensive employee training and conducts periodic independent audits to help identify areas in need of improvement. It also brings Ecolab's commitment to its customers full circle.

For more information, visit www.ecolab.com or call 612.293.2364.

GOLD SUSTAINING MEMBER PROFILE

Kraft Foods is a global leader in branded foods and beverages with 2004 net revenues of more than $32 billion. Built on more than 100 years of quality and innovation, Kraft has grown from modest beginnings to become the largest food and beverage company in North America and the second largest in the world, marketing many popular brands in more than 155 countries around the globe. The Kraft brand portfolio is one of the strongest of any packaged goods company with more than fifty $100 million brands and five $1 billion brands (*Kraft* branded products, *Jacobs* coffees, *Oscar Mayer* meats, *Philadelphia* cream cheese, and *Post* cereals). Our global brands include *Kraft*, the number one cheese brand in the world, as well as our best-known brand for salad and spoonable dressings, packaged dinners, barbecue sauce, and other products, *Philadelphia*, the world's number brand of cream cheese, *Jacobs* and *Maxwell House* coffees, *Toblerone* chocolates, *Oreo* cookies, *Ritz* crackers, and *Crystal Light/Clight* and *Tang* beverages.

The history of Kraft dates back to 1903, when with $65 in capital, a rented wagon, and a horse named Paddy, J. L. Kraft started purchasing cheese at Chicago's Water Street wholesale market and reselling it to local merchants. From that first idea of selling wholesale cheese to stores, Kraft has been a company built on innovation. Through the years many people have contributed to the success of Kraft – and its numerous predecessor companies, some of which trace their heritage back to the 1700s. These contributions have resulted in numerous breakthrough ideas, such as the 1898 introduction of the *Uneeda* biscuit, which featured the first "inner-seal" packaging; the 1906 launch of *Kaffee Hag*, the first decaffeinated coffee; the 1927 introduction of *Kool Aid*, the first successful powdered soft drink; the 1950 introduction of *Kraft Deluxe*, the first commercially packaged process-cheese slices; the 1995 launch of *DiGiorno Rising Crust* pizza, revolutionizing the frozen pizza category, and the 2004 introduction of the *Tassimo* hot beverage system.

Kraft's company vision of "Helping People Around the World Eat and Live Better" captures the essence of who we are. To our more than 98,000 employees operating in 68 countries worldwide it tells what we care about and what we strive to do each and every day. This vision captures the importance of health and wellness, but it also embodies all the ways we can eat and live better, such as the enjoyment of a dessert, the convenience of a microwave meal, the safety and value of our products and the services and solutions we provide. Kraft is proud of its long association with IAFP. The goals of IAFP are consistent with Kraft's company vision and Kraft's long heritage of producing safe and wholesome food.

To learn more about Kraft please visit us at www.kraft.com.

Call for Symposia
IAFP 2006

August 13-16
Calgary, Alberta, Canada

The Program Committee invites International Association for Food Protection Members and other interested individuals to submit a symposium proposal for presentation during IAFP 2006, August 13–16, 2006 in Calgary, Alberta, Canada.

WHAT IS A SYMPOSIUM?

A symposium is an organized, 3 1/2 hour session emphasizing a central theme relating to food safety and usually consists of six 30-minute presentations by each presenter and a 30-minute break. Short symposia with three or four 30-minute presentations are also possible. Innovative approaches such as roundtable question-and-answer sessions or open format concepts will also be considered.

Symposia may include a discussion emphasizing a scientific aspect of a common food safety and quality topic, issues of general interest relating to food safety and microbiological quality, a report of recent developments, an update of state-of-the-art methodologies, or a discussion of basic and applied research in a given area. The material covered should include current work and the newest findings. Symposia will be evaluated by the Program Committee for relevance to current science and to Association Members. Proposals may be prepared by individuals, committees, or professional development groups (PDGs).

SUBMISSION INSTRUCTIONS

To submit a symposium proposal, read all information on this page, pay close attention to the "Symposia Selection Procedure" on the next page, then complete the "Symposium Proposal" on page 462. Follow all instructions for making a submission. Your suggested presenters need not be confirmed at this stage, only identified.

SYMPOSIUM PROPOSAL DEADLINE

Proposals may be sent to the Association office no later than August 5, 2005 or be presented to the Program Committee at its meeting on Sunday, August 14, 2005 in Baltimore, Maryland.

The Program Committee will review submitted symposia at the conclusion of IAFP 2005 to decide which symposia will be selected for further development. Organizers will be notified as to the status of their proposal by September 30, 2005. Accepted symposia are required to be finalized and sent to the IAFP office by February 8, 2006. The Program Committee has the final decision whether symposia will be accepted for presentation at IAFP 2006. The organizer will be notified of the final results by March 31, 2006.

PRESENTERS WHO ARE NOT MEMBERS

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

ASSOCIATION FOUNDATION SPONSORSHIP

The International Association for Food Protection Foundation has limited funds for travel sponsorship of presenters. After final acceptance of the symposium (March 2006), symposia organizers may make requests in writing to the Program Committee Chairperson. Requests are reviewed on an individual and first-come-first-served basis. The maximum funding grant will be $500 per presenter ($750 if outside North America). Organizers are welcome to seek funding from other sources and the Association will provide recognition for these groups in our program materials. Organizers are asked to inform the Association if they obtain outside funding.

SYMPOSIA SELECTION PROCEDURE:

The primary focus of the symposia selection procedure is to provide a balanced educational program for attendees of the IAFP Annual Meeting. To achieve this goal, symposia may be combined or modified by the Program Committee, as appropriate, to prevent overlap of topics among competing symposia. During this process, the top symposia proposed by groups and individuals will be selected for further development.

Guidelines for tentative acceptance:

1. Proposed symposia must be pertinent to IAFP members and PDGs. Priority will be given to symposia that address one or more of the following program areas:
   - Safety and Microbial Quality of Foods (Dairy, Meat and Poultry, Seafood, Produce, Water)
   - Viruses and Parasites, Retail Food Safety, Epidemiology and Public Health
   - Non-Microbiology Food Safety Issues (food toxicology; allergens; chemical contaminants)
   - General-Applied (advances in sanitation, lab methods, quality assurance, food safety systems)
   - General-Food Protection for the Future (risk analysis; emerging pathogens; biotechnology; predictive models, etc.)
   - Other pertinent food protection topics may be considered if space is available
2. In addition to addressing pertinent program areas, symposia accepted for further development should:
   - Be new, emerging and/or address areas not covered in last 2 years
   - If covered in last 2 years, provide new information that warrant another symposium
3. Symposium submissions must include:
   - Titles that clearly convey the topics to be covered
   - Topics that are unique to prevent overlap of basic information among speakers
   - Names of suggested speakers from a variety of backgrounds, such as industry, regulatory, academic researchers, or consumer perspective (as appropriate)
   - Suggested speakers who are knowledgeable and good communicators
4. Special consideration will be given to symposium submissions that:
   - Are directly applicable or provide viable safety options for food manufacturers, including small to medium size manufacturers
   - Bring an international (outside of North America) focus or viewpoint to the meeting
   - Attract/involve students
   - Attract/involve local affiliate members who would not otherwise attend the annual meeting (e.g., regional specialties like shellfish issues for New Orleans)
   - Would attract members of a new PDG or program area that IAFP is trying to develop or encourage
5. Other considerations for selecting symposia for further development
   - Proposals must be submitted to the Program Committee by Sunday, August 14, 2005
   - The Program Committee reserves the right to limit the number of sessions devoted to a single program area to provide a balanced program
   - If relevant topics are proposed by more than one submission, the Program Committee will make the final decision to combine or modify symposia as appropriate to avoid overlap of topics among competing symposia
   - Due to space and time limitations, only the top proposals (as modified by the Program Committee) will be selected for further development as either full sessions (consisting typically of six 30-minute presentations or round table discussions) or short sessions (consisting typically of three or four 30-minute presentations or round table discussions)
   - Three sessions will be reserved for symposia sponsored by our partner, International Life Science Institute North America (ILSI, N.A.). The ILSI N.A. symposia address topics that are of general interest to IAFP meeting attendees, focus on emerging food safety issues and technologies, and provide a global perspective
   - Additional sessions may be added at the discretion of the Program Committee to accommodate emerging issues
6. Final decisions on symposia selection will be made at the February 2006 Program Committee Meeting.
   - Accepted symposia are required to be finalized with speakers confirmed and sent to the IAFP office by February 8, 2006. Only fully developed symposia will be considered.

WHO TO CONTACT:

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

Symposium Proposal

IAFP 2006

August 13-16

Calgary, Alberta, Canada

Title: _____

Organizer's Name: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

Topic — Suggested Presenter, Affiliation

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

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Suggested Convenors:

_____

_____

Description of Audience: _____

Signature of Organizer: _____

Submit by August 5, 2005 to:

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

Submit in person on August 14, 2005 to:

Program Committee — IAFP 2006
Baltimore, Maryland

or Contact:

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

In March 2005, the International Association for Food Protection participated at the Food Safety Summit in Washington, D.C. While exhibiting, we offered a drawing for a one-year Membership with our Association and a free registration to our Annual Meeting. We are pleased to announce the following winners of the drawing:

IAFP Membership

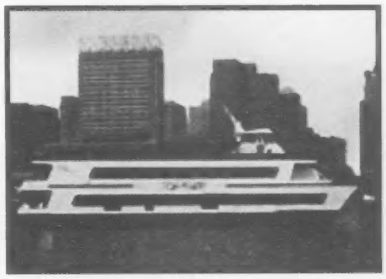
Bo Moreland
McKee Foods Corporation
Gentry, Arizona

IAFP Annual Meeting Registration

Amy Kearns
Good Humor–Breyers
Hagerstown, Maryland

Monday Night Social – Harbor Cruise

Monday, August 15, 2005
6:30 p.m. - 10:00 p.m.
Cost: $45.00
$55.00 after July 13
Price includes dinner



Purchase your ticket online at
www.foodprotection.org
or call the Association office at 800.369.6337; 515.276.3344

NEW MEMBERS

ARGENTINA

Silvia Gonzalez
Centro De Referencia Para Lactobacilos
San Miguel, De Tucuman

AUSTRALIA

Stephen F. Grove
University of Tasmania
Werribee, Victoria

CANADA

Peter H. Ferguson
Sun Valley Foods
Brampton, Ontario

Sarah E. Parker
University of Saskatchewan
Saskatoon, Saskatchewan

MEXICO

Erika A. Neri Herrera
Universidad Autonoma de Queretaro
Queretaro, Queretaro

Jose A. Gonzalez Gutierrez
Universidad Autonoma de Queretaro
Queretaro, Queretaro

Juan P. Campos-Sauceda
Culiacan, Sinaloa

Naaxielii Serna Villagomez
Universidad Autonoma de Queretaro
Queretaro, Queretaro

NEW ZEALAND

Wendy M. Divall
New Zealand Medical & Scientific Limited
Royal Oak, Auckland

Susan E. Gilbert
Institute of Environmental Science & Research Ltd.
Christchurch, Canterbury

Christopher F. Graham
Institute of Environmental Science & Research Ltd.
Christchurch, Canterbury

Robin J. Lake
Institute of Environmental Science & Research Ltd.
Christchurch, Canterbury

Wong TeckLok
Institute of Environmental Science & Research Ltd.
Christchurch, Canterbury

Nicola J. Turner
Institute of Environmental Science & Research Ltd.
Christchurch, Canterbury

PHILIPPINES

Arnel E. Mantes
Goldilocks Bakeshop, Inc.
Mandaluyong City

SOUTH KOREA

Keum-Il Jang
Chungbuk National University
Cheongiu, Chungbuk

SPAIN

Sergi Figueras
VEDEQSA
Terrassa, Barcelona

UNITED STATES

ARIZONA

Robert A. Gooch
Arizona Dept. of Health Services
Flagstaff

CALIFORNIA

Kelli A. Cavaliero
Disneyland Resorts
Mission Viejo

Patrick E. Cochran
Ready Pac
Irwindale

Mark Taggatz
eFoodSafety.com, Inc.
North Palm Springs

COLORADO

Courtney E. Heller
Colorado State University
Fort Collins

Catherine A. Simpson
Colorado State University
Fort Collins

DISTRICT OF COLUMBIA

Gerri M. Ransom
USDA/FSIS
Washington

FLORIDA

Shaji George
Walt Disney World Co.
Lake Buena Vista

GEORGIA

Oscar R. Carrion
US Army Veterinary Services
Fort Gordon

Nimita F. Goyal
Emory University
Tucker

Blane E. Olson
Clearsmoke Technologies, Inc.
Atlanta

Bruce S. Seal
ARS/USDA
Athens

Insook Son
University of Georgia
Athens

NEW MEMBERS

ILLINOIS

David F. Kendra
USDA/ARS
Peoria

Susan P. Monckton
Kraft Foods
Glenview

MARYLAND

Nivedita Dhiman
University of Maryland–College Park
Greenbelt

Virgil Marek
Sterilex
Owings Mills

MASSACHUSETTS

Everett Gasbarro
Dunkin Brands
Canton

MICHIGAN

Dennis Hunt
Michigan Dept. of Agriculture
Lansing

Karina G. Martino
Michigan State University
Lansing

NEBRASKA

Andres M. Vargas
University of Nebraska-Lincoln
Lincoln

NORTH DAKOTA

Patricia E. Aune
United Tribes Technical College
Bismarck

SOUTH CAROLINA

Cheryl Pierce
Bi Lo/Johnson Diversey
Anderson

TENNESSEE

Molly W. Warren
The Pictsweet Co.
Bells

VERMONT

Dennis J. D'Amico
University of Vermont
Burlington

NEW SUSTAINING MEMBERS

W. Payton Pruett, Jr.
ConAgra Foods
Omaha, NE

UPDATES

Reeves Named 2005–06 President of American Dietetic Association

Registered dietitian Rebecca S. Reeves, an expert in the prevention and treatment of obesity and heart disease, began her one-year term June 1 as the 2005–06 president of the American Dietetic Association.

Ms. Reeves is assistant professor of medicine and managing director of the Behavior Medicine Research Center at the Baylor College of Medicine in Houston, TX. She will be the 80th president of the American Dietetic Association.

At Baylor, Ms. Reeves is project director for nutrition intervention studies focused on heart disease and the behavioral treatment of obesity, including "Look Ahead," an 11-year study of the role of sustained weight loss among overweight people with Type-2 diabetes in reducing cardiovascular problems. Ms. Reeves' recent research has focused on weight-loss treatments for Mexican-American and African-American women, binge eating and alternative treatments for obesity.

The Food Products Association Welcomes New President

Cal Dooley is the new president and chief executive officer of the Food Products Association (FPA), formerly the National Food Processors Association (NFPA).

Prior to being named FPA's president and CEO, Mr. Dooley served as a Member of the US House of Representatives from 1991 to 2004, representing the 20th district of California. He served on the House Agriculture Committee, and was Ranking Minority Member of the Agriculture Subcommittee on Department Operations, Oversight, Nutrition and Forestry. He also served on the House Resources Committee.

DFA Farmer Leaders Elect 2005 Officers

The dairy farmer leaders, who are members of the corporate board of directors for Dairy Farmers of America, Inc. (DFA), elected its slate of officers immediately following the cooperative's 7th annual meeting.

DFA's board of directors re-elected Tom Camerlo, a dairy farmer from Florence, CO to another one-year term as DFA's chairman of the board.

Dairy farmer members were also re-elected to serve a one-year term as officers on the DFA board of directors. They include: Randy Mooney, Rogersville, MO; Tom Croner, Berlin, PA; Steve Hofman, Ripan, CA; Bill Siebenborn, Trenton, MO; Wayne Palla, Clovis, NM, Lewis Gardner, Galeton, PA; Joyce Bupp, Seven Valleys, PA; Clyde Rutherford, Otego, NY; Ray Veldhuis, Winton, CA; and Steve Matthees, Goodhue, MN.

International Association for Food Protection® NEWS

IAFP's Vice President Frank Yiannas Honored with Special Achievement Award for Contributions to Food Allergy Awareness

The Food Allergy & Anaphylaxis Network (FAAN) is pleased to announce that Frank Yiannas, vice president of IAFP and director of safety and health at Walt Disney World is being honored with a Special Achievement Award for his contributions in food allergy education and awareness, as well as providing special care to individuals with food allergies. The FAAN Special Achievement Award recognizes an individual or organization that has made a significant contribution to the food allergy community through educational outreach, awareness, advocacy or research.

In partnership with FAAN, Walt Disney World Company under Yiannas' direction, worked alongside a group of food safety professionals from Burger King, Darden Restaurant Group, Kroger, Marriott International, National Restaurant Association Education Foundation, and Wegmans, to promote awareness and better understanding of food allergies by developing easy-to-understand training instructions for service and retail food industry staff. With the help of Disney artists, a four-color poster was designed for display in restaurants and retail food stores, to remind staff how to keep food-allergic guests safe.

William J. Merrick, III, Selected as American Dairy Products Institute Award of Merit Recipient

The American Dairy Products Institute has announced that William J. Merrick, III is the 2005 Recipient of the Award of Merit. "The Award of Merit is given to individuals who have consistently made a difference to the dairy industry, and Bill Merrick has been making significant contributions to the dairy and feed industries for forty years," said Jim Page, CEO of ADPI.

Bill started a manufacturing operation in 1970 using dairy-based ingredients producing products for the animal feed industry. Bill's experience in the dairy industry came from his years in his father's dairy brokerage operation.

Today Bill operates 3 plants, all dedicated to manufacturing quality products for the feed industry. Bill continues to invest his expertise and time back into the dairy and animal feed industry. He is very active in dairy and animal feed trade associations, providing experienced leadership for the entire industry.

NSW Food Authority: First Year in Review

A successful merger, a new beginning... The NSW Food Authority was established in April 2004 following the successful merger of SafeFood NSW with NSW Health food safety staff. As the Authority passes its first 12-month milestone, it has delivered a more streamlined, consistent and efficient approach to food regulation in NSW.

The NSW Food Authority remains a unique organization – Australia's first "through chain" agency. This means it can regulate food safety all the way from "paddock to plate." Complete document available at http://www.foodauthority.nsw.gov.au/year_in_rev1.htm.

Keeping Your Dairy Products Safe

Is your milk safe? Scientists with the Agricultural Research Service (ARS) have joined forces with the Regional Dairy Quality Management Alliance (RDQMA) to make sure it is. RDQMA is a group of state veterinarians, extension personnel and university scientists in 10 northeastern and mid-Atlantic states who are interested in dairy-related issues. In 2003, ARS began working with RDQMA to develop a set of best management practices for dairy producers. These practices are designed to minimize the risk of diseases caused by microbial pathogens in dairy cows and dairy products, and assure the maximum safety of the products as they leave the farm.

The collaborative research team consists of the ARS Environmental Microbial Safety Laboratory in Beltsville, MD; the ARS Antimicrobial Research Laboratory in Athens, GA.; Cornell University, Pennsylvania State University, the University of Pennsylvania and University of Vermont. A pilot project, begun in January 2004, originally involved a 300-cow herd in New York and a 100-cow herd

in Pennsylvania. A third herd in Vermont was recently added. The researchers collect biological samples from the herds, such as blood, manure and bulk tank milk, as well as environmental samples, such as bird droppings, water, feed and soil. The samples are distributed to university and ARS researchers who test them for the presence of pathogens such as *Salmonella*, *E. coli* O157:H7, *Listeria monocytogenes* and *Campylobacter*. One sampling at one of the test farms revealed that although 45 percent of the cows tested positive for *Salmonella*, no *Salmonella* was actually detected in the bulk tank milk, according to ARS microbiologist Jeffrey Karns at Beltsville. Molecular genetic techniques are used to detect particular strains of *Salmonella*, *Listeria* and *E. coli*. This type of analysis helps differentiate between those that are harmful to humans and those that are not. Read more about the research in the April 2005 issue of *Agricultural Research* magazine, available online at http://www.ars.usda.gov/is/AR/archive/apr05/dairy0405.htm.

Smithfield Achieves International "Gold Standard" for Its Environmental Management Practices

Smithfield Foods, Inc. has announced that it has become the first in its industry to achieve ISO 14001 certifiation for all its United States' hog production and processing facilities.

Smithfield has achieved its aggressive goal of ISO 14001 certification for all Environmental Management Systems (EMSs) in its US-based hog production and processing facilities.

ISO 14001 is the international gold standard for environmental management. The International Organization for Standardization (ISO), based in Geneva, Switzerland, promotes the development and implementation of voluntary international standards for environmental management systems. If a facility receives ISO certification, it means that facility has implemented state-of-the-art environmental management systems that include formalized practices to protect the environment.

To obtain ISO certification, a company must meet a rigorous and comprehensive set of requirements and criteria developed by more than 2,000 experts worldwide. The certification process is conducted by an accredited third-party auditor and ensures that anyone receiving certification has mechanisms in place to ensure, and move beyond, environmental compliance.

Strongest Proof Yet Found for Prion Hypothesis

UTMB scientists offer strongest evidence yet that infectious misformed proteins cause mad cow disease and other mysterious brain disorders. Researchers at the University of Texas Medical Branch at Galveston (UTMB) have produced the strongest proof yet that the mysterious and devastating brain diseases known as "transmissible spongiform encephalopathies" (TSEs) are transmitted by an infectious agent composed only of a malformed protein, and not a virus. TSEs, which can afflict both human beings and animals, include mad cow disease, new-variant Creutzfeldt-Jakob Syndrome, scrapie, kuru and chronic wasting disease.

This controversial "prion hypothesis" was proposed by Stanley Prusiner in 1982, and led to Prusiner receiving the Nobel Prize in Medicine in 1997. Until now, however, scientists have been unable to confirm its validity by causing a TSE in normal lab animals by infecting them with malformed proteins (dubbed "prions" by Prusiner) created entirely in a test tube. Such an approach eliminates the possibility that some other agent might be causing the disease.

In a paper scheduled to appear in the journal *Cell* on April 21, the UTMB researchers describe the use of a method they developed called "protein misfolding cyclic amplification" (PMCA) to vastly accelerate the activity of a small number of prions taken from infected hamsters and placed in test tubes containing healthy brain proteins. When the healthy proteins had been largely transformed into prions, the samples were diluted over and over again and the process repeated, until the only remaining prions were those that had been generated in the test tubes. These were then injected into the brains of healthy hamsters, which began showing TSE symptoms within four months and, on average, died less than six months after inoculation.

"For many years, people have tried to make these infectious prions in test tubes, because what is needed to prove the prion hypothesis completely is to be able to produce this process in vitro in the absence of living cells and thus rule out the presence of a virus," said Claudio Soto, professor of neurology at UTMB and senior author of the paper. "The evidence in favor of the prion hypothesis was strong, but the final proof was still missing. Now we have supplied this proof."

Soto emphasized that a tremendous increase in efficiency of the PMCA technology played a crucial role in the work of his team, which included study co-authors Joaquín Castilla, Paula Saá and Claudio Hetz.

By mimicking the natural mechanism of prion formation but doing so at a much higher rate, PMCA made it possible to produce the large quantities of prion protein necessary for the success of the experiments and opened the door to further TSE studies. According to Soto, it should also soon facilitate creating a much-needed blood test for prions, which would greatly improve current surveillance techniques for mad cow disease and its human form, new-variant Creutzfeldt-Jakob Syndrome.

Funding Feeds the Next Generation of Foods

Australia's leading food researchers will invest new Victorian Government funding to develop the next generation of potentially revolutionary food processing technologies.

Victoria's Minister for Innovation, John Brumby, recently announced a $3.5 million boost to the work of researchers from Food Science Australia, the University of Melbourne, Swinburne University of Technology and CSIRO Plant Industry. The funding is part of the Science, Technology and Innovation Initiative administered by the Victorian Department of Innovation, Industry and Regional Development. The grant will be used to establish the Advanced Processing and Innovative Foods Program.

"This is a great opportunity to advance food processing technologies with the potential to benefit Australia's food industry and economy, as well as consumers and the environment," says the director of the Innovative Foods Centre, Dr. Kees Versteeg. "Scientists at the Centre investigate non-thermal food processing technologies like ultra high-pressure and high-power ultrasonics. This new program will broaden the research scope to include microwave technology, advanced separation technologies, ingredient functionality and food architecture."

"These technologies will allow food manufacturers to create exciting, new foods and ingredients with qualities that have until now been difficult to achieve. Consumers can look forward to new flavors, textures and specific nutritional and health benefits across a range of food products," Dr. Versteeg says.

Theme director at Food Science Australia, Dr. Geoffrey Smithers, says the growth potential for global functional foods markets – now valued at in excess of $50 billion – is undeniable. "In response to consumer demands, we foresee that the next generation of foods will need to provide more specific health benefits without compromising eating quality. Scientists in the Advanced Processing and Innovative Foods Program will be working towards developing and applying cost-effective processing technologies that do not compromise the health-promoting activity of ingredients (proteins, peptides and antioxidants) for these next generation foods," Dr. Smithers says.

The aims of the program are closely aligned with those of CSIRO's Food Futures Flagship which will provide substantial additional funding. Flagship director, Dr. Bruce Lee, says new food technologies should boost Australia's economy through the creation of new companies and jobs and an increase in exports of high-value ingredients and foods. "This collaboration, bringing together the expertise in CSIRO's Food Science Australia and Plant Industry and the universities, provides the momentum for development of frontier technologies, helping to transform Australia's agrifood sector and create new industries," Dr. Lee says.

Foodborne Illnesses Continue Downward Trend: 2010 Health Goals for *E. coli* O157 Reached

A report released by the Centers for Disease Control and Prevention (CDC) in collaboration with the Food and Drug Administration (FDA) and US Department of Agriculture (USDA) showed important declines in foodborne infections due to common bacterial pathogens in 2004.

For the first time, cases of *E. coli* O157 infections, one of the most severe foodborne diseases, are below the national Healthy People 2010 health goal. From 1996–2004, the incidence of *E. coli* O157 infections decreased 42 percent. *Campylobacter* infections decreased 31 percent, *Cryptosporidium* dropped 40 percent, and *Yersinia* decreased 45 percent. Overall, *Salmonella* infections dropped 8 percent, but only one of the five most common strains declined significantly. Different *Salmonella* strains are found in a variety of animal hosts and in different geographic locations.

Further efforts are needed to better understand why some *Salmonella* strains tend to contaminate produce during production and harvest. FDA has recently developed a plan to decrease foodborne illnesses associated with fresh produce. To better control foodborne pathogens in animals and plants, prevention efforts should be implemented across the farm to table continuum.

"This report is good news for Americans and underscores the importance of investments in food safety. Our efforts are working and we're making progress in reducing foodborne illnesses," said CDC director Dr. Julie Gerberding.

"However, foodborne disease is still a significant cause of illness in the United States and further efforts are needed to sustain and extend these important declines and to improve prevention of foodborne illnesses."

"The continued reduction in illnesses from *E. coli* O157 is a tremendous success story and we are committed to continuing this positive trend in the future," said USDA Secretary Mike Johanns. "These results demonstrate that through innovative policies and strong and consistent enforcement of inspection laws, we are protecting the public's health through a safer food supply."

Several factors have contributed to the decline in foodborne illnesses. USDA's Food Safety and Inspection Service implemented a series of new recommendations beginning in 2002 to combat *E. coli* O157 in ground beef and *Listeria* in ready-to-eat products. In response, most establishments have significantly enhanced their food safety systems. Many have applied new technologies to reduce or eliminate pathogens and have increased their testing to ensure the effectiveness of control measures. Furthermore, these improvements likely reflect industry efforts to reduce *E. coli* O157 in live cattle and during slaughter.

The reduction in *Campylobacter* infections may be due to greater consumer awareness of safe poultry handling and cooking methods. Food safety education efforts targeted to specific foodborne hazards as well as general consumer tips, such as the public-private FightBac campaign, have helped consumers become more aware and knowledgeable of food safety hazards and how to prevent them.

The incidence of *Shigella*, which is found in a wide variety of foods, did not change significantly from 1996 through 2004. *Vibrio* infections increased 47 percent. *Vibrio* infecions, which are primarily associated with consumption of certain types of raw shellfish, can be prevented by thoroughly cooking seafood, especially oysters.

In 1996, the FoodNet surveillance system began collecting valuable information to quantify, monitor, and track the incidence of laboratory confirmed cases of foodborne illnesses caused by *Campylobacter*, *Cryptosporidium*, *Cyclospora*, *E. coli* O157, *Listeria*, *Shigella*, *Yersinia* and *Vibrio*. Since its inception, FoodNet has grown to include ten states and 44 million people, about 15 percent of the American population.

The full report, "Preliminary FoodNet Data on the Incidence of Infections with Pathogens Transmitted Commonly Through Food – Selected Sites, United States, 2004" appeared in *Morbidity and Mortality Weekly Report* (April 15, 2005) and is available online at www.cdc.gov/mmwr. To learn more about FoodNet please visit http://www.cdc.gov/foodnet/. To learn more about various foodborne pathogens, visit http://www.cdc.gov/az.do.

Canada, Mexico and United States Release Harmonized North American BSE Strategy

The US Department of Agriculture has announced that Canada, Mexico and the United States have established a harmonized approach to bovine spongiform encephalopathy (BSE) risk mitigation to more effectively address any BSE risk in North America.

This science-based framework of risk management measures for BSE has been developed with the objective to help normalize trade in ruminants and ruminant products within North America and to promote an international BSE strategy consistent with World Organization for Animal Health (OIE) guidelines. The strategy also represents the integrated North American approach that will be presented to the OIE as part of any further discussions to promote international harmonization of BSE risk mitigation measures through the OIE.

The minimum standards defined in the report have not been codified throughout North America. Rather, they will be considered by the appropriate animal health and public health officials in each country through their respective regulatory processes. These recommendations do not change the requirements in place for products currently being traded. The report is available on the APHIS Web site at http://www.aphis.usda.gov.

Safefood Announces All-Island Forum to Deliver Harmonization of Food Safety Systems on Island of Ireland

Safefood, the food safety promotion board issued a report April 12/05 highlighting the need for a complete and efficient food safety system on the Island of Ireland. The report entitled "Foodborne Infections and Gastrointestinal Diseases on the island of Ireland" for the first time ever, examines the relevant surveillance data collected in both the Republic of Ireland and Northern Ireland. It points to differences in the recording systems and the levels

of infectious gastrointestinal disease in both jurisdictions and suggests key recommendations for harmonizing the two surveillance systems.

As a result of the report, safefood also launched an all-island collaborative forum comprising the Communicable Disease Surveillance Centre (CDSC) in Northern Ireland and the National Disease Surveillance Centre (NDSC) in the Republic of Ireland, under the umbrella of safefood. This forum is committed to collaborating with the public health services, north and south, on the prevention and control of intestinal infectious disease on the island.

With Ireland suffering 3.2 million cases of acute gastroenteritis each year, or 8,800 new cases each day, safefood believes it is essential to marry the data from the two systems to provide a full all-island picture of the surveillance of infectious intestinal disease. According to Dr. Cliodhna Foley-Nolan, safefood's chief specialist public health, this step is even more pressing given the "heavy economic toll" as a direct result of the illness. "About 1.5 million working days are lost each year in Ireland due to acute gastroenteritis. In financial terms, this means we are losing an estimated £114m/€173.5m in earnings alone on the island of Ireland as a whole. Work towards harmonizing the two existing surveillance systems and reporting structures will undoubtedly be of financial benefit."

Gastrointestinal infections are a shared issue for Public Health Practitioners in ROI and NI, and the report shows that we would all benefit from enhanced collaboration. This study provides us with a way forward to achieve an all-island approach to both surveillance and effective control for the benefit of all.

The report found that *Campylobacter* (a bacterium primarily from poultry sources) was the single most common bacterial cause of food poisoning in both the Republic of Ireland and Northern Ireland, and that the rate was consistently lower when compared to rates in GB. *E. coli* O157 rates were similar in both jurisdictions, but much lower than Scotland and higher than England and Wales. Furthermore, exotic gastrointestinal infections from abroad were found to be rare, with only 2 cases of cholera and 7 of typhoid found on the island as a whole for the year under study. Approximately a quarter of the *Salmonella* cases were found to be imported from abroad, mostly from Mediterranean holiday resorts. The all-island collaborative forum met for the first time on March 2, 2005.

Food Safety: From the Farm to the Fork – Training Strategy

"Better Training for Safer Food" is a new initiative of the Commission aimed at organizing a Community (EU) training strategy in the areas of food law, feed law, animal health and animal welfare rules, as well as plant health rules.

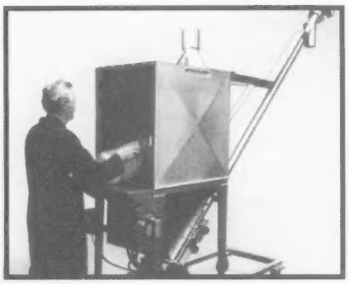
Article 51 of the newly adopted Regulation (EC) No 882/2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules, provides the legal instrument for this initiative.

Training will be designed for all staff of competent authorities of Member States involved in official controls activities so as to keep them up-to-date with all aspects of Community law in the above specified areas and ensure that controls are carried out in a more uniform, objective and adequate manner in all Member States.

It is also essential that third countries and in particular developing countries are familiar with EU import requirements and, where they exist, with the possibility of EU support. For this purpose, training will also be open to participants from those countries.

The future Community training strategy in the areas of food law, feed law, animal health, animal welfare and plant health, will be explained in a Commission White Paper expected to be published in December 2005. Introduction, Objectives, Programme available from http://europa.eu.int/comm/food/training/index_en.htm.

INDUSTRY PRODUCTS



Spiroflow Systems, Inc.

Spiroflow Systems Introduces New Mobile Flexible Screw Conveyor for Multiple Conveying Applications

Spiroflow has recently designed and manufactured a mobile Flexible Screw Conveyor for multiple product applications in the food, chemical, plastics and other industries.

The mobility of this Flexible Screw Conveyor allows the operator to use for diverse applications and different areas of the plant facility. This system design also allows for easy change over, permitting different products to be conveyed using the same conveyor. The system's UHMWPE tube and steel spiral can be easily disassembled and cleaned with little downtime to reduce product contamination when moving and switching products.

Spiroflow has designed this conveyor with the operator in mind. Many competing mobile conveyors are cumbersome to move. The Spiroflow Flexible Screw Conveyor allows a single attendant to easily operate the machine.

The conveyor is easily controlled with an "on-board" control panel that can be pre-programmed. The conveyor, featuring locking swivel wheels for stability, is easy to maneuver, especially in tight facility locations.

Spiroflow offers a number of different tube diameters and lengths to accommodate required rates up to 100,000 cubic feet per hour.

The mobile option is favored by many industries including chemical and food where there is often a need for multiple applications. A USDA Dairy Accepted/3-A Authorized model is also available.

Spiroflow Systems, Inc.
704.291.9595
Charlotte, NC
www.spiroflowsystems.com

New Laboratory Homogenizer from Niro, Inc.

The Niro Soavi NS2002H Twin Panda table-top laboratory/pilot plant homogenizer is ideal for feasibility testing and process development in the food, food ingredients, and dairy industries.

The Twin Panda homogenizer is a tabletop model designed for the laboratory/pilot plant needs of companies processing food and dairy products. It is a unique unit, with the ability to process small volumes of liquids and pumpable fluids.

The Twin Panda is designed to homogenize samples at pressures up to 8700 PSI. The internal design has special features permitting the homogenizer to handle feeds at high viscosity up to 20,000 cP and at temperatures up to 90°C (194°F) without any feeding pump.

The Twin Panda 600 homogenizer is an ideal piece of equipment, easy to commission and operate. It can easily be dismantled for maintenance and cleaning by the laboratory operator. Homogenization conditions can be optimized and the results used in scale-up to industrial operations.

The Twin Panda 600 homogenizer is supplied with an analog pressure gauge (0-600 bar). The feed system is by gravity through a feed funnel, without any feeding pump. For high viscosity products a pneumatic feeding system with jacketed stainless steel feeding hopper is available. The jacket can be used both for cooling and heating the test product.

An integral stainless steel casing enables easy cleaning and maintenance. The standard toothed direct drive belt incorporates an AC high-duty motor which is supplied with a main switch including magnetothermic motor protection. The Twin Panda 600 is delivered ready to use complete with a set of special tools, spare parts, and operation/maintenance manual.

Niro, Inc.
Hudson, WI
715.386.9371
www.niroinc.com

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

Onset Computer Corporation

Onset Computer Corporation Introduces Data Logger for In-transit Monitoring of Temperature-sensitive Goods

Onset Computer Corporation has introduced the HOBO-pendant logger, a miniature, low-cost data logger for monitoring temperatures during the transport and storage of temperature-sensitive goods. Examples include perishable foods/produce, beverages, chemicals, flowers/plants, and works of art.

Designed for use in a wide range of environments – from refrigerated trucks to ocean cargo containers – the waterproof HOBO pendant offers improved performance over previous low-cost data loggers by providing 0.5°C accuracy and up to 52,000 readings. The logger records temperatures around the clock, and provides high and low LED alarms for both shipping and storage applications. For shipping, the alarms offer "on-the-dock" visual verification that temperatures have not exceeded user-defined limits. In storage, the alarms can provide instant visual notification when temperatures go out of range.

"Today, it is more important than ever to monitor temperatures of goods through all stages of the cold chain for regulatory compliance," said Paul Gannett, product marketing manager for Onset. "This is particularly true with highly perishable items, such as poultry, meat, fish and dairy. The new HOBO pendant logger makes compliance easy for shippers and receivers, delivering accurate, reliable temperature data in a tiny reusable package that fits into any type of shipping or storage container."

Onset Computer Corporation
508.759.9500
Bourne, MA
www.onsetcomp.com

Nilfisk-Advance America to Launch New Line of Industrial Vacuum Cleaners

Nilfisk-Advance America has launched its CFM 08 Series of industrial vacuum cleaners, designed for heavy-duty clean-ups in manufacturing plants and other facilities. The new, user-friendly vacuums feature clog-resistant filters and interchangeable attachments for fast, continuous cleaning, and quiet-running motors and cord holders for easier, safer operation. They are ideal for a variety of environments, including industrial manufacturing, food manufacturing, powder coating, and metalworking.

The three-phase, HEPA-filtered CFM 08 Series vacuums which include the CFM 3308, CFM 3508, CFM 3508W, and CFM 3558 are engineered for non-stop operation and minimal maintenance. Oversized main filters prevent premature clogging; a newly designed filter shaker handle enables workers to shake down filters with minimal effort; and a side inlet provides a better cyclonic effect, resulting in maximum suction power and minimal clogging.

"We listened carefully to our customers' concerns about plant hygiene, then built the new CFM 08 Series vacuums according to their wish list. That's why the vacuums are packed with features that make them easier to operate, easier to customize, and easier to maintain," said Paul Miller, vice president of Nilfisk-Advance America.

Based on customer feedback, Nilfisk-Advance America has incorporated the following additional features into the CFM 08 Series vacuums: quieter-running motors for increased worker comfort; cord holders for improved worker safety; extra-large wheels and wrap-around handles for easy transportation; and, hinged doors that open to the motor for fast maintenance.

The modular CFM 08 Series vacuums can be customized based on the type of materials being collected (i.e., fine dust/powders, toxic materials, liquids, etc.) using hundreds of interchangeable CFM accessories, hoses, and filters. The attachments are compatible with all CFM vacuums, allowing users to swap in what they need without searching for the attachments that match a particular vacuum or investing in multiple sets of tools.

Nilfisk-Advance America
877.215.8322
Malvern, PA
www.nilfisk-advance.com

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

Remove Contaminants from Steam in Food Processing with Parker Hannifin's Steam Filters

Balston® Steam filters that permit direct steam contact with food are now available from Parker Hannifin Corp.

Balston Steam Filters remove 98+% of 0.1 micron particles and 100% of all visible particles from steam. Liquid condensate is removed at the same efficiency as for solid particles. Models are available to handle flow rates of up to 3,000 lbs/h.

Other benefits of Balston Steam filters include: Reduction in steam condensate mixing with the food products when steam is used for agitating, mixing or cooking; significant reduction in carryover of boiler feed water chemicals into the food product, causing taste and odor problems; greatly reduced maintenance requirements for valves, cookers, heat exchangers, and other equipment.

Balston Steam Filters are in full compliance with the requirements of the US Food, Drug and Cosmetic Act. They meet the regulations for Indirect Food Additives used as Basic Components for Repeated Use Food Contact Surfaces as specified in 21 CFR Part 177, and Current Good Manufacturing Practices, 21 CFR Part 110. Balston Steam Filters have also been accepted by the USDA for use in federally inspected meat and poultry plants. They are also in full compliance with the 3-A Accepted Practices (Number 609-00) for producing steam of culinary quality, and they are in full compliance with the requirements of the Health Protection Branch of Health and Welfare Canada.

Parker Hannifin Corporation
Haverhill, MA
800.343.4048
www.parker.com/balston

Sanitation Strategies Launch Online Resource for Food Safety Professionals

The necessity for food processors to apply all available resources to their food safety effort is here to stay.

Food safety professionals must cope with an ever-changing playing field in their quest to produce safe food for consumers. To accomplish this daunting challenge, food processing companies require cutting-edge technology that reduces microbial contamination, increases shelf life, and ensures the safety of the consumer.

"Traditionally, food sanitation equipment and related food safety products have only been available through the food processor's sanitation chemical supplier. The challenge for the food processor is that they don't always get exposure to the latest food safety and sanitation equipment technology. In some cases, the chemical supplier themselves are not aware of new and more effective ways of cleaning and sanitizing the food processing environment. SanitationTools.com provides an excellent resource for the food safety professional in their search to find the best hygienic solutions for their particular processing environment," said Sherman L. McDonald, president of Sanitation Strategies, LLC.

The vast majority of food processing companies use sanitation equipment provided on a loaned basis from their chemical supplier. The food processor does not see the sanitation equipment they use as a capital expenditure under the loaned program, however, they are paying for the equipment they use in the price of the chemicals they purchase. The catch for the food processor is that they are often paying for their sanitation equipment many times over. The standard practice is for the chemical supplier to calculate the cost of the loaned equipment they are supplying the food processor and to add a surcharge to the price per gallon to cover the cost of the loaned equipment. In most cases, the loaned equipment is paid for in the per gallon cost within 12–18 months, after which, the chemical vendor typically keeps the surcharge in place. "I have seen some cases where the food processor actually has paid for their loaned equipment five to ten times over because the surcharge remains in place long after the equipment was paid for. Food processors can often reduce their overall sanitation costs by owning their sanitation equipment and negotiating a lower price per gallon for the sanitation chemicals from their chemical vendor," said McDonald.

Sanitation Strategies, LLC
877.HYGIENIC
Okemos, MI
www.sanitationstrategies.com

Xenon Corporation

Xenon Corporation's Pulsed Xenon Lamps Shaped to Match Optical Footprint

Pulsed Xenon lamps that are mercury-free can be custom manufactured in a wide variety of shapes and sizes to accommodate specific targets, optical footprints, and applications.

Xenon Pulsed Flash-Lamps can be custom manufactured to meet virtually any design requirement for the purpose of focusing high energy pulsed light onto a specific target or optical footprint from spot size up to 15" O.D. Featuring point source, linear, spiral, ring, and serpentine shapes, they can be produced for the UV to IR and finished with end-caps or graded seals.

Capable of delivering high-peak energy that is 100,000 times more powerful than the sun, Xenon Pulsed Flash-Lamps are designed for start/stop applications, consume less energy than continuous wave mercury lamps, and do not create or use VOCs or suspended airborne particulates.

Applications include UV curing, medical and pharmaceutical research, sterilization, photochemistry, alarm systems, and tall tower signal lights.

Xenon Corporation
Woburn, MA
800.936.6695
www.xenoncorp.com

Problem-solver Multi-port Ball Valves Offer Superior Fit, Performance, and Maintainability

Innovative engineering by A-T Control makes new TRIAC Series 33, 43 and 53 stainless steel multi-port ball valves a superior all-around solution to mixing, diverting and multi-directional flow control. Featuring four patented design innovations, the TRIAC multi-port valves are easy to configure and install, engineered for superior performance and reliability, and permit fastest, easiest in-line maintenance. Five-seat, full-port construction provides equal seat loading and positive sealing at any port, while balls offer L-Port, T-Port, I-Port, TT-Double T-Port, and LL-Double L-Port configurations. Available in 3-,4- and 5-way models, 1/4" to 4" sizes, a wide range of end connections and seat materials, the TRIAC multi-port valves can be configured for nearly 150 different flow pattern combinations.

Direct-mount, dual-pattern ISO 521 pad enables space-saving, low-profile actuator mounting without brackets or adapters for easy, low-cost automation. Valves can be ordered with actuators as pre-assembled packages, a specialty of A-T Controls.

Patented engineering advances assure superior performance, maintainability and ease of use: Patented pyramidal packing provides optimum stem sealing and extended cycle life, while a blow-out-proof stem offers maximum safety. A patented semi-trunnion ball design locks ball to stem to eliminate backlash and hysteresis, ensure accurate positioning, and reduce operating torque. Patented cavity-filled seat design fills 95% of the dead space between ball and valve body, the most of any multi-port valve to minimize contamination potential. Patented two-piece end cap design enables easy removal with the valve mounted in line, making for fast, economical replacement of gaskets and seats.

The TRIAC Series 33/43/53 multi-port valves are constructed of ASTM-standard 316 stainless steel. Sanitary versions are an option. Precision-machined, mirror-polished solid balls deliver bubble-tight shut-off with less operating torque. Valves are built in compliance with relevant ANSI, API, ISO, DIN, and MSS standards, are produced to ISO 9001 quality controls, and carry CE approval.

A–T Controls Inc.
513.530.5175
Cincinnati, OH
www.a-tcontrols.com

A New Mini Centrifuge from Thomas Scientific

Requiring less than 6 inches of bench space, the Thomas® Mini Centrifuge is a personal-size unit for microfiltration and quick spin downs from the walls and caps of microcentrifuge tubes. Mini Centrifuge is supplied with easy-to-interchange standard microtube and strip rotors and adapters to accommodate 0.4, 0.5 and 1.5 ml tubes as well as 0.2 ml strips and individual tubes. Easy-open translucent lid features a durable stainless steel hinge pin. The on/off switch is located on the side of the Mini Centrifuge, with the switch in the "on" position; the centrifuge can be started and stopped by closing and opening the lid.

Thomas Scientific
800.345.2100
Swedesboro, NJ
www.thomassci.com

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

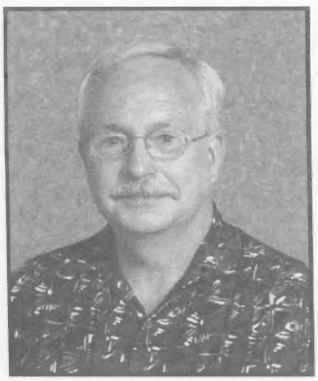
Ivan Parkin Lecture

Sunday, August 14
7:00 p.m. – 8:00 p.m.

Food Safety 2005: Facts Come Easy – Answers are Elusive

Presented by

Douglas L. Archer, Ph.D.
Professor and Past Chair
Food Science and Human Nutrition Department
University of Florida
Gainesville, Florida, USA



Dr. Douglas L. Archer is a professor and Past Chair of the Food Science and Human Nutrition Department, Institute of Food and Agricultural Sciences at the University of Florida, Gainesville. He received a B.A. degree in Zoology in 1968, a M.S. degree in Bacteriology in 1970 from the University of Maine and a Ph.D. degree in Microbiology in 1973 from the University of Maryland.

Dr. Archer served as Deputy Director, Center for Food Safety and Applied Nutrition, US Food and Drug Administration (FDA) in charge of research, regulatory and policy activities of programs including foods, food additives and food labeling; dietary supplements; seafood, cosmetics and colors. He was a Commissioned Officer in the United States Public Health Service (USPHS) and was appointed Assistant Surgeon General in July 1990. He received numerous awards including five citations for excellence, three Meritorious Service Medals and the Distinguished Service Medal. Other awards included the 1988 Tanner Memorial Award from the Institute of Food Technologists and the J. C. Frazier Memorial Award from the University of Wisconsin in 1992. Dr. Archer retired from the USPHS on January 1, 1994.

Dr. Archer also served as Chairman of the FAO/WHO Codex Alimentarius Committee on Food Hygiene from 1984 to 1994. He is the past US Associate Editor for Food Control where he now serves on the Editorial Board, and since 1990 has been a member of the WHO Expert Advisory Panel on Food Safety.

Dr. Archer is a member of the International Association for Food Protection and the Institute of Food Technologists and also serves as an advisor to the FDA and the WHO. Dr. Archer has authored or co-authored more than 80 scientific publications and given hundreds of presentations to scientific organizations, trade organizations and consumer groups.

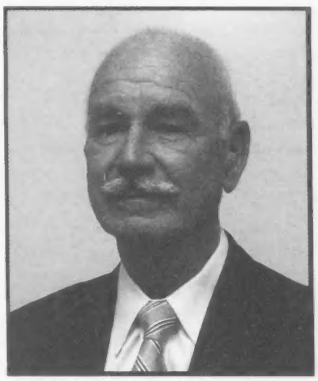
John H. Silliker Lecture

Wednesday, August 17
3:45 p.m. – 4:30 p.m.

Managing the Safety of Internationally Traded Food

Presented by

Michiel van Schothorst, Ph.D.
Retired Vice President, Food Safety Affairs
Nestlé
Vevey, Switzerland



Dr. Michiel van Schothorst studied Veterinary Medicine and obtained his Ph.D. at the University of Utrecht (NL). He began his career as a food microbiologist at the National Institute of Public Health in The Netherlands where he became Head of the Laboratory for Zoonosis in 1975. From 1965 to 1980 Dr. van Schothorst was Secretary-Treasurer of the World Association of Veterinary Food Hygienists (WAVFH).

In 1980, Dr. van Schothorst continued his career at the Nestlé Head Office in Vevey, Switzerland where he was appointed Head of Quality Assurance in 1985. In 1992 he was nominated Vice President of Food Safety Affairs until he retired in 2002.

Dr. van Schothorst was elected to become the first professor and European Chair in Food Safety Microbiology at the University of Wageningen (NL) in 1997. In addition he has been active in developing Quality Assurance and Food Safety programs and promoting the HACCP concept through textbooks, publications, lecturing and training.

Dr. van Schothorst was a member of the Permanent Food Safety Advisory Panel of the World Health Organization from 1986-2002, participating in the Codex Food Hygiene Committee from 1968-2002. He was also a member of the International Commission on Microbiological Specifications for Foods (ICMSF) from 1973-2003 and Secretary from 1992-2003.

Dr. van Schothorst participated in many FAO/WHO expert meetings on Food Safety and Public Health, and plays an active role in the WHO/ICD Food Safety training programs such as "Food Safety for Nutritionists and other Health Workers," "HACCP" and "Microbiological Risk Assessment". He is author or co-author of more than 140 scientific publications or chapters in scientific books.

IAFP 2005 Preliminary Program

SUNDAY, AUGUST 14

Opening Session – 7:00 p.m.

- Ivan Parkin Lecture – Food Safety 2005: Facts Come Easy – Answers are Elusive, Douglas L. Archer, Ph.D.

MONDAY, AUGUST 15

Morning – 8:30 a.m. – 12:00 p.m.

Symposium Topics

- Laboratory Response to Food Bioterrorism: How Prepared are We?
- Microbiological Predictive Models: Development, Use and Misuse
- Food Allergens: Concerns for the Packaged Food and Food Service Industries
- Global Water Quality Concerns
- Recent Regulatory Changes and Issues Affecting Your Dairy Operation

Technical Session

- Produce

Poster Session

- Pathogens

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposium Topics

- Update on Foodborne Disease Outbreaks
- Safety Concerns of Food Chemical Contaminants
- Data for Decision Making
- Materials for Multi-Use Food Contact Surfaces: Characteristics, Fabrication, and Evaluation

Technical Session

- Foods of Animal Origin

Poster Session

- Risk Assessment and Antimicrobials

TUESDAY, AUGUST 16

Morning – 8:30 a.m. – 12:00 p.m.

Symposium Topics

- Foodborne Diseases: Discovery of Causes and Reduction Strategies
- Safety of Raw Milk Cheeses – A Global Perspective
- Yeast and Molds: When Fungi Go Bad, Who Do You Call?
- They Said What? – The Risky World of Risk Communication
- Pre-Harvest Issues Associated with the Transmission of Viruses and Parasitic Protozoa – The Problems and the Solutions

Technical Session

- Pathogens

Poster Session

- Produce and General Microbiology

Afternoon – 12:15 p.m. – 1:00 p.m.

- IAFP Business Meeting

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposium Topics

- Managing the Risk of *Listeria monocytogenes* at Retail and Restaurants
- Risk and Control of *Salmonella* in Raw Nuts
- Oceans and Human Health: Trends and Practical Tools for Seafood Safety
- Risk Ranking for Foodborne Pathogens
- Enrichment Media and Sample Preparation: What's New?

Technical Session

- Antimicrobials

Poster Session

- Miscellaneous Food Commodities

WEDNESDAY, AUGUST 17

Morning – 8:30 a.m. – 12:00 p.m.

Symposium Topics

- A Behavioral Approach to Performance-based Food Safety Management – Theory, Practice and Outcome for Successful Retail Food Safety Programs
- Produce Packinghouse Sanitation: Designing and Implementing Effective Food Safety Programs
- International Food Safety Opportunities and Challenges in the Developing World
- Recent Advances in Intervention Strategies for Pathogen Control

Technical Session

- Risk Assessment
- Education

Poster Session

- Method Development for Pathogen Testing

Afternoon – 1:30 p.m. – 3:30 p.m.

Symposium Topics

- Microarray Technology: An Emerging Tool in the Food Microbiologists' Toolbox
- Pathogen Survival in Dried Fermented Meat and Partially Cooked Products
- Food Safety Objectives – Now We Have Decided to Have Them, How Do We Think They Will be Used in Food Safety Management?
- Current Practices and Innovations in Cold Chain Management for Food Products

Technical Session

- General Microbiology

Afternoon – 3:45 p.m. – 4:30 p.m.

- John H. Silliker Lecture – Managing the Safety of Internationally Traded Food, Michiel van Schothorst, Ph.D.

Subject to change

IAFP 2005 Networking Opportunities

IAFP FUNCTIONS

NEW MEMBER RECEPTION

Saturday, August 13, 2005 • 4:30 p.m. –5:30 p.m.

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

AFFILIATE RECEPTION

Saturday, August 13, 2005 • 5:30 p.m. –7:00 p.m.
Sponsored in part by Weber Scientific, Inc.

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

COMMITTEE MEETINGS

Sunday, August 14, 2005 • 7:00 a.m. –5:00 p.m.
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 any number of committees or PDGs. Everyone is invited to attend.

STUDENT LUNCHEON

Sunday, August 14, 2005 • 12:00 p.m. –1:30 p.m.

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

OPENING SESSION AND IVAN PARKIN LECTURE

Sunday, August 14, 2005 • 7:00 p.m. –8:00 p.m.

Join us to kick off IAFP 2005 at the Opening Session. Listen to the prestigous Ivan Parkin Lecture delivered by Douglas L. Archer, Ph.D., Professor and Past Chair, Food Science and Human Nutrition Department, University of Florida, Gainesville, Florida. He will deliver a presentation titled "Food Safety 2005: Facts Come Easy – Answers are Elusive."

CHEESE AND WINE RECEPTION

Sunday, August 14, 2005 • 8:00 p.m. –10:00 p.m.
Sponsored by Kraft Foods, Inc.

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, August 14 through Wednesday, August 17, 2005

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

COMMITTEE AND PDG CHAIRPERSON BREAKFAST

(By invitation)
Monday, August 15, 2005 • 7:00 a.m. –9:00 a.m.

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

EXHIBIT HALL RECEPTION

Monday, August 15, 2005 • 5:00 p.m. –6:15 p.m.
Sponsored by DuPont Qualicon and REMEL, Inc.

Join your colleagues in the Exhibit Hall to see the most up-to-date trends in food safety techniques and equipment. Discuss with exhibitors their latest products or use this time to view the poster presentations. Take advantage of this great networking reception.

BUSINESS MEETING

Tuesday, August 16, 2005 • 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.

PRESIDENT'S RECEPTION (By invitation)

Tuesday, August 16, 2005 • 5:30 p.m. – 6:30 p.m.
Sponsored by Fisher Scientific

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

PAST PRESIDENTS' DINNER (By invitation)

Tuesday, August 16, 2005 • 6:30 p.m. – 9:00 p.m.

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

JOHN H. SILLIKER LECTURE

Wednesday, August 17, 2005 • 3:45 p.m. – 4:30 p.m.

Michiel van Schothorst, Ph.D., Retired Vice President, Food Safety Affairs, Nestlé, Vevey, Switzerland will deliver a presentation titled "Managing the Safety of Internationally Traded Food".

AWARDS BANQUET

Wednesday, August 17, 2005 • 7:00 p.m. –9:30 p.m.

Bring IAFP 2005 to a close at the Awards Banquet. Award recipients will be recognized for their outstanding achievements and the gavel will be passed from Dr. Kathleen Glass to Incoming President Dr. Jeffrey Farber.

IAFP 2005 Event Information

EVENING EVENTS

Orioles Baseball Game
Saturday, August 13, 2005 • 3:30 p.m. -7:30 p.m.

Play Ball! Join the fun as the Orioles take on the Toronto Blue Jays. Oriole Park at Camden Yards became the official home of the Orioles on April 6, 1992. The one-time railroad center is only 2 blocks from the birth-place of baseball's most legendary hero, George Herman "Babe" Ruth. Ruth's father operated Ruth's Cafe on the ground floor of the family residence, now center field at Oriole Park.

Oriole Park is state-of-the-art yet unique, traditional and intimate in design. It blends with the urban context of downtown Baltimore while taking its image from baseball parks built in the early 20th century. Ticket price includes admission to the game and transportation between the Baltimore Marriott Waterfront Hotel and Camden Yards.

Monday Night Social – Harbor Cruise
Monday, August 15, 2005 • 6:30 p.m. -10:00 p.m.

Let the good times float on a Harbor Cruise. After a short walk from the Baltimore Marriott Waterfront to the Pier, the Bay Lady will be waiting for you to come on board and enjoy the evening. The Bay Lady will take you across the harbor and along the Patapsco River, with the city skyline in view. Enjoy a fabulous spread of food within the enclosed air-conditioned deck or go up to the top deck for a refreshing breeze and the most gorgeous panoramic view of Baltimore's Historic Harbor. Get your ticket today to reserve your spot aboard the Bay Lady! Everyone is welcome.

Little Italy Walking Tour and Dinner
Tuesday, August 16, 2005 • 6:30 p.m. - 10:30 p.m.

Take a guided walking tour through Little Italy, founded in 1849 and located in the heart of the downtown renaissance in Baltimore. Nestled between the Inner Harbor and Historic Fells Point, the area boasts more than 20 of Maryland's best Italian restaurants and trattorias. It's so hard to pick just one of the fabulous restaurants -so tonight you'll try three! Appetizer, entrée and dessert are served in charming trattorias for which this neighborhood is known regionally. Limited tickets available.

GOLF TOURNAMENT

Golf Tournament
Saturday, August 13, 2005 • 8:45 a.m. - 4:00 p.m.

Begin IAFP 2005 with a relaxing round of golf with your friends. This year's tournament will be held at Waverly Woods Golf Club, which was recognized as the "2002 Maryland Course of the Year" for its unique design and playability. The appeal of this new but mature and lush course is its wide-landing areas for tee shots while much of the challenge comes from the small, undulating greens. Course designer Arthur Hills was selected by *Golf Digest* magazine as one of their "Top Five Favorite Present-Day Architects." Everyone is welcome to play in this fun best-ball tournament. Registration fee includes green fees, cart, range balls, transportation to and from the course, a box lunch and prizes!

DAYTIME TOURS

Welcome to Washington
Saturday, August 13, 2005 • 9:00 a.m. –5:00 p.m.

Welcome to America's most unique city! One of the few capitals founded as a show-place and a seat of government, Washington is really several cities in one and you will get a chance to experience something of each.

This all-encompassing tour of Washington is designed to introduce you to the most magnificent monuments, memorials and architectural structures of the city. You will ride by the White House, Washington Monument, Capitol Building, Supreme Court, Library of Congress, Smithsonian Complex, as well as many other Washington attractions. You will stop at the Lincoln Memorial, World War II Monument, Vietnam Veterans Memorial, Korean War Veterans Memorial, and the Jefferson Memorial.

While visiting these sites, you will hear the story of Washington's unique city plan devised by the gifted architect, Pierre L'Enfant. L'Enfant was the master architect who envisioned placing broad avenues, dramatic vistas and plentiful parkland in what was then a swamp.

Lunch will be at Washington, D.C.'s historic Union Station, a Beaux Arts national landmark. After lunch, guests may enjoy over 100 stores in which to browse and window shop.

Baltimore City Tour by Land and by Sea
Sunday, August 14, 2005 • 10:00 a.m. –2:00 p.m.

Guests will take a guided tour through the historic Mt. Vernon, Federal Hill and Fells Point neighborhoods. Once arriving in Fells Point, the original harbor of Baltimore, a costumed Living-History Narrator brings to life Baltimore's colorful history with stories about real people. Lunch in an authentic Fells Point pub is also included.

Then sail aboard a blue and white Water Taxi out to the place where Francis Scott Key wrote our nation's anthem. From the water, you'll see where British ships fired on Fort McHenry in 1814.

From the fastest sailing vessels in the history of the Navy to the arrest of Southern sympathizers in City Hall at the beginning of the "War between the States", to the oldest continually working waterfront in the country, you'll take home a new opinion of Baltimore as a stalwart city of national importance.

Annapolis Past and Present
Monday, August 15, 2005 • 9:00 a.m. –2:00 p.m.

The brick streets, the charming church, state circles around which colonial era homes and inns are built, and the history that breathes from every antique house all contribute to a fascinating day's adventure in Maryland's Capital, Annapolis.

You'll begin with a walking tour of the historic center of Annapolis. Led by costumed guides you will hear fascinating stories.

The State House, the oldest continually operating in the US, is another highlight of your visit. It is where George Washington resigned as Commander-in-Chief of the Continental Armies.

There's much more to this quaint seaport town, and as you continue your exploration, you'll walk through the US Naval Academy, with its stately brick campus, and passing Bancroft Hall Dormitory, where thousands of midshipmen are fed in a matter of minutes; the famous Tecumseh statue, which serves as an Academy mascot; and stopping at the Chapel and at the dolphin-supported grave of Naval hero John Paul Jones.

Lunch will be served at the historic Maryland Inn. The Maryland Inn has a rich history – dating back to our country's revolutionary era.

PLEASE NOTE: Photo Identification is required for admittance to the US Naval Academy.

A Taste of Baltimore from the Inside
Tuesday, August 16, 2005 • 10:30 a.m. –3:30 p.m.

Take a guided tour through the new world headquarters of Phillips Foods in Baltimore, where millions of crab cakes and seafood products are prepared for distribution across the country. Known for award-winning Maryland style crab cakes and simple dedication to quality, Phillips has served millions of seafood lovers from around the world.

Guests will see how Phillips produces more than 150 crab cakes per minute –80,000 crab cakes a day –20 million crab cakes per year! Then, get a true taste for blue crab with a Maryland crab cake sandwich.

Next, it's on to Clipper City Brewing Company. Clipper City is Baltimore's largest brewing facility producing hand-crafted draught and bottled beers. Enjoy complimentary samples after the tour featuring Baltimore's "best locally brewed beer."

Chesapeake Bay Cooking Class
Wednesday, August 17, 2005 • 10:00 a.m. –1:00 p.m.

Executive Chef Jerry Pellegrino is fascinated by food and wine, and the way they work in harmony on the palate. His understanding of the two goes all the way to the molecular level, drawing on his advanced education in molecular biology. His cuisine is simple and surprising, pairing unexpected ingredients together to work with wines from the US.

Participate and observe as the Chef prepares regional specialties step-by-step. You will dine on the chef's creations and learn about what makes a wine complement or clash with cuisine.

Each course will be served with Maryland wines – Cheers!

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
- Awards Banquet
- Exhibit Hall Admittance
- Cheese and Wine Reception
- Exhibit Hall Reception
- Program and Abstract Book

4 EASY WAYS TO REGISTER

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

Online: www.foodprotection.org

Fax: 515.276.8655

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

Phone: 800.369.6337; 515.276.3344

The early registration deadline is July 13, 2005. After this date, late registration fees are in effect.

REFUND/CANCELLATION POLICY

Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by July 29, 2005. No refunds will be made after July 29, 2005; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 22, 2005. Event and tour tickets purchased are nonrefundable.

STUDENT FUNDRAISER

Help support the students with their annual fund raiser. See page 487 to order T-shirts or polo shirts.

International Association for Food Protection®

EXHIBIT HOURS

Sunday, August 14, 2005	8:00 p.m. - 10:00 p.m.
Monday, August 15, 2005	8:00 a.m. - 11:00 a.m.
	1:00 p.m. - 6:15 p.m.
Tuesday, August 16, 2005	8:00 a.m. - 2:00 p.m.

DAYTIME TOURS – Lunch included

Saturday, August 13, 2005	9:00 a.m. - 5:00 p.m.
Welcome to Washington	
Sunday, August 14, 2005	10:00 a.m. - 2:00 p.m.
Baltimore City Tour by Land and by Sea	
Monday, August 15, 2005	9:00 a.m. - 2:00 p.m.
Annapolis Past and Present	
Tuesday, August 16, 2005	10:30 a.m. - 3:30 p.m.
A Taste of Baltimore from the Inside	
Wednesday, August 17, 2005	10:00 a.m. - 1:00 p.m.
Chesapeake Bay Cooking Class	

EVENING EVENTS

Saturday, August 13, 2005	
Orioles Baseball Game	3:30 p.m. - 7:30 p.m.
Sunday, August 14, 2005	
Opening Session	7:00 p.m. - 8:00 p.m.
Cheese and Wine Reception *Sponsored by Kraft Foods North America*	8:00 p.m. - 10:00 p.m.
Monday, August 15, 2005	
Exhibit Hall Reception *Sponsored by DuPont Qualicon and REMEL, Inc.*	5:00 p.m. - 6:15 p.m.
Monday Night Social - Harbor Cruise	6:30 p.m. - 10:00 p.m.
Tuesday, August 16, 2005	
Little Italy Walking Tour and Dinner	6:30 p.m. - 10:30 p.m.
Wednesday, August 17, 2005	
Awards Banquet Reception	6:00 p.m. - 7:00 p.m.
Awards Banquet	7:00 p.m. - 9:30 p.m.

GOLF TOURNAMENT

Saturday, August 13, 2005	
Golf Tournament at Waverly Woods Golf Club	8:45 a.m. - 4:00 p.m.

HOTEL INFORMATION

For reservations, contact the hotel directly and identify yourself as an IAFP 2005 attendee to receive a special rate of $149 per night, single/double or make your reservations online. This special rate is available only until July 13, 2005 or until sold out.

Baltimore Marriott Waterfront Hotel
700 Aliceanna St.
Baltimore, Maryland 21202
Phone: 800.228.9290 • 410.385.3000 • Fax: 410.895.1910
Web site: www.stayatmarriott.com/IAFP2005
(Group Code iafiafa)

Attendee Registration Form

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.

Member since: _____

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

PAYMENT MUST BE RECEIVED BY JULY 13, 2005 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES:	MEMBERS	NONMEMBERS	TOTAL
Registration	$ 385 ($ 435 late)	$ 583 ($633 late)	_____
Association Student Member	$ 78 ($ 88 late)	Not Available	_____
Retired Association Member	$ 78 ($ 88 late)	Not Available	_____
One Day Registration* ❒ Mon. ❒ Tues. ❒ Wed.	$ 210 ($235 late)	$ 320 ($345 late)	_____
Spouse/Companion* (Name): _____	$ 55 ($ 55 late)	$ 55 ($ 55 late)	_____
Children 15 & Over* (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			

EVENING EVENTS:		# OF TICKETS	
Golf Tournament (Saturday, 8/13)	$ 135 ($145 late)	_____	_____
Baseball Game (Saturday, 8/13 – 3:30 p.m.–7:30 p.m.)	$ 26 ($ 36 late)	_____	_____
Student Luncheon (Sunday, 8/14)	$ 5 ($ 15 late)	_____	_____
Monday Night Social – Harbor Cruise (Monday, 8/15)	$ 45 ($ 55 late)	_____	_____
Children 14 and under	$ 40 ($ 50 late)	_____	_____
Tuesday Evening – Little Italy Walking Tour and Dinner (Tuesday, 8/16)	$ 92 ($102 late)	_____	_____
Additional Awards Banquet Ticket (Wednesday, 8/17)	$ 50 ($ 60 late)	_____	_____

DAYTIME TOURS: (Lunch included in daytime tours)			
Welcome to Washington (Saturday, 8/13)	$ 89 ($ 99 late)	_____	_____
Baltimore City Tour by Land and by Sea (Sunday, 8/14)	$ 74 ($ 84 late)	_____	_____
Annapolis Past and Present (Monday, 8/15)	$ 125 ($135 late)	_____	_____
A Taste of Baltimore from the Inside (Tuesday, 8/16)	$ 80 ($ 90 late)	_____	_____
Chesapeake Bay Cooking Class (Wednesday, 8/17)	$ 99 ($109 late)	_____	_____

PAYMENT OPTIONS: ❒ VISA ❒ MasterCard ❒

❒ Check Enclosed

Credit Card # _____

Name on Card _____

Signature _____

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

TOTAL AMOUNT ENCLOSED $_____
US FUNDS on US BANK

Expiration Date _____

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

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

EXHIBITORS DO NOT USE THIS FORM

IAFP 2005 Workshops

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3
Friday, August 12 1:00 p.m. to 5:00 p.m.	**Friday, August 12** 1:00 p.m. to 5:00 p.m.	**Friday and Saturday** **August 12–13** 8:00 a.m. to 5:30 p.m.
Statistics as a Tool for the Microbial Evaluation of Foods	***Statistics as a Tool for the Microbial Evaluation of Foods***	***Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed***
Saturday, August 13 8:00 a.m. to 4:30 p.m.	**Saturday, August 13** 8:00 a.m. to 4:30 p.m.	
Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods	***Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data***	

Workshop 1 and Workshop 2

Day 1– Statistics as a Tool for the Microbial Evaluation of Foods

Basic statistical concepts including variance and errors, types of distributions, and their frequencies as well as basic approaches to sampling and testing, and the risks and uncertainties in sampling and distribution will be taught. The workshop will end with a session on practical application using HACCP validation and microbiological testing assurances of meat quality as examples.

Topics:

- Basic Statistical Concepts
- Uncertainty and Distribution (Basic approaches to sampling and testing)
- Practical Application – HACCP Validation and Microbiological Testing Assurances of Meat Quality

Instructors:

Colin Gill, Agriculture and Agri-Food Canada, Lacombe, Alberta, Canada
Don Schaffner, Rutgers University, New Brunswick, NJ
Richard C. Whiting, FDA-CFSAN, College Park, MD

Organizer: Ron Usborne, Guelph, Ontario Canada

Workshop 1

Day 2 – Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods

Selecting the analytical tools for microbiological analysis that best meets your needs is a critical task. This workshop will teach you about selecting a microbiological method that is "fit for purpose." Experience a first time release and the demonstration of an AOAC "online" learning center to understand the various international approaches to method validation schemes. Speakers will address

Workshop 2

Day 2 – Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data

This workshop will present principals for understanding and implementing microbial environmental testing in a food production facility and the subsequent value and importance of that data through trending analysis. You will learn, in an interactive environment, how to perform effective environmental sampling that can be implemented into your standard operating procedures and

practical considerations in method selection both for corporate and single manufacturing site labs; the concept of uncertainty of measurement as a key component of method verification; and the Canadian experience in expectations of accrediting authorities for methods verification.

Topics:

- Method Validation – The AOAC RI Learning Center Approach
- How to Choose a Method: Practical Consideration
- Is the Uncertainty of Measurement a European Conspiracy?
- Expectations of an Accrediting Body – A Canadian Perspective

Instructors:

Michael Brodsky, Brodsky Consultants, Thornhill, Ontario, Canada
Donna Christensen, Canadian Food Inspection Agency, Calgary, Alberta, Canada
Robin Kalinowski, National Center for Food Safety and Technology, Summit-Argo, IL
Deborah McKenzie, AOAC Research Institute, Gaithersburg, MD
Maria Nelson, AOAC Research Institute, Gaithersburg, MD

Organizers:

Christine Aleski, Centrus International Inc., Ann Arbor, MI
George Wilson, BD Diagnostics, Sparks, MD

provide powerful trending information. Workshop participants will review and discuss material from practical case studies and will discuss trend analysis and summation of the data in order to develop the tools needed for the implementation of practical and measurable corrective action.

Topics:

- How Microorganisms Evade HACCP Plans: Developing Effective Environmental Sampling
- Are You Ready to Trend? Authenticating Results for Accurate and Reliable Data
- Using Data Management and Trend Analysis to Drive Continuous Improvement
- Three Case Studies

Instructors:

Robert Behling, Kornacki Food Safety Associates, LLC, McFarland, WI
Jeff Kornacki, Kornacki Food Safety Associates, LLC, McFarland, WI
W. Payton Pruett, Jr., ConAgra Foods, Inc, Omaha NE
Patricia Rule, bioMérieux, Inc., Hazelwood, MO
Cindy Ryan, Nestlé USA, Dublin, OH

Organizers:

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

Workshop 3

Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed

This course is aimed at microbiologists and personnel working in the food industry who wish to gain a better understanding of how foodborne disease is recognized and investigated, ranging from the local to the national and international level and including in-plant epidemiological investigations by USDA and FDA. The program will include lectures and exercises, including case studies and mock outbreak investigations.

Topics:

- The Science of Epidemiology: an Overview
- Local, State, Federal, and International Agencies Involved in Foodborne Illness Outbreak Investigations
- Epidemiology Applied to Foodborne Disease
- Surveillance: Laboratory Techniques, Application, and Analysis
- Mock Outbreak Investigations

Instructors:

Jack Guzewich, Food and Drug Administration, College Park, MD
Randy Huffman, American Meat Institute Foundation, Washington, D.C.
Marguerite Neill, Brown Medical School and Memorial Hospital of Rhode Island, Pawtucket, RI
Martin Wiedmann, Cornell University, Ithaca, NY

Organizer:

Catherine Nnoka, International Life Sciences Institute, North America

IAFP 2005

Workshop Registration Form

FRIDAY AND SATURDAY • AUGUST 12–13, 2005

❑ **Workshop 1**

Day 1 — ***Statistics as a Tool for the Microbial Evaluation of Foods***

Day 2 — ***Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods***

❑ **Workshop 2**

Day 1 — ***Statistics as a Tool for the Microbial Evaluation of Foods***

Day 2 — ***Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data***

❑ **Workshop 3 –** ***Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed***

First Name (will appear on badge)

Last Name

Company | Job Title

Address | City

State/Province | Country | Postal Code/Zip +4

Area Code & Telephone | Fax

E-mail | Member #

❑ Check Enclosed ❑ VISA ❑ ❑ MasterCard

Account Number **Total Amount Enclosed (US Funds on US Bank) $**

Signature **Expiration date**

• REGISTRATION •

Payment must be received by July 22, 2005 to avoid late registration rates.

WORKSHOP 1	Early Rate	Late Rate
IAFP Member	$400.00	$475.00
NonMember	$500.00	$575.00

WORKSHOP 2	Early Rate	Late Rate
IAFP Member	$420.00	$495.00
NonMember	$520.00	$595.00

WORKSHOP 3	Early Rate	Late Rate
IAFP Member	$350.00	$425.00
NonMember	$450.00	$525.00

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

Refund/Cancellation Policy

Registration fees, less a $50 administrative charge, will be refunded for written cancellations received by July 29, 2005. No refunds will be made after that date; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 22, 2005. The workshop may be cancelled if sufficient enrollment is not received by July 22, 2005.

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

• 4 Easy Ways to Register •

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

Online: **www.foodprotection.org**

Phone: 800.369.6337; 515.276.3344

Fax: 515.276.8655

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

STUDENT FUNDRAISER!

Purchase an IAFP 2005 long-sleeve T-shirt or Polo Shirt from the Student PDG to help raise money in support of our Students. Pre-ordered T-shirts are $18.00 and Polo shirts are $25.00. Shirts will be available for pick-up from the SPDG booth throughout IAFP 2005. All order forms are due by July 13th. If you have any questions, contact Renee Raiden at rraiden@vt.edu.

IAFP SPDG Shirt Order Form

If you choose to pay by credit card, make sure you include the amount to be charged. If you are paying by check make checks payable to IAFP and enclose the check with your order form. Please mail order forms for receipt by July 13, 2005 for pre-orders.

Please return order form to the following address: Renee Raiden, Virginia Tech, 22 Food Science Bldg., Blacksburg, VA 24061-0418; Fax: 540.231.9293.

Name _____ Title _____

Mailing Address _____

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

Telephone _____ Fax _____ E-mail _____

Quantity _____ **T-shirts** (long-sleeve) S ❑ M ❑ L ❑ XL ❑ $18.00

Polo Shirts S ❑ M ❑ L ❑ XL ❑ $25.00

METHOD OF PAYMENT: ❑ VISA ❑ MasterCard ❑ (Payable to IAFP)

TOTAL AMOUNT ENCLOSED $_____
US FUNDS on US BANK

❑ Check or Money Order Enclosed

Credit Card # _____

Name on Card _____

Signature _____ Expiration Date _____

Contribute to the Eighth Annual Foundation Fund Silent Auction Today!

The Foundation of the International Association for Food Protection will hold its Annual Silent Auction during IAFP 2005, the Association's 92nd Annual Meeting in Baltimore, Maryland, August 14–17, 2005. The Foundation Fund supports:

- Student Travel Scholarships
- Ivan Parkin Lecture
- Travel support for exceptional speakers at the Annual Meeting
- Audiovisual Library
- Developing Scientist Competition
- Shipment of volumes of surplus *JFP* and *FPT* journals to developing countries through FAO in Rome

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

- Bausch & Lomb Student Microscope
- Brazil Cook's Tour
- Country Cured Ham
- Cultured Pearl Necklace
- The Food Safety Professional Guide Set
- Georgia Gift Basket
- International Food Safety Icons CD
- New York State Pure Maple Syrup
- Premium Export Brandy
- Wine

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

JULY

- **7–8, SuperSafeMark® Train-the-Trainer Program,** Indiana University Purdue University, Indianapolis, IN. For more information, contact Barbara Fisher at 317.274.3418; E-mail: ExecEduc@iupui.edu.
- **12–14, HTST Pasteurization and Controls Seminar,** LaQuinta Inns & Suites, San Antonio, TX. For more information, call 210.628.1596; E-mail: mvk1030@aol.com.
- **16–20, IFT Annual Meeting,** Ernest N. Morial Convention Center, New Orleans, LA. For more information, contact James Klapthor at 312.782.8424 ext. 231 or go to www.am-fe.ift.org.
- **17–20, 7th Annual Foodborne Pathogen Analysis Conference and 42nd Annual Pesticide Residue Workshop,** TradeWinds Island Grand Resort, St. Pete Beach, FL. For more information, contact Patricia Baxter at 850.410.4797 or go to www.FLworkshop.com.
- **24–28, Milk Protein Interactions Focus of Special Symposia,** Cincinnati Convention Center, Cincinnati, OH. For more information, contact Jennifer Giambroni at 415.254.4549; E-mail: jgiambroni@sbcglobal.net.

AUGUST

- **10–11, SuperSafeMark® Train-the-Trainer Program,** Indiana University Purdue University, Indianapolis, IN. For more information, contact Barbara Fisher at 317.274.3418; E-mail: ExecEduc@iupui.edu.
- **12–13, IAFP 2005 Workshops,** Baltimore Marriott Waterfront Hotel, Baltimore, MD.

  Workshop 1, *Statistics as a Tool for the Microbial Evaluation of Foods* **and** *Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods*;

  Workshop 2, *Statistics as a Tool for the Microbial Evaluation of Foods* **and** *Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data*; and

  Workshop 3, *Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed.*

  For more information, see page 484 of this issue or contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org.
- **14–17, IAFP 2005, the Association's 92nd Annual Meeting,** Baltimore Marriott Waterfront Hotel, Baltimore, MD. For more information, see page 483 of this issue or contact Julie Cattanach at 800. 369.6337; E-mail: jcattanach@foodprotection.org.
- **15–19, Culinology Arts for Food Technologists, A Culinology® Workshop,** The Culinary Institute of America, St. Helena, CA. For more information, contact Deb North at 404.252.3663; E-mail: dnorth@kellencompany.com.
- **29–30, Microbiology II: Sanitation,** Guelph, Ontario, Canada. For more information, contact GFTC at 519.821.1246; E-mail: gftc@gftc.ca.

SEPTEMBER

- **11–14, 4th International Whey Conference,** Chicago, IL. For more information, contact James Page at 630.530.8700 or go to www.IWC-2005.org.
- **13–15, HTST Pasteurization,** Nashville, TN. For more information, call 205.595.6455; E-mail: usrandolph-consulting.com.
- **20, Georgia Association for Food Protection Annual Fall Meeting,** Georgia Tech Food Processing Auditorium, Atlanta, GA. For more information, contact Louis Hughes at 912.267.3623; E-mail: lhughes@kpseafood.com.
- **20–22, Kansas Environmental Health Association Annual Fall Meeting,** Hyatt Regency, Wichita, KS. For more information, contact Cyndra Kastens at 316.383.7951; E-mail: ckastens@sedgwick.gov.
- **20–22, New York State Association for Food Protection Annual Meeting,** Holiday Inn, Liverpool, NY. For more information, contact Janene Lucia at 607.255.2892; E-mail: jgg3@cornell.edu.
- **20–22, Washington Association for Food Protection Annual Conference,** Campbells Resort on Lake Chelan, Chelan, WA. For more information, contact Bill Brewer at 206.363.5411; E-mail: billbrewer1@juno.com.
- **21–22, Wisconsin Association for Food Protection Joint Education Conference,** Stoney Creek Inn, Mosinee, WI. For more information, contact Randy Daggs at 608.837.2087; E-mail: rdaggs@juno.com.
- **23–27, The 7th International Exhibition on Food & Drink Industry,** International Exhibition & Convention Center, Hochiminh City, Vietnam. For more information, contact Nguyen Ba Vinh at 84.90340.6383; E-mail: vinhba@hn.vnn.vn.
- **27–29, Wyoming Environmental Health Association Annual Educational Conference,** Buffalo Bill Village Resort, Cody, WY. For more information, contact Roy Kroeger at 307.633.4090; E-mail: roykehs@laramiecounty.com.

OCTOBER

- **3–7, Dairy Technology Workshop,** Newport, KY. For more information, call 205.595.6455; E-mail: us@randolph-consulting.com.
- **11–12, IAFP European Symposium on Food Safety "Recontamination Issues in the Food Industry,"** to be held in Prague, The Czech Republic. For more information, check www.foodprotection.org under "Meetings and Education."
- **11–12, Better Process Control School,** University of Nebraska, Lincoln, NE. For more information, call 402.472.9751; E-mail: tkoeppe2@unl.edu.
- **11–13, HTST Pasteurization and Controls Seminar,** LaQuinta Inns & Suites, San Antonio, TX. For more information, call 210.628.1596; E-mail: mvk1030@aol.com.
- **11–13, North Dakota Environmental Health Association Annual Meeting,** Holiday Inn, Fargo, ND. For more information, contact Deb Larson at 701.328.1291; E-mail: djlarson@state.nd.us.

COMING EVENTS

- **12–13, Association of Illinois Milk, Food and Environmental Sanitarians' Annual Fall Meeting,** Stoney Creek Inn, Peoria, IL. For more information, contact Frank Brown at 217.785.2439; E-mail: fbrown@idph.state.il.us.
- **15–19, Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology Symposium,** University of Wisconsin-River Falls, WI. For more information, contact Doreen Cegielski at 715.425.3704; E-mail: foodmicro@uwrf.edu.
- **18–20, Applied Extrusion Workshop,** University of Nebraska, Lincoln, NE. For more information, call 402.472.9751; E-mail: tkoeppe2@unl.edu.
- **19, Metropolitan Association for Food Protection Spring Meeting,** Cook College Student Center, Rutgers University, New Brunswick, NJ. For more information, contact Carol Schwar at 908.689.6693; E-mail: cschwar@entermail.net.
- **25, Iowa Association for Food Protection Annual Fall Meeting,** Western Starlite Motel, Ames, IA. For more information, contact Phyllis Borer at 712.754.2511 ext. 33; E-mail: borerp@ampi.com.
- **31–Nov. 1 Food Plant Sanitation,** Guelph, Ontario, Canada. For more information, contact GFTC at 519.821.1246; E-mail: gftc@gftc.ca.

NOVEMBER

- **2–3, Sanitary Design: A Practical Perspective,** Guelph, Ontario, Canada. For more information, contact GFTC at 519.821.1246; E-mail: gftc@gftc.ca.
- **8–9, Sensory and QA Workshop,** St. Louis, MO. For more information, call 205.595.6455; E-mail: us@randolph-consulting.com.
- **11–12, Mexico Association for Food Protection Annual Meeting,** Guadalajara, Jal., Mexico. For more information, contact Alejandro Castillo at 979.845.3565; E-mail: a-castillo@tamu.edu.
- **16, Ontario Food Protection Association Annual Fall Meeting,** Mississauga, Ontario, Canada. For more information, contact Gail Evans Seed at 519.463.5674; E-mail: seed@golden.net.

DECEMBER

- **12–14, Microbiology III: Foodborne Pathogens,** Guelph, Ontario, Canada. For more information, contact GFTC at 519.821.1246; E-mail: gftc@gftc.ca.

IAFP UPCOMING MEETINGS

AUGUST 14-17, 2005
Baltimore, Maryland

AUGUST 13-16, 2006
Calgary, Alberta, Canada

JULY 8-11, 2007
Lake Buena Vista, Florida

AUGUST 3-6, 2008
Columbus, Ohio

ADVERTISING INDEX

CAREER SERVICES SECTION

CAREER SERVICES SECTION

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

Ads appearing in *FPT* will be posted on the Association Web site at www.foodprotection.org at no additional cost.

Send your job ads to Donna Bahun at dbahun@foodprotection.org or to the Association office: 6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2864; Phone: 800.369.6337; 515.276.3344; Fax: 515.276.8655.

IAFP Members

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

University of Alberta
Department of Agricultural, Food and Nutritional Science

Associate / Full Professor in Meat Science

UNIVERSITY OF ALBERTA, Edmonton. The Department of Agricultural, Food and Nutritional Science at the University of Alberta invites applications for a tenure track/tenured appointment at the Associate/Full Professor level in Meat Science. This position is a key appointment in developing the Value Added Meat Program in the Institute for Food and Agricultural Sciences, Alberta (IFASA). IFASA is a partnership between the University of Alberta, Alberta Agriculture, Food and Rural Development and the Alberta Research Council, and has committed to a substantial expansion in meat science teaching, research and technology transfer capacity. The incumbent will provide scientific leadership and direction for the IFASA Value Added Meat Program.

The appointee will hold a PhD degree in an appropriate discipline and be expected to teach at both the undergraduate and graduate level, conduct research in meat science and lead a group representing the three partners and help establish key linkages with Agriculture & Agri-Food Canada Olds College and the meat industry identifying and filling gaps in the existing resources to allow Alberta to move towards its goal of maximizing its value added potential in the red meat and poultry industries. It is expected that the appointee will take a leadership role in the creation and eventual operation of a Centre of Innovation in Meat Science and Technology.

The appointee will be a visionary leader with proven success in research and teaching as well as expert knowledge of, and credibility with, appropriate aspects of the meat industries, from production to consumption. Experience in the industrial commercialization of new technologies and value added meat products would be beneficial.

Applications, including a statement of interest and vision regarding research and teaching, curriculum vitae, and the names of three referees, should be sent to:

Dr. Erasmus Okine, Acting Chair
Department of Agricultural, Food and Nutritional Science
University of Alberta
Edmonton, Alberta, Canada T6G 2P5

Closing date for applications is **May 31, 2005** or until a suitable candidate is found. For further information contact Dr. Okine at (780) 492-2131 / (780) 492-4265 (fax), email afns-chair@ualberta.ca or visit the web site at www.afns.ualberta.ca.

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

The University of Alberta hires on the basis of merit. We are committed to the principle of equity in employment. We welcome diversity and encourage applications from all qualified women and men, including persons with disabilities, members of visible minorities, and Aboriginal persons.

Journal of Food Protection®

ISSN: 0362-028X
Official Publication

International Association for Food Protection®

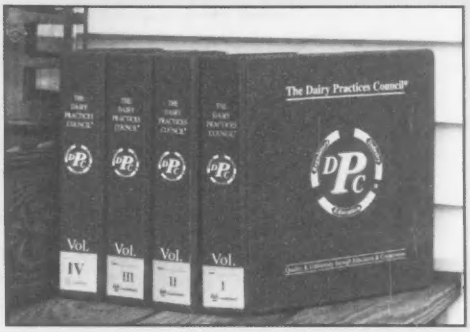
Reg. U.S. Pat. Off.

Vol. 68 **May 2005** **No. 5**

Research Notes

Review

* Asterisk indicates author for correspondence.



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

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

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

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

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

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

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

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

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

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

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

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

- ❒ D1180 10 Points to Dairy Quality
- ❒ 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 Hauler Training
- ❒ D1110 Milk Plant Sanitation: Chemical Solution
- ❒ D1120 Milk Processing Plant Inspection Procedures
- ❒ D1125 Ohio Bulk Milk Hauling
- ❒ D1130 Pasteurizer – Design and Regulation
- ❒ D1140 Pasteurizer – Operation
- ❒ D1150 Processing Fluid Milk (slides)

ENVIRONMENTAL

- ❒ E3010 The ABCs of Clean – A Handwashing & Cleanliness Program for Early Childhood Programs
- ❒ E3020 Acceptable Risks?
- ❒ E3030 Air Pollution: Indoor
- ❒ E3031 Allergy Beware
- ❒ E3040 Asbestos Awareness
- ❒ E2012 Better TEDs for Better Fisheries
- ❒ E3055 Effective Handwashing–Preventing Cross-Contamination in the Food Service Industry
- ❒ E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- ❒ E3070 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)
- ❒ E3075 EPA: This is Superfund
- ❒ E3080 Fit to Drink
- ❒ E3110 Garbage: The Movie
- ❒ E3120 Global Warming: Hot Times Ahead
- ❒ E3125 Good Pest Exclusion Practices
- ❒ E3128 Integrated Pest Management (IPM)
- ❒ E3130 Kentucky Public Swimming Pool & Bathing Facilities
- ❒ E3131 Key Pests of the Food Industry
- ❒ E3161 The Kitchen Uncovered Orkin Sanitized EMP
- ❒ E3170 The New Superfund: What It is & How It Works–(1) Changes in the Remedial Process: Clean-up Standards & State Involvement Requirements
- ❒ E3180 The New Superfund: What It is & How It Works–(2) Changes in the Removal Process: Removal & Additional Program Requirements
- ❒ E3190 The New Superfund: What It is & How It Works – (3) Enforcement and Federal Facilities
- ❒ E3210 The New Superfund: What It is & How It Works – (4) Emergency Preparedness & Community Right-to-Know
- ❒ E3220 The New Superfund: What It is & How It Works – (5) Underground Storage Tank Trust Fund & Response Program
- ❒ E3230 The New Superfund: What It is & How It Works – (6) Research & Development/Closing Remarks
- ❒ E3133 Physical Pest Management Practices
- ❒ E3135 Plastic Recycling Today: A Growing Resource
- ❒ E3140 Putting Aside Pesticides
- ❒ E3150 Radon
- ❒ E3160 RCRA – Hazardous Waste
- ❒ 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?

FOOD

- ❒ F2260 100 Degrees of Doom...The Time & Temperature Caper
- ❒ F2265 A Day in the Deli
- ❒ F2450 A Guide to Making Safe Smoked Fish
- ❒ F2451 A HACCP-based Plan Ensuring Food Safety in Retail Establishments
- ❒ F2005 A Lot on the Line
- ❒ F2007 The Amazing World of Microorganisms
- ❒ F2011 Available Post Harvest Processing Technologies for Oysters
- ❒ F2008 A Recipe for Food Safety Success
- ❒ F2009 Basic Personnel Practices
- ❒ F2440 Cleaning & Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!
- ❒ F2010 Close Encounters of the Bird Kind
- ❒ F2013 Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments
- ❒ F2015 Controlling *Listeria*: A Team Approach
- ❒ F2111 Controlling *Salmonella*: Strategies that Work
- ❒ F2037 Cooking and Cooling of Meat and Poultry Products (2 Videos)
- ❒ F2030 "Egg Games" Foodservice Egg Handling and Safety
- ❒ F2020 Egg Handling & Safety
- ❒ F2021 Egg Production
- ❒ F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef (2 Videos)
- ❒ F2035 Fabrication and Curing of Meat and Poultry Products (2 Videos)
  FastTrack 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
- ❒ F2039 Food for Thought – The GMP Quiz Show
- ❒ F2040 Food Irradiation
- ❒ F2045 Food Microbiological Control (6 Videos)
- ❒ F2050 Food Safe – Food Smart – HACCP & 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
- ❒ F2134 Food Safety: Fish and Shellfish Safety Video
- ❒ F2090 Food Safety: An Educational Video for Institutional Food-Service Workers
  Food Safety for Food Service – Series I
- ❒ F2100 Tape 1–Cross Contamination
- ❒ F2101 Tape 2– HACCP
- ❒ F2102 Tape 3–Personal Hygiene
- ❒ F2103 Tape 4–Time and Temperature Controls
  Food Safety for Food Service – Series II
- ❒ F2104 Tape 1–Basic Microbiology and Foodborne Illness
- ❒ F2105 Tape 2– Handling Knives, Cuts and Burns
- ❒ F2106 Tape 3–Working Safely to Prevent Injury
- ❒ F2107 Tape 4–Sanitation
- ❒ F2120 Food Safety: For Goodness Sake, Keep Food Safe
- ❒ F2133 Food Safety First
- ❒ F2110 Food Safety is No Mystery
- ❒ F2130 Food Safety: You Make the Difference
- ❒ F2125 Food Safety Zone: Basic Microbiology
- ❒ F2126 Food Safety Zone: Cross Contamination
- ❒ F2127 Food Safety Zone: Personal Hygiene
- ❒ F2128 Food Safety Zone: Sanitation
- ❒ F2129 Food Technology: Irradiation
- ❒ F2124 Fruits, Vegetables, and Food safety: Health and Hygiene on the Farm
- ❒ 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
- ❒ F2143 GMP Basics: Guidelines for Maintenance Personnel
- ❒ F2148 GMP – GSP Employee
- ❒ F2150 GMP: Personal Hygiene and Practices in Food Manufacturing
- ❒ F2147 GMP Basics: Process Control Practices
  GMP Food Safety Video Services
- ❒ 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 & Control of Contamination during Processing
  GMPs for Food Plant Employees: 5 Volume Video Series Based on European Standards and Regulations
- ❒ F2161 Tape 1: Definitions
- ❒ F2162 Tape 2: Personnel and Personnel Facilities
- ❒ F2163 Tape 3: Building and Facilities
- ❒ F2164 Tape 4: Equipment and Utensils
- ❒ F2165 Tape 5: Production/Process Controls
- ❒ F2266 HACCP: A Basic Understanding
- ❒ F2180 HACCP: Safe Food Handling Techniques
- ❒ F2169 HACCP:Training for Employees–USDA Awareness
- ❒ F2172 HACCP: Training for Managers
- ❒ F2170 The Heart of HACCP
- ❒ F2171 HACCP: The Way to Food Safety
- ❒ F2173 Inside HACCP: Principles, Practices & Results
- ❒ F2175 Inspecting for Food Safety – Kentucky's Food Code
- ❒ 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
- ❒ F2240 On the Front Line
- ❒ F2250 On the Line
- ❒ F2270 Pest Control in Seafood Processing Plants
- ❒ F2271 Preventing Foodborne Illness
- ❒ F2280 Principles of Warehouse Sanitation
- ❒ F2290 Product Safety & Shelf Life
- ❒ F2220 Proper Handling of Peracidic Acid
- ❒ F2230 Purely Coincidental
- ❒ F2310 Safe Food: You Can Make a Difference
- ❒ F2320 Safe Handwashing
- ❒ F2325 Safe Practices for Sausage Production
- ❒ F2460 Safer Processing of Sprouts
- ❒ F2330 Sanitation for Seafood Processing Personnel
- ❒ F2340 Sanitizing for Safety
- ❒ F2341 Science and Our Food Supply
- ❒ F2342 Seafood HACCP Internet Training Course
- ❒ F2350 SERVSAFE® Steps to Food Safety (6 Videos)
- ❒ F2430 Smart Sanitation: Principles & Practices for Effectively Cleaning Your Food Plant
- ❒ F2370 Supermarket Sanitation Program – "Cleaning & 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

OTHER

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

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	
	*Developing HACCP Plans–A Five-Part Series (as published in *DFES*)	15.00	15.00	
	*Surveillance of Foodborne Disease – A Four-Part Series (as published in *JFP*)	18.75	18.75	
	*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, 2006

PAYMENT:

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

❑ **Check or Money Order Enclosed** ❑ VISA ❑ MasterCard ❑ Discover

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

MEMBERSHIP DATA:

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.

MEMBERSHIP CATEGORIES:

MEMBERSHIPS	US	Canada/Mexico	International
❑ **Membership with *JFP* & *FPT* – *BEST VALUE!***	$185.00	$220.00	$265.00
12 issues of the *Journal of Food Protection* and *Food Protection Trends*			
❑ add *JFP* Online	$36.00	$36.00	$36.00
❑ **Membership with *FPT***	$100.00	$115.00	$130.00
12 issues of *Food Protection Trends*			
❑ add *JFP* Online	$36.00	$36.00	$36.00
❑ ***Student Membership with *JFP* Online** (no print copy)	$48.00	$48.00	$48.00
❑ ***Student Membership with *JFP* & *FPT***	$92.50	$127.50	$172.50
❑ ***Student Membership with *JFP***	$50.00	$70.00	$100.00
❑ ***Student Membership with *FPT***	$50.00	$65.00	$80.00
❑ add *JFP* Online	$36.00	$36.00	$36.00

*Must be a full-time student. Student verification must accompany this form.

SUSTAINING MEMBERSHIPS

Recognition for your organization and many other benefits. *JFP* Online included.

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

PAYMENT:

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

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

TOTAL MEMBERSHIP PAYMENT $ _____

All prices include shipping and handling
Prices effective through August 31, 2006

CREDIT CARD # _____

EXP. DATE _____

SIGNATURE _____

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

Invite a Colleague to Join

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

Benefits of Membership

- ***Food Protection Trends*** — Published as the general Membership publication, each issue contains refereed articles on applied research, applications of current technology and general interest subjects for food safety professionals. Regular features include industry and association news, an industry-related products section and a calendar of meetings, seminars and workshops.
- ***Journal of Food Protection*** — First published in 1937, the Journal is a refereed monthly publication. Each issue contains scientific research and authoritative review articles reporting on a variety of topics in food science pertaining to food safety and quality.
- ***Journal of Food Protection* Online** — Internet access to abstracts and full text articles. Full text searching, active reference links, multiple delivery options, and table of contents alerting at your fingertips.
- **The Audiovisual Library** — As a free service to Members, the Library offers a wide variety of quality training videos dealing with various food safety issues.
- **The Annual Meeting** — With a reputation as the premier food safety conference, each meeting is attended by over 1,500 of the top industry, academic and government food safety professionals. Educational sessions are dedicated to timely coverage of key issues and cater to multiple experience levels.

Promote YOUR Association to Colleagues

If you know someone who would prosper from being a Member, share with them the benefits of Membership, send them to our Web site, or provide us with their mailing address and we will send them information as well as sample journals. Together we are *Advancing Food Safety Worldwide*!

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