

ISSN: 1043-3546

April • 1994

200W Merle Hay Centre • 6200 Aurora Avenue  
Des Moines • Iowa • U.S.A. • 50322

UNIVERSITY MICROFILMS  
INTERNATIONAL  
300 NORTH ZEEB ROAD  
ANN ARBOR MI

94.12

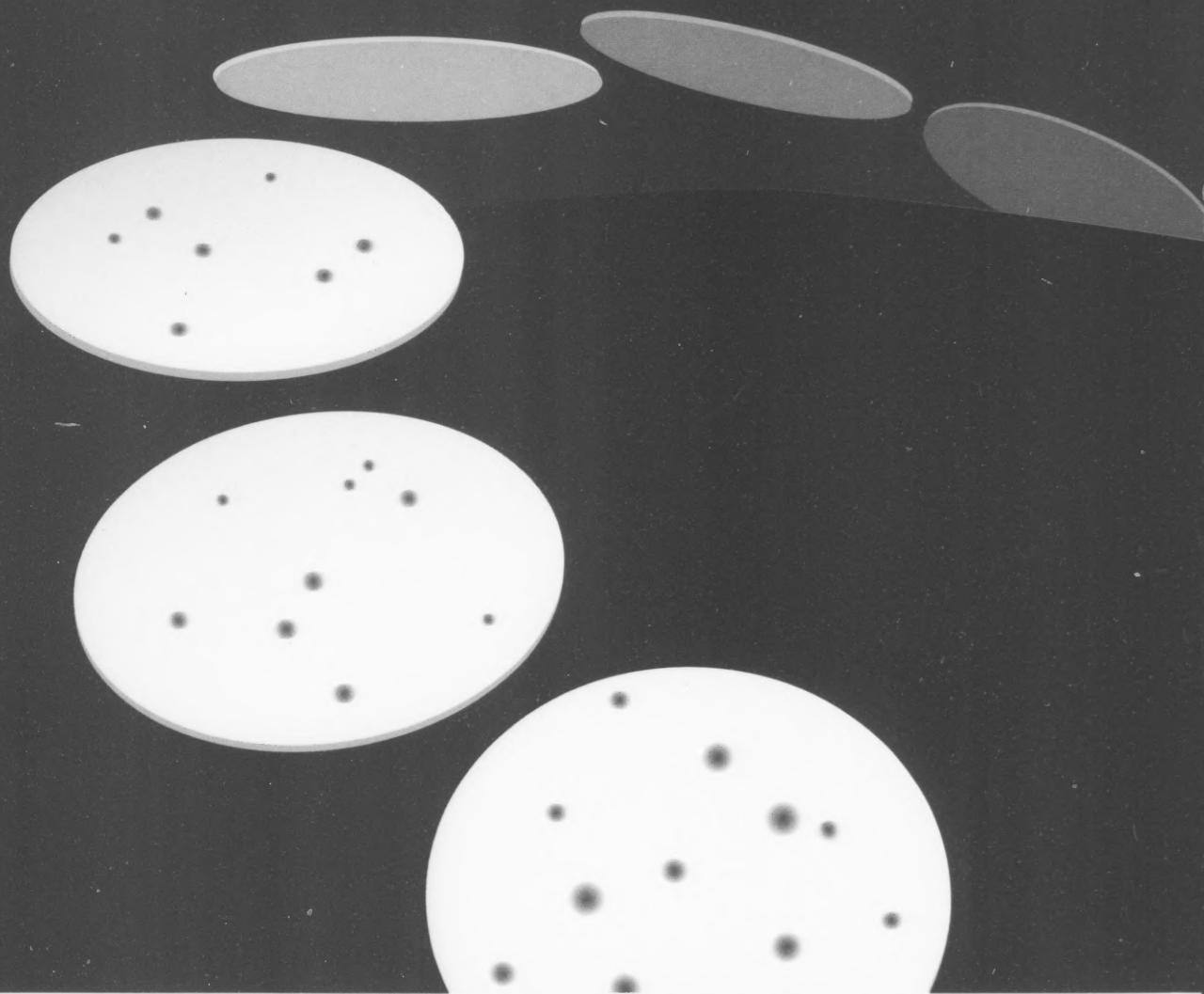
Vol • 14 • No. 4 • Pages 189-248

48106-

DAIRY, FOOD AND ENVIRONMENTAL

# SANITATION

APRIL 1994



A Publication of the International Association of Milk, Food and Environmental Sanitarians, Inc.

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



# Are You Pouring Out Profit?

You're pouring out profit when you dump antibiotic contaminated milk into your bulk tank. And you're sacrificing profit when you keep a treated cow out of the milking herd one minute longer than necessary. So, put your milk to the test.

With Delvotest P and SP, you can detect virtually all antibiotic residues in milk before it ever hits the bulk tank.

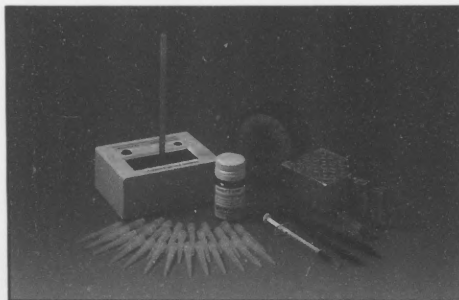
Delvotest is simple to use, and the best part is Delvotest can be conducted right there on your farm at your convenience.

With an inexpensive Delvotest farm block heater and a few minutes of your time, the test will yield easily

interpreted and conclusive readings. And with the use of the automatic Delvotest timer, you can read the test results at your convenience, up to 12 hours from the start of the incubation period.

Delvotest saves you time and money, and assures you that the milk going into the bulk tank is antibiotic free.

Ask about Delvotest P and SP, and stop letting antibiotics milk your profits.

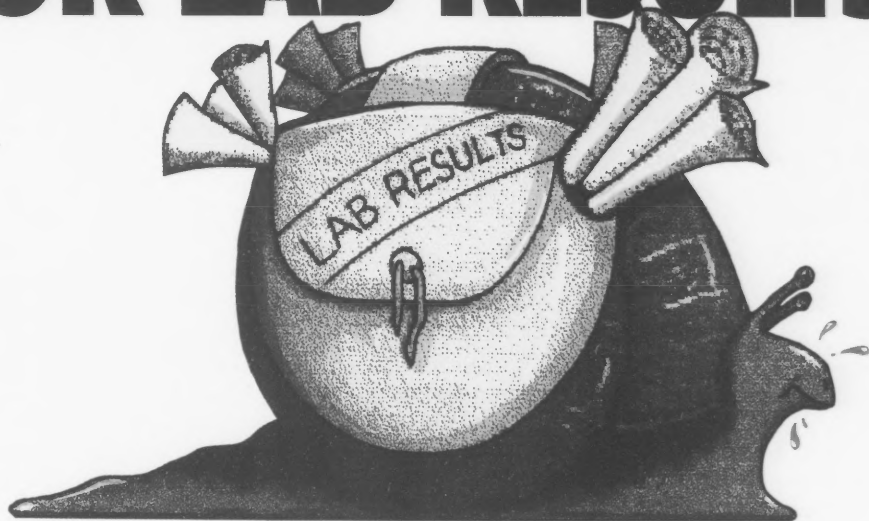


*Gist-brocades*

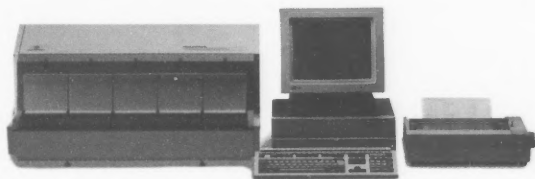
For complete information, write to:  
Gist-brocades Food Ingredients, Inc.  
2200 Renaissance Blvd.  
King of Prussia, PA 19406  
1-800-662-4478

Please circle No. 105 on your Reader Service Card  
IAMFES Sustaining Member  
1994 Exhibitor

# TIRED OF WAITING FOR LAB RESULTS?



*VIDAS® automatically screens pathogens from enriched samples in as little as 45 minutes!*



VIDAS® is a time-saving breakthrough in automated microbiology testing. Now QA/QC personnel can quickly screen food samples for *Salmonella*, *Listeria* and Staphylococcal enterotoxin.

Operate VIDAS® in concert with the Vitek® System or Bactometer® with the multi-tasking Nerve Center computer, or as a stand-alone system.

### **Glowing Reviews**

Designed for direct antigen detection and serological testing of infectious disease agents, VIDAS® utilizes the Enzyme-Linked Fluorescent Immunoassay (ELFA), a version of the well-known ELISA technology.

Testing produces a fluorescent product that's read by a special optical scanner within the instrument.

### **The SPR and Reagent Strip**

Our patented Solid Phase Receptacle (SPR) and special Reagent Test Strips contain all pre-dispensed reagents required for on-line processing.

Process assays simultaneously or initiate them at various times. You may even mix and match quantities and types of assays!

### **Testing Speed and Capacity**

Run up to 30 tests from enriched samples with results automatically printed in as little as 45 minutes! Additional readers can expand system capacity to 120 tests.



*mini VIDAS® is available for laboratories with smaller testing volumes.*

Call today for more information: **800-638-4835**



**bioMérieux**

bioMérieux Vitek, Inc. 595 Anglum Drive, Hazelwood, MO 63042-2395, USA • 314/731-8500, 800/638-4835 • FAX: 314/731-8700

# Thoughts From the President . . .



By  
**Harold Bengsch**  
IAMFES President

In my January (1994) column, I reported to you that the IAMFES Executive Board had voted to change the paper used in printing *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection*. You may recall that at that time, our compelling reason for making the change was one of economy.

Simply stated, by using the uncoated paper, we could save about \$11,000 a year in printing costs. At a time when saving money is on everyone's mind, that seemed too good an opportunity to pass up.

I invited you to contact me with your comments concerning the change. Several of you did, but the conclusions were inconclusive, in that some thought it was a good idea. Others didn't like the change and expressed concern over what we had done.

Three main ideas seemed to surface: 1. That the new paper would not have the ability to withstand the ravages of time as well as the old paper had; 2. That the pictures, line drawings and graphics would not be as "sharp" as what we were accustomed to with the old paper; and 3. That it "cheapened" the journals. Let me address each of these concerns.

1. **Archival Quality:** It is very important that the paper used in our journals will hold up over time. We certainly don't want them fading, yellowing, cracking or disintegrating prematurely. According to paper suppliers, the archival quality of any paper is driven by its pH. The closer the paper is to neutral, the longer it will last under similar conditions. The new paper we are using has essentially the same pH as the coated paper we were using.

The supplier went on to point out that all papers in use today are "100 times better than what we were using just 10 years ago." Take a look at some of your old JFPs and see if they aren't in pretty good shape. I think that we can conclude that changing the paper will have no significant effect on the archival value of the journals.

2. **Picture Reproduction:** We know that the two types of papers will, in fact, accept the ink differently. With a coated paper, the ink resides more on the surface while with the uncoated papers, the ink soaks in. Thus, we might expect to see some differences and you can – under magnification. Far more critical is the quality of the originals. Their quality will have more to do with the sharpness of the reproduction than will the fact that the paper is coated or uncoated. There is very little that the editors can do if the quality is lacking in the originals.
3. **Cheapened the Journals:** I can't really argue with this, because this is a judgement call. I personally like the uncoated papers better – I find them easier to read and easier to make notes on. The uncoated papers also seem to be cleaner and whiter to me.

On the other hand, we have come to associate coated papers with class or richness. Newsprint may well be at one end of the spectrum and the fashion magazines at the other, and those fashion magazine are most definitely printed on coated papers. Again, it is in the eye of the beholder. Do the journals look cheaper on the uncoated papers than they did on the coated papers? It's up to you.

You will shortly be receiving (if you haven't already) a journal readership survey. In it are two questions regarding the use of coated/uncoated papers for printing the journals. Our decision as to whether to go back to using coated papers will be based on what we learn from these questions. Please help us by completing your survey and returning it.

Please circle No. 210 on your Reader Service Card



# ✓ U<sub>S</sub> OUT.

INDUSTRIAL

BIOTECHNOLOGY

- ✓ Only manufacturer dedicated solely to producing over 300 dehydrated media formulations.
- ✓ Only supplier not utilizing national distribution chain-store systems. Contact directly or with a select group of regional independent companies.
- ✓ As we do not have to support \$ absorbing projects unrelated to dehydrated media, our prices are substantially lower than others.
- ✓ Quality products are a given...or your money back.
- ✓ U<sub>S</sub> out for media ingredients (1 lb. or 1 ton) or specially formulated complete media.

FOOD

WATER

DAIRY

CLINICAL

**acumedia**<sup>TM</sup>



**Acumedia  
Manufacturers, Inc.**  
3651 Clipper Mill Rd.  
Baltimore, MD 21211

Call (410) 467-3200 • (800) 783-3212 Fax (410) 366-8563 • (800) 875-8563 or TLX 904059 WSH

# IAMFES Sustaining Members

**ABC Research**, PO Box 1557, Gainesville, FL 32602; (904)372-0436

**ABELL Pest Control**, 246 Attwell Drive, Etobicoke, ON M9W 5B4; (416)675-6060

**Accurate Metering Systems, Inc.**, 1651 Wilkening Court, Schaumburg, IL 60173; (708)882-0690

**Alfa-Laval Agri, Inc.**, 11100 North Congress Avenue, Kansas City, MO 64153; (816)891-1565

**AMPCO Pumps, Inc.**, 4000 W. Burnham St, Milwaukee, WI 53215; (414)643-1852

**Applied Microbiology, Inc.**, 170 53rd Street, Brooklyn, NY 11232; (212)578-0851

**Babson Bros. Co.**, 1880 Country Farm Drive, Naperville, IL 60563; (708)369-8100

**Becton Dickinson Microbiology Systems**, PO Box 243, Cockeysville, MD 21030; (301)584-7188

**Bentley Instruments, Inc.**, 327 Lake Hazeltine Drive, Chaska, MN 55318; (612)448-7600

**Biolog, Inc.**, 3447 Investment Blvd., Suite 2, Hayward, CA 94545; (415)785-2585

**bioMérieux Vittek, Inc.**, 595 Anglum Drive, Hazelwood, MO 63042-2395; (800)638-4835

**Borden, Inc.**, 180 E. Broad Street, Columbus, OH 43215; (614)225-6139

**Capitol Vial Corp.**, PO Box 446, Fultonville, NY 12072; (518)853-3377

**Charm Sciences, Inc.**, 36 Franklin Street, Malden, MA 02148; (617)322-1523

**Cherry-Burrell Corp.**, 2400 6th Street, SW, Cedar Rapids, IA 52406; (319)399-3236

**Custom Control Products, Inc.**, 1300 N. Memorial Drive, Racine, WI 53404; (414)637-9225

**Dairy and Food Labs, Inc.**, 3401 Crow Canyon Road, Suite 110, San Ramon, CA 94583-1307; (510)830-0350

**Dairy Quality Control Inst.**, 5205 Quincy Street, St. Paul, MN 55112-1400; (612)785-0484

**Dairywomen, Inc.**, 10140 Linn Station Road, Louisville, KY 40223; (502)426-6455

**Darlgold, Inc.**, 635 Elliott Avenue, W., Seattle, WA 98119; (206)284-6771

**Dean Foods**, 1126 Kilburn Avenue, Rockford, IL 61101; (815)962-0647

**Decagon Devices**, PO Box 835, Pullman, WA 99163; (509)332-2756

**Difco Laboratories**, PO Box 331058, Detroit, MI 48232; (313)462-8478

**Diversey Corp.**, 12025 Tech Center Drive, Livonia, MI 48150-2122; (313)458-5000

**Eastern Crown, Inc.**, PO Box 216, Vernon, NY 13476; (315)829-3505

**Electrol Specialties Company**, 441 Clark Street, South Beloit, IL 61080; (815)389-2291

**F & H Food Equipment Co.**, PO Box 398595, Springfield, MO 65808; (417)881-6114

**FRM Chem, Inc.**, PO Box 207, Washington, MO 63090; (314)583-4360

**Alex C. Fergusson, Inc.**, Spring Mill Drive, Frazer, PA 19355; (215)647-3300

**Foss Food Technology Corporation**, 10355 W. 70th Street, Eden Prairie, MN 55344; (612)941-8870

**H.B. Fuller Co.**, 3900 Jackson Street, NE, Minneapolis, MN 55421; (612)781-8071

**Gardex Chemicals, Ltd.**, 246 Attwell Drive, Etobicoke, ON M9W 5B4; (416)675-6727

**GENE-TRAK Systems**, 31 New York Avenue, Framingham, MA 01701; (508)872-3113

**General Mills Restaurants, Inc.**, P. O. Box 593330, Orlando, FL 32859; (407)850-5330

**Gist-brocades Food Ingredients, Inc.**, N93 W14560 Whittaker Way, Menomonee Falls, WI 53051; (800)423-7906

**Hess & Clark, Inc./KenAg**, 7th & Orange Street, Ashland, OH 44805; (800)992-3594

**IBA, Inc.**, 27 Providence Road, Millbury, MA 01527; (508)865-6911

**IDEXX Laboratories, Inc.**, 1 Idexx Drive, Westbrook, ME 04092; (800)321-0207

**Integrated BioSolutions, Inc.**, 4270 US Route One, Monmouth Junction, NJ 08892; (908)274-1778

**International Dairy Foods Association**, 888 16th Street, NW, Washington, DC 20006; (202)296-4250

**Kienzle Division, Ecolab Inc.**, Ecolab Center North, St. Paul, MN 55102; (612)293-2233

**Land O'Lakes Inc.**, PO Box 116, Minneapolis, MN 55440-0116; (612)481-2870

**Maryland & Virginia Milk Prod. Assn., Inc.**, 1985 Isaac Newton Square, Reston, VA 22090; (703)742-6800

**Metz Sales, Inc.**, 522 W. First Street, Williamsburg, PA 16693; (814)832-2907

**Mid America Dairymen, Inc.**, 3253 E. Chestnut Expressway, Springfield, MO 65802-2584; (417)865-7100

**Minnesota Valley Testing Laboratories**, PO Box 249, New Ulm, MN 56073-0249; (507)354-8317

**Nabisco Foods Group**, 75 North Arlington Avenue, East Orange, NJ 07017; (201)503-2080

**Nasco International**, 901 Janesville Avenue, Fort Atkinson, WI 53538; (414)563-2446

**National Mastitis Council**, 1840 Wilson Boulevard, Suite 400, Arlington, VA 22201; (703)243-8268

**Nelson-Jameson, Inc.**, 2400 E. Fifth Street, PO Box 647, Marshfield, WI 54449-0647; (715)387-1151

**NESTLE USA, Inc.**, 800 N. Brand Blvd., Glendale, CA 91203; (818)549-6159

**Northland Food Lab.**, 2415 Western Avenue, PO Box 160, Manitowoc, WI 54221-0160; (414)682-7998

**Norton Company Transflow Tubing**, PO Box 3660, Akron, OH 44309-3660; (216)798-9240

**Organon Teknika**, 100 Akzo Avenue, Durham, NC 27704; (919)620-2000

**Pall Ultrafine Corp.**, 2200 Northern Boulevard, East Hills, NY 11548; (516)484-5400

**Penn State Creamery**, 12 Borland Laboratory, University Creamery, University Park, PA 16802; (814)865-7535

**Ralston Analytical Laboratories**, 2RSCheckerboard Square, St. Louis, MO 63164; (314)982-1680

**Rio Linda Chemical Co., Inc.**, 410 N. 10th Street, Sacramento, CA 95814; (916)443-4939

**Ross Laboratories**, 625 Cleveland Avenue, Columbus, OH 43216; (614)227-3333

**Seiberling Associates, Inc.**, 11415 Main Street, Roscoe, IL 61073; (815)623-7311

**Silliker Laboratories Group, Inc.**, 900 Maple Drive, Homewood, IL 60430; (708)957-7878

**Sparta Brush Co. Inc.**, PO Box 317, Sparta, WI 54656; (608)269-2151

**Tekmar Co.**, PO Box 371856, Cincinnati, OH 45222-1856; (513)761-0633

**3M/Medical-Surgical Div.**, 3M Center, St. Paul, MN 55144-1000; (612)736-9593

**Unipath Co., Oxoid Div.**, P.O. Box 691, Ogdensburg, NY 13669; (800)567-8378

**Viatran Corporation**, 300 Industrial Drive, Grand Island, NY 14072; (716)773-1700

**VICAM**, 313 Pleasant Street, Watertown, MA 02172; (617)926-7045

**Walker Stainless Equipment Co.**, 618 State Street, New Lisbon, WI 53950; (608)562-3151

# Dairy, Food and Environmental Sanitation **CONTENTS**

## Articles:

- Listeria monocytogenes and Food:**  
**The U. K. Approach** ..... 198  
*Diane Roberts*

- Australian Perspectives on Listeria monocytogenes** ..... 205  
*Michael J. Eyles*

- Foodborne Illness (Part 6): Vibrios** ..... 210  
*George H. Reed*

- European Perspectives on Listeria monocytogenes** ..... 212  
*Paul Teufel*

- Updates** ..... 215

- News** ..... 216

- Federal Register** ..... 217

- Food and Environmental Hazards to Health** ..... 218

- HAZCON-Based Total Quality Management** ..... 219

## Association News:

- Thoughts From the President** ..... 190  
**Sustaining Members** ..... 192  
**On My Mind** ..... 196  
**New IAMFES Members** ..... 222  
**Affiliate News** ..... 223  
**81st IAMFES Annual Meeting Preliminary Program** ..... 229  
**81st IAMFES Annual Meeting Tours and Special Events** ..... 238  
**81st Annual Meeting Registration Forms** ..... 240

- Industry Products** ..... 224

- Business Exchange** ..... 242  
 "Classifieds"

- Coming Events** ..... 245

- Advertising Index** ..... 246

- IAMFES Booklet Form** ..... 247

- IAMFES Membership Application** ..... 248

ABOUT THE COVER . . . Artwork courtesy of VICAM, 313 Pleasant Street, Watertown, MA 02172, (617)926-7045, FAX (617)923-8055. Artist's rendition of VICAM's quantitative 24 hour Listeria test results from Listerest™.

The publishers do not warrant, either expressly or by implication, the factual accuracy of the articles or descriptions herein nor do they so warrant any views or opinions offered by the authors of said articles and descriptions.

**Dairy, Food and Environmental Sanitation** (ISSN-1043-3546) is published monthly beginning with the January number by the International Association of Milk, Food and Environmental Sanitarians, Inc. executive offices at 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, IA 50322-2838, USA. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc. 911 N. Second Street, Ames, IA 50010, USA. Second Class Postage paid at Des Moines, IA 50318 and additional entry offices.  
**Postmaster:** Send address changes to Dairy, Food and Environmental Sanitation, 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, IA 50322-2838, USA.  
**Manuscripts:** Correspondence regarding manuscripts and other reading materials should be addressed to Jeanne A. Lightly, 200W Merle Hay Centre, 6200 Aurora Ave., Des Moines, IA 50322-2838, USA. "Instructions to Contributors" can be obtained from the editor.  
**Orders for Reprints:** All orders should be sent to DAIRY, FOOD AND ENVIRONMENTAL SANITATION, IAMFES, Inc., 200W Merle Hay Centre, 6200 Aurora Ave., Des

Moines, IA 50322-2838. **Notes:** Single copies of reprints are not available from this address; address reprint requests to principal author.  
**Business Matters:** Correspondence regarding business matters should be addressed to Steven K. Halstead, IAMFES, 200W Merle Hay Centre, 6200 Aurora Ave., Des Moines IA 50322-2838.  
**Subscription Rates:** \$100.00 per year. Single copies \$10.00 each. No cancellations accepted.  
**Sustaining Membership:** A sustaining membership in IAMFES is available to companies at a rate of \$450 per year, which includes \$100 credit toward an ad in the "annual meeting issue" of Dairy, Food and Environmental Sanitation, the July issue. For more information, contact IAMFES, 200W Merle Hay Centre, 6200 Aurora Ave., Des Moines, IA 50322-2838, 515-276-3344.  
**Membership Dues:** Membership in the Association is available to individuals only. Direct dues are \$50 per year and include a subscription to Dairy, Food and Environmental Sanitation. Direct dues including both Dairy, Food and Environmental Sanitation and Journal of Food Protection are \$80.00. Student membership is

\$25.00 per year, with verification of student status, and includes Dairy, Food and Environmental Sanitation or Journal of Food Protection. No cancellations accepted. Student membership with both journals is \$40.  
**Postage:** Canada and foreign add \$22.50 PER journal subscription. U.S. FUNDS ONLY-ON U.S. BANK. Single copies add \$7.00.  
**Claims:** Notice of failure to receive copies must be reported within 30 days domestic, 90 days foreign. All correspondence regarding changes of address and dues must be sent to IAMFES, Inc., 200W Merle Hay Centre, 6200 Aurora Ave., Des Moines, IA 50322-2838, 515-276-3344.

### IAMFES EXECUTIVE BOARD

**President,** Harold Bengsch, Springfield/Greene Co. Health Dept., 921 W. Turner, Springfield, MO 65803, 417-864-1657.  
**President-Elect,** C. Dee Clingman, General Mills Restaurants, 5313 Foxshire Court, Orlando, FL 32819; (407)245-5330.

**Vice-President,** F. Ann Drughon, University of Tennessee, PO Box 1071, Knoxville, TN 37901-1071, 615-974-7147.  
**Secretary,** Michael H. Brodsky, Ontario Ministry of Health, PO Box 9000, Terminal A, Toronto, Ontario, Canada M5W 1R5; 416-235-5717  
**Past President,** Michael P. Doyle, Dept. of Food Science, GA Exper. Station, University of Georgia, Griffin, GA 30223; 404-228-7284  
**Affiliate Council Chairperson,** Charles Price, US FDA, 508 S. Brewster Avenue, Lombard, IL 60148; 312-353-9407  
**Executive Mgr.,** Steven K. Halstead, CAE, 200W Merle Hay Centre, 6200 Aurora Ave., Des Moines, IA 50322-2838, 515-276-3344.

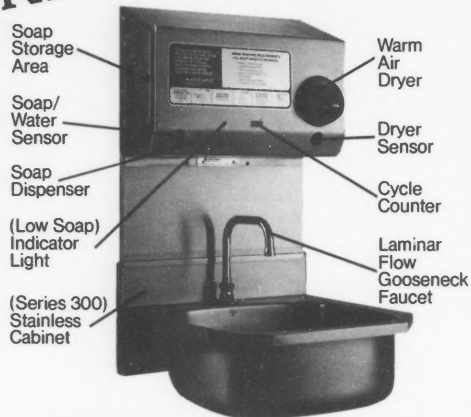
### EDITORS

**STEVEN K. HALSTEAD, Managing Editor,** 200W Merle Hay Centre, 6200 Aurora Ave., Des Moines, IA 50322, 515-276-3344.  
**JEANNE A. LIGHTLY, Editor,** 200W Merle Hay Centre, 6200 Aurora Ave., Des Moines, IA 50322, 515-276-3344.

### EDITORIAL BOARD

**KEVIN F. ANDERSON** ..... Ames, IA  
**SIDNEY BARNARD** ..... University Park, PA  
**HAROLD BENGSH** ..... Springfield, MO  
**FLOYD W. BODYFELT** ..... Corvallis, OR  
**JOHN C. BRUHN** ..... Davis, CA  
**J.H. BURKETT** ..... Sioux City, IA  
**WARREN S. CLARK, JR.** ..... Chicago, IL  
**WILLIAM W. COLEMAN, II** ..... St. Paul, MN  
**OLIVER D. COOK** ..... Rockville, MD  
**NELSON COX** ..... Athens, GA  
**RUTH G. FUQUA** ..... Mt. Juliet, TN  
**THOMAS M. GILMORE** ..... Rockville, MD  
**PAUL HARTMAN** ..... Ames, IA  
**CHARLOTTE W. HINZ** ..... Laroy, NY  
**RICHARD F. JOLLEY** ..... Branford, FL  
**WILLIAM S. LAGRANGE** ..... Ames, IA  
**JAMES W. LITTLEFIELD** ..... Austin, TX  
**PAUL F. MARTIN** ..... Chicago, IL  
**DEBBY L. NEWSLOW** ..... Plymouth, FL  
**DAVID H. PEPPER** ..... Sioux City, IA  
**MICHAEL PULLEN** ..... White Bear Lake, MN  
**J. REEDER** ..... Reston, VA  
**ROBERT L. SANDERS** ..... Washington, DC  
**P.C. VASAVADA** ..... River Falls, WI

# NEW! TOUCHLESS HANDWASHING



## FOR FOODSERVICE KITCHENS

- Fights hand-to-food contamination
- Cycle counter keeps score of handwashes
- User-friendly features encourage frequent handwashing
- Touchless activation eliminates re-contamination of clean hands after washing
- All-in-one design conserves valuable kitchen space



5700 McDermott Drive  
 Berkeley, Illinois 60163  
 Toll Free: (800) 323-0701  
 Phone: (708) 449-6950  
 Fax: (708) 449-6958

Please circle No. 220 on your Reader Service Card

# FOOD ANALYSIS



## SMITH LABORATORY SERVICE LTD.

367 Olivewood Road  
 Toronto, Ontario M8Z 2Z8

Tel. (416) 231-2546  
 FAX (416) 231-2410

- |                                 |                              |
|---------------------------------|------------------------------|
| SANITATION/ENVIRONMENTAL AUDITS | HEAVY METALS                 |
| MICROBIOLOGICAL ANALYSIS        | FILTH DETECTION              |
| NUTRITIONAL LABELLING           | SULFA-DRUG RESIDUES          |
| RESEARCH & DEVELOPMENT          | ANTIBIOTICS/HORMONES         |
| CUSTOMER COMPLAINTS             | PRODUCT ADULTERATION         |
| CHEMICAL ANALYSIS               | RESEARCH AND DEVELOPMENT     |
| CONSULTATION                    | PESTICIDE/HERBICIDE RESIDUES |

Sample Pick-up  
 Rush Analysis

Accredited by Standards Council  
 of Canada and  
 Agriculture Canada  
 for specific tests registered  
 with the Council

NOVAMANN (Ontario) Inc.  
 5540 McAdam Road  
 Mississauga, Ontario L4Z 1P1  
 Tel. (905) 890-2555, FAX (905) 890-0370  
 Canadawide Toll-Free: 1-800-563-6266



Please circle No. 213 on your Reader Service Card

# None So Pure



SANITARY  
**PETROL-GEL**  
 LUBRICANT

WHITE  
 MINERAL OIL  
 USP Ingredients  
 COMPLETELY TASTELESS,  
 ODORLESS  
 High Melting Point.  
 Will not taint when  
 coming in contact with  
 food products.  
 Impervious to water.

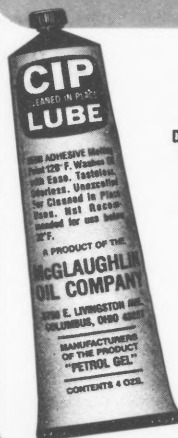
MANUFACTURED BY  
**McGLAUGHLIN  
 OIL COMPANY**  
 3750 E. LIVINGSTON  
 COLUMBUS, OH

Write  
 for  
**FREE**  
 Trial  
 Tube

## Lube Daily with PETROL-GEL

The ideal sanitary lubricant, Petrol-Gel is tasteless and odorless. Recommended uses: Stainless Steel Valves, Ice Cream Freezers, Homogenizer Pistons, Guide and Slide Mechanisms, Centrifugal Pumps, Continuous Freezers, Gaskets and Seals, and "O" Rings. The U.S. Department of Agriculture has approved the ingredients or component parts of materials used in the making of Petrol-Gel.

PACKAGED 6 & 12 four ounce tubes



## CIP LUBE

Developed specifically to meet the demand for a lubricant for use with stationary or in-place cleaning. Washes off easily—no dismantling of tubing, valves, gaskets and seals. CIP Lube is used by most of the nation's leading dairies.

Write for **FREE** Trial Tube

## McLaughlin Oil Co.

3750 E. Livingston Ave.  
 Columbus, Ohio 43227





**Detect *E. coli*  
before you can say  
4-Methylumbelliferyl- $\beta$ -  
D-glucuronide**

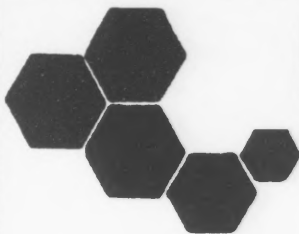
Well... maybe not that fast. But when traditional tests for the presence of *E. coli* often take a week or longer, Marcor's overnight MUG (4-Methylumbelliferyl- $\beta$ -D-glucuronide) testing reagent seems awfully fast.

How does it work? Almost all strains of *E. coli* produce  $\beta$ -glucuronidase, an enzyme which hydrolyzes MUG. The result is 4-methylumbelliferone, a fluorogenic product which can be easily detected under long wave UV or 366-nm light. When MUG is incorporated into a modified MacConkey Agar or Lauryl Sulfate Broth, seeded with a single *E. coli* cell, fluorescence is usually detectable in 12 to 20 hours.

Plan now for future QC speed and economy. Perform both gas production and fluorescent tests simultaneously, and compare the results. For recommended test procedures and complete product specification, Marcor is just a phone call away.

**MARCOR**  
DEVELOPMENT  
CORPORATION

108 JOHN STREET  
HACKENSACK, NJ 07601-4130  
201-489-5700  
TELEK: 710 990 5131  
MARCORDEV HAK  
FAX: 201-489-7357



**DFL**

**Dairy & Food Labs, Inc.**

San Ramon & Modesto  
Established 1925



**Microbiological & Chemical  
Testing**

Recognized by:  
USDA - FSIS

California State Dept. of Agriculture  
California State Dept. of Health

**Salmonella • Listeria  
Rapid Methods**

Environmental Sampling Programs

**Complete Nutrition  
Labeling Services**

**Pickup Services Available Daily**  
Bay Area • Sacramento • Stockton  
Fresno • Visalia • Tulare

**San Ramon**

3401 Crow Canyon Road,  
Suite 110  
San Ramon, Ca 94583  
(510) 830-0350  
FAX (510) 830-0379

**Modesto**

1548 Cummins Drive  
Modesto, CA 95358  
(209) 521-5503  
FAX (209) 521-1005

# On My Mind . . .



By  
*Steven K. Halstead, CAE*  
*IAMFES*  
*Executive Manager*

is association membership...

I found myself in a strange situation the other afternoon – someone was encouraging me to join an association and was listing all the benefits of membership like I had never heard about associations before. Like I said, it felt weird.

Several months ago, James, my budding cowboy, convinced me that he needed a quarter horse that he could show in “western pleasure” and “maybe run some barrels.” A friend of his from the stable knew of a nine-month-old palomino quarter horse colt that the owner was willing to sell. Suddenly James came to the realization that he could have a colt (“they’re so cute!”) AND a quarter horse at the same time.

The deal was struck that we would pay the owner half now and the rest when the owner delivered the registration papers. If colts can have “terrible twos and threes,” this one is right in the middle of them. He has done everything but kick out the side of the barn – but he is cute.

Well, that was several months ago and we hadn’t heard a word from the former owner. I was beginning to think that maybe we had gotten the colt half price when we got a call from him saying that he had finally gotten the registration papers and that he would be out the next day. (So much for bargain horses!)

Upon arriving with the papers, he apologized – all the blame going to the American Quarter Horse Association – for being so late. I lost track of the number of times he commented on how slow they were in registering the colt. In my mind, I was defending the AQHA staff with thoughts about how the holidays slow everything down; the volume of work involved in registering all the quarter horses in the country; the myriad

of things that an association has to do beside the one thing he wanted them to do and how all association staffs are over-worked.

I was just about to jump to their defense when he asked if we were members of AQHA. When I replied that we weren’t, he began to extol the virtues of membership. I was amazed. He talked about the benefits of membership; about their journal and all the good information it contains; about the insurance programs available to members; about the buy and sell program; about the annual convention; and about the state group. He even knew the price of the various levels of membership. Alas, the only thing lacking was a membership application.

After he left, I got to thinking. Why was he so zealous about us joining AQHA? He isn’t an officer. He isn’t a big time operator. He has absolutely nothing to gain by my decision. Yet, he wanted me to join. Why?

I guess it was because he felt strongly that AQHA is a good organization and that he receives value for his dues dollar. He wanted me to experience the same satisfaction he gets from his membership.

We all like to share our good experiences and I hope that your IAMFES membership is a good experience. When was the last time you talked to someone about joining IAMFES? Were you as knowledgeable as my friend? Did you have an application form? (I know I would have joined on the spot had my friend had an application blank with him.)

I sincerely hope that each of you feel as strongly about IAMFES as this man felt about AQHA. And I hope you have an application form with you!

### Procedures to Implement the HAZARD ANALYSIS at CRITICAL CONTROL POINT System (HACCP) Manual

This manual, the latest in a series of procedural manuals developed by the **IAMFES Committee on Communicable Diseases Affecting Man**, provides vital information, including, how to:

- Implement the HACCP System
  - Analyze Hazards and Assess Risks
  - Determine Critical Control Points
  - Monitor Critical Control Points
  - Collect Samples
  - Test Samples for Pathogens
  - Evaluate Processing Systems for Hazards
  - Diagram Processing Systems
- TO ORDER:** Complete this card, place in envelope, and return it, with check or money order, to IAMFES.

#### MANUAL PRICES

IAMFES Member: \$6.00 (U.S. each)

Non-member: \$9.00 (U.S. each)

**SHIPPING AND HANDLING:** U.S. - \$2.00 first item, \$1.00 each additional item

Outside the U.S. - \$4.00 first item, \$2.00 each additional item

Please send \_\_\_\_\_ HACCP Manuals

Amount Enclosed \$ \_\_\_\_\_ (US Funds - US Bank)

To:

NAME

COMPANY

STREET ADDRESS

CITY/STATE/ZIP

PHONE

or CHARGE to: VISA/MASTERCARD/AMERICAN EXPRESS

CARD #

EXP. DATE

SIGNATURE

## IAMFES Members

### INVITE A COLLEAGUE TO JOIN THE ASSOCIATION

You, as a member of IAMFES, can contribute to the success of the Association and the professional advancement of your colleagues by inviting them to become a part of IAMFES. On your behalf, we would be happy to send a colleague a membership kit, including complimentary copies of *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection* and an invitation to join IAMFES. It's easy, just fill in the following information and return this card to IAMFES. (Please Print)

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_

State/Prov.: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

Your Name: \_\_\_\_\_ Your Phone: \_\_\_\_\_

Place  
Stamp  
Here

---

# IAMFES

200W Merle Hay Centre  
6200 Aurora Ave.  
Des Moines, Iowa 50322

DFES  
4/94

Place  
Stamp  
Here

---

# IAMFES

200W Merle Hay Centre  
6200 Aurora Ave.  
Des Moines, Iowa 50322

DFES  
4/94

# SERVSAFE... IT'S ALL ABOUT PEOPLE.



THE NATIONAL FOOD SAFETY  
CERTIFICATION PROGRAM

The Educational Foundation of the National Restaurant Association believes that we, as an industry, have an obligation to provide complete food safety for consumers dining away from home. The best way to meet this obligation is through a comprehensive employee training program, covering a broad spectrum of foodservice sanitation practices. Our goal is to ensure, through the SERVSAFE program, that every foodservice establishment in America makes an ongoing commitment to effective food safety practices.

**Find out more today!**  
**For ordering information, call 1-800-765-2122.**

National Restaurant Association

**THE EDUCATIONAL FOUNDATION** 

250 S. Wacker Dr., Suite 1400, Chicago, IL 60606-5834 312-715-1010

# *Listeria monocytogenes* and Food: The U.K. Approach

Diane Roberts, Public Health Laboratory Service, Food Hygiene Laboratory, Central Public Health Laboratory,  
61 Colindale Avenue, London NW9 5HT, United Kingdom

As presented at the IAMFES 80th Annual Meeting, Atlanta, Georgia, August 2, 1993, in the symposium  
"Listeria monocytogenes: Current Issues and Concerns" sponsored by the International Life Sciences Institute

## SUMMARY

In the late 1980s the United Kingdom saw a sharp increase in the number of reports of cases of human listeriosis and also of the presence of *Listeria monocytogenes* in a wide variety of foods. Public concern was raised, there were some rather 'hysterical' items in the media, action was, therefore, taken by the Government. Three areas are examined in this short review: a) the recent pattern of human listeriosis in the U.K.; b) the occurrence of *L. monocytogenes* in foods; and c) the response by Government and the food industry.

## INTRODUCTION

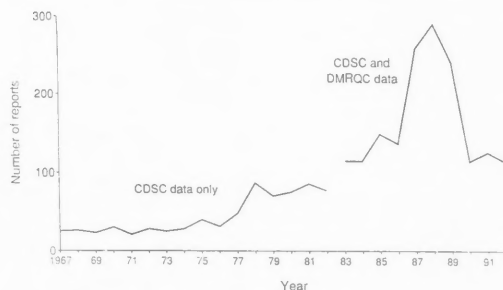
In the U.K. there is a statutory requirement for the notification of certain infectious diseases, but this does not include most forms of listeriosis. However, as all deaths and meningitis of all causes must be notified there will be some statutory notifications of the disease. Surveillance of human listeriosis in the U.K. is undertaken by the Public Health Laboratory Service (PHLS) Communicable Disease Surveillance Centre, the *Listeria* Reference Unit at the Central Public Health Laboratory and the Communicable Diseases (Scotland) Unit through the national voluntary reporting scheme. Strains of *L. monocytogenes* from throughout the country are sent to the PHLS for confirmation and serotyping. Thus the pattern of the disease can be followed.

### HUMAN LISTERIOSIS IN THE U. K.

Figure 1 shows the annual totals of laboratory reports of human listeriosis in England, Wales and Northern Ireland for the period 1967 to 1992, (mother and baby pairs are counted as one case). The number of cases, including those reported from Scotland, rose slowly until the 1980s to 131 cases in 1983. There followed a sharp upsurge in numbers with a doubling between 1986 and 1987 to a peak of 327 in 1988. From mid-1989 to 1990 and 1991 there was a dramatic decline to 131 (1990) and 143 (1991) cases (18) and reports for 1992 remained at this low level.

Much of the upsurge between 1987 and mid-1989 was caused by 366 cases (out of a total of 823 cases) due to two

Fig 1. Human Listeriosis - Annual Totals of Laboratory Reports  
England, Wales and N. Ireland 1967-1992



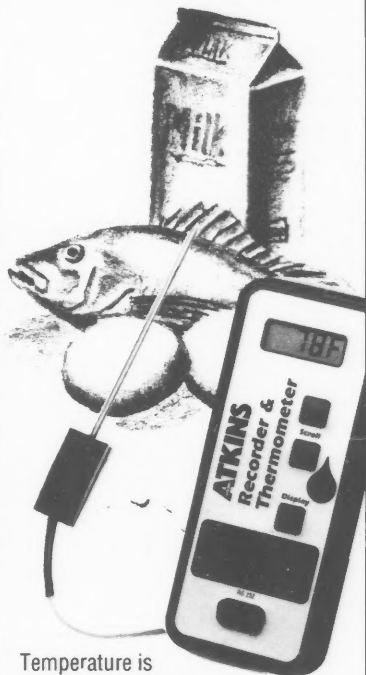
Data from Communicable Disease Surveillance Centre

subtypes of *L. monocytogenes*, serotype 4b phage type 6,7 and serotype 4bX probe type cc,i,ee,dd, which accounted for 30 to 54% of the annual totals (16). These two strains were much less common both before 1987 and after July 1989. Contaminated imported pâté was identified as the most likely source of these strains. In a nationwide survey (13) of retail samples of pâté carried out in July 1989 some 162 (10%) were shown to be contaminated with the organism. Pâtés from a single plant were more likely to be contaminated with *L. monocytogenes* and at a higher level than those from other producers. The organism was recovered from 51 of 107 (48%) samples from this one plant and 98% of the strains were indistinguishable from the strains responsible for the 1987-89 upsurge. The strains were uncommon in the product of other manufacturers and in a wide variety of other foods. The decline in cases from mid-1989 coincided with a health warning issued by the Government to vulnerable groups concerning the consumption of pâté (5,6) and the removal of the product from one manufacturer from the market. It seems probable that contamination of pâté was an important contributory cause of the increase in the incidence of listeriosis in the U.K. between 1987 and 1989.

A 2-year national case-control study undertaken by the PHLS Communicable Disease Surveillance Centre has been completed. Data is currently being analyzed and should shed light on some of the risk factors for cases of listeriosis, which are still occurring.

1994 Exhibitor  
Please circle No. 134  
on your Reader Service Card

## Protect Against Food-Borne Illnesses



Temperature is critical to food safety and quality inspections—rely on Atkins Thermometers and Recorders! Ideal for wet processing environments, they are O-ring sealed against moisture. These rugged, high accuracy digital thermometers have several probe designs available.

Atkins 330 Series with Probe  
Priced from \$115

Recorder Thermometer with Probe  
Priced from \$325

1-800-284-2842 ext. 510

# ATKINS

Thermometer Manufacturing  
Gainesville, FL USA • (904) 378-5555  
FAX to (904) 335-6736 • Dept. 510

24 Hour Auto-Faxed Information

Call 1-800-888-1335, key in Info Pak #510,  
information will be immediately faxed to you.

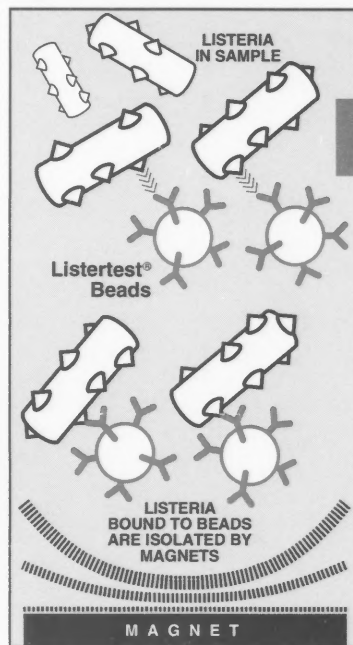
1994 Exhibitor  
IAMFES Sustaining Member  
Please circle No. 199 on your Reader Service Card

# Listertest™



## Accurate, quantitative results in 24 hours

**No Prior  
Enrichment Needed**



Know your product is Listeria-free the day after you make it. Be confident that your production environment is clean with Listerest from VICAM – the only test which gives you accurate, confirmed quantitative results within 24 hours.

Listertest eliminates enrichment which is not only time consuming, but can produce false negatives if the Listeria are killed by harsh selective agents. And, Listerest won't produce false positives either – eliminating the need and cost of confirmation. In our test, *live* Listeria are bound to antibodies on microscopic magnetic beads. These beads

are then isolated from the rest of the food / environmental sample, and *live* Listeria are confirmed immunologically and biochemically. All in 24 hours.

Best of all, because the test is simple, it can be run in house. No other Listeria test is this fast, simple, sensitive, or competitively priced.

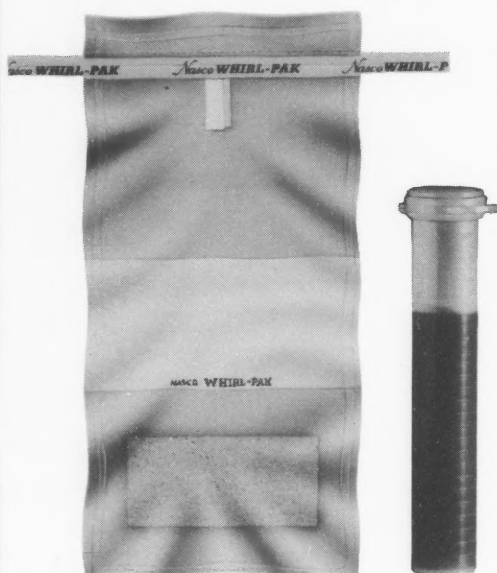
So, for more information, give us a quick toll-free call at 800-338-4381 (in Massachusetts, call 617-926-7045) and we'll respond even faster than our test.

Your Silent Partner  
In Food Safety



313 PLEASANT STREET  
WATERTOWN, MA 02172

## LISTERIA, SALMONELLA SAMPLING MADE EASY



The Whirl-Pak® "Speci-Sponge" Bag contains a 1½" x 3" sterile, non-inhibitory sponge for surface sampling to test for foodborne pathogens. Add our DE Neutralizing Broth to moisten the sponge, or use the dry sponge when wiping in a wet area.

After collecting the sample, return sponge to the bag, and send to lab for testing. Growth media may also be added after collection if desired. The DE broth will neutralize several sanitizers which may be present on the surface.

For a free sample of the "Speci-Sponge" Bag and a copy of our Sampling Products Catalog, write NASCO, Dept. WL404, or call toll free.

Free Phone Order Service: 1-800-558-9595

FAX: 1-414-563-8296

*Nasco*

Fort Atkinson, WI 53538-0901  
Modesto, CA 95352-3837

## LISTERIA MONOCYTOGENES IN FOODS

Although the association between listeriosis and foods did not become prominent until the 1980s there is a description of foodborne listeriosis dating back as far as 1936 (1). Food is now considered the major source of *L. monocytogenes* causing human infection, but there are other less common routes of transmission such as direct contact with infected animals and cross infection between neonates shortly after delivery. The series of large outbreaks of foodborne listeriosis, which occurred in North America and Europe in the 1980s (12), brought about a general interest in the disease and its food sources. Isolation methods have been greatly improved and many samples have been examined for the presence of the organism. The PHLS and other U.K. laboratories have examined a large number of samples either as part of planned surveys on specific foods or as part of the routine surveillance of foods. Between 1987 and 1990 *L. monocytogenes* was isolated from 740 of 10,434 samples (7.1%) examined as part of surveys and from 1159 (6.1%) of 18,337 surveillance samples (10). Results from some of the surveys are given in Table 1.

Strains of serogroup 1/2 were isolated more frequently than serogroup 4 from most foods apart from meat pâté in which serogroup 4 predominated. Levels of contamination were, on the whole, low, foods most likely to be heavily contaminated ( $10^3$  to  $10^6$ /g) were meat pâté and cows' milk soft ripened cheese. Of the wide range of samples examined during routine microbiological surveillance of foods those which most frequently yielded *L. monocytogenes* included raw meat and poultry and their products (34%), raw fish and fish products (37%), meat pâté (17%), fried rice (17%), ready-to-eat meat and poultry (9%) and unprocessed vegetables, salads, fruit, nuts and herbs (9%) (10). In 798 of 1,159 foods containing *L. monocytogenes* the level of the organism was determined and in 42 (5%) it exceeded  $10^3$ /g (15).

In a large coordinated survey conducted in the North of England in 1989 and 1990 (19) a wide variety of dairy, catering cook-chill and commercial chilled foods were examined. *Listeria monocytogenes* was isolated from 342 of 7,273 samples (4.7%), many of which would probably have been eaten without further heating. Samples sold loose, e.g. unpackaged, were more likely to be contaminated than packaged products.

The range of foods from which *L. monocytogenes* has been isolated is extensive and it would appear that the only exceptions are those which receive a stringent heat treatment within their final packaging.

Tests for the presence of *L. monocytogenes* in foods are now carried out by most food microbiology laboratories in the U.K. and with the development and refinement of methods performance has improved. The PHLS Food Microbiology External Quality Assessment Scheme (21), which issues simulated food samples to participants every 2 months, has included *L. monocytogenes* as the target organism in three of its distributions since the Scheme was launched in September 1991. Performance improved from 69% to 88% isolation for the first two distributions (20) and this improvement was maintained in the third.



Please circle No. 165 on your Reader Service Card

**When Sanitation  
Is A Must...**

**Choose  
Sellers**

- 3 models – Drum Major® and 2" & 3" Troll Ball®
- Rotating action cleans smaller tanks up to 20' in diameter
- Choice of 4 high-impact, cleaning patterns
- Stainless steel construction for portable and CIP installation

*Made in  
the U.S.A.*

For a **FREE** brochure of Sellers® Cleaning Systems Products, call **TODAY!**

**Sellers**  
Cleaning Systems Products

**PROSSER/ENPO**  
A Numa Pump, Inc. Company

420 Third St. Piqua, OH 45356  
(513) 773-2442  
FAX: (513) 773-2238

1994 Exhibitor

IAMFES Sustaining Member

Please circle No. 139 on your Reader Service Card

## BENTLEY INSTRUMENTS, INC.

**\*\* Milk Testing Instruments \*\***

### Somacount 300

A somatic cell counter controlled by a personal computer. State of the art technology.

### Bentley 2000

Infrared milk analyzer for fat, protein, lactose, and solids in milk and milk products.

*Bentley Instruments Inc. is an American manufacturer of quality instruments for the dairy industry.*

Call for more information

### Bentley Instruments, Inc.

P.O. Box 150  
Chaska, MN 55318

Tel. (612) 448-7600  
Fax. (612) 368-3355

1994 Exhibitor

IAMFES Sustaining Member

Please circle No. 122 on your Reader Service Card

*Just when you need it*

**A leading supplier of pest control  
chemicals and equipment is only  
10 finger-taps away:**

# 800-563-4273

(or fax 416-675-6727)

- Sprayers, misters, foggers and dusters.
- Application, detection and safety equipment.
- Flying insect eliminators.
- Baits, traps and monitoring systems.
- Insecticides and rodenticides.

Ask for our  
300-item  
catalog

# GARDEX

GARDEX CHEMICALS LTD

Please circle No. 222 on your Reader Service Card

**SAVE TIME SAVE SAVE TIME SAVE SAVE TIME**

## MicroQuik™ RAPID RESULT MICRO TESTS ARE HERE

**IS FOUR TO SIX HOURS FROM SAMPLE TO RESULT FAST ENOUGH?  
ASK ABOUT OUR CULTURE ASSAYS**

**WOULD YOU LIKE A FIVE MINUTE CONFIRMATION TEST THAT IS  
TAKEN DIRECTLY FROM A MIXED CULTURE?**

**ASK ABOUT OUR CONFIRMATIONS**

**WOULD SANITARIANS LIKE A TWENTY MINUTE DIRT INDICATOR  
WHICH CAN BE DONE ON SITE BY THE CREW?**

**ASK ABOUT MoniTek™**

PHONE (800) 849-3961

# ENVIROCON

FAX (510) 676-2734

**SAVE TIME SAVE SAVE TIME SAVE SAVE TIME**

Table 1. Occurrence of *L. monocytogenes* in foods examined as part of planned surveys 1987-1990. UK\*

Food	Number of samples examined containing <i>L. monocytogenes</i>		range (%)
<b>Raw</b>			
Poultry (2 surveys)	125	74 (59)	56-60
Pork sausages	59	29 (49)	-
Prepacked salads (2 surveys)	102	12 (12)	7-19
Salad ingredients	108	2 (2)	-
<b>Foods to be reheated before consumption</b>			
Cook-chill from retail premises (2 surveys)	95	18 (19)	18-14
Cook-chill from catering units (2 surveys)	736	12 (2)	-
<b>Cooked or ready-to-eat</b>			
Chicken (2 surveys)	629	90 (14)	12-27
Salami and continental sausage	67	11 (16)	-
Prepacked sliced meats	772	23 (3)	-
Pâté(3 surveys)	2076	287 (11)	4-35
Prawns, shrimps and cockles	40	0 (0)	-
Prepacked sandwiches	91	16 (17)	-
<b>Dairy Products</b>			
Raw Cows' milk (2 surveys)	901	27 (3)	3-4
Pasteurized cows milk	1039	11 (1)	-
Cow's milk cheese soft ripened (2 surveys)	991	98 (9)	8-10
Cow's milk cheese soft unripened	366	4 (1)	-
Cow's milk hard cheese	66	1 (1.5)	-
Yogurt	108	4 (2)	-
Ice cream	150	2 (2)	-

\*Adapted from Gilbert (10).

### RESPONSE OF THE GOVERNMENT AND THE FOOD INDUSTRY

The response of the Government to the increase in cases of listeriosis and reports of *L. monocytogenes* in food was not to introduce legislation requiring the absence of the organism in specific products — although it is now required to incorporate into U.K. food law the microbiological standards included in Directives issued by the European Community (EC). An example of the latter is the EC Directive on milk and milk based products (2), which comes into force in January 1994. The Directive lists a number of microbiological criteria including one for *L. monocytogenes*. The organism must be absent in 25 g ( $n = 5, c = 0$ ) of soft cheese and absent in 1 g of other products.

In order to assist local authorities in judging the microbiological quality of food samples submitted for examination, the PHLS has produced provisional guidelines for some cooked ready-to-eat foods at point of sale (11). The criteria for *L. monocytogenes* are given in Table 2. However, it should be emphasized that these are guidelines only and have no statutory power.

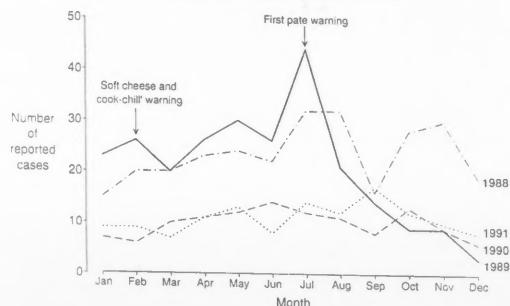
Table 2. *Listeria monocytogenes*: Provisional guidelines for microbiological acceptability of some ready-to-eat foods (11).

Satisfactory (The Aim)	-	Not detected in 25 g
Fairly satisfactory	-	Present in 25 g < 100/g
Unsatisfactory	-	100 - 1000/g
Unacceptable/potentially hazardous	-	>100/g

The Government's response, which has been actively supported by the PHLS, has been to establish the facts about *L. monocytogenes*, provide clear advice to vulnerable groups, initiate research and introduce new legislation, which will help control the growth of organisms in food. In an amendment to the Food Hygiene Regulations (14) the lower temperature at which high-risk foods must be held has been reduced from 10°C to 8°C or 5°C depending on the product.

When it was recognized that specific foods were frequently contaminated with *L. monocytogenes* and sometimes at high levels the Government acted by issuing warnings to the vulnerable groups. Early in 1989 warnings were issued concerning soft cheese, cook-chill meals and ready-to-eat poultry (4) and in July 1989 a further warning that pregnant women and immunocompromised patients should avoid eating pâté (5,6) The decline in cases during 1989 (Fig. 2) may reflect compliance with these warnings.

Fig. 2. Human Listeriosis - Reports to the Public Health Laboratory Service England, Wales and N. Ireland 1988-1991



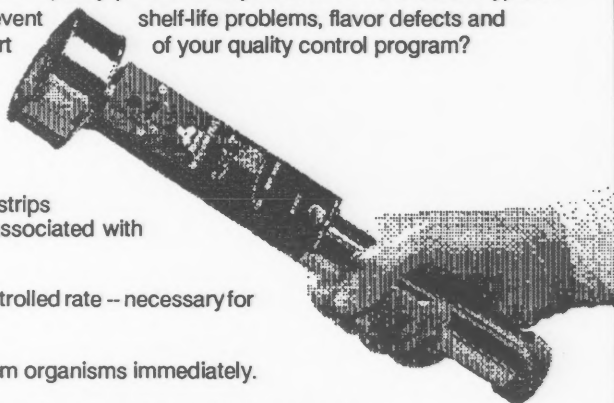
PHLS from Communicable Disease Surveillance Centre

# Attack Air Quality Problems

The **RCS Air Sampler** detects air quality problems days or even weeks before typical sampling methods. Giving you time to prevent shelf-life problems, flavor defects and spoilage in your products. Shouldn't it be a part of your quality control program?

## Features

- Impinges airborne microorganisms onto agar strips using centrifugal force -- eliminates chance associated with sedimentation methods.
- Pulls air from the environment at a precisely controlled rate -- necessary for detecting trends in microbial populations.
- Employs selective agar strips -- identify problem organisms immediately.
- Travels with the technician on routine plant inspections -- no delays due to setup or operator training.
- Has the respect of health, pharmaceutical, cosmetic and food industry professionals -- gain immediate credibility among your customers and regulators.



**Nelson-Jameson, Inc.**  
2400 E. 5th St., Marshfield, WI 54449  
Phone 715/387-1151 ■ FAX 715/387-8746

phone toll free 800-826-8302

1994 Exhibitor

IAMFES Sustaining Member

In its efforts to improve food safety, including the prevention of listeriosis, the U.K. Government issued a leaflet (9) aimed at educating the general public, which was widely distributed through supermarkets, pharmacies and doctors surgeries. More recently a booklet 'While you are pregnant: Safe eating and how to avoid infection from food and animals' (8) has been distributed, which gives clear advice in relation to certain foods (cheese, pâté, cook-chill meals and ready-to-eat poultry) and contact with animals which are likely to be infected such as sheep and lambs.

The response of the food industry to adverse publicity about *L. monocytogenes* in their products and the occasional recalls of contaminated foods has been to look closely at its own food production and control procedures. Voluntary Codes of Practice have been produced by some sectors of the food industry, for example the Creamery Proprietors Association which includes many of the soft and fresh cheese manufacturers. Their Code of Practice (3) also gives a microbiological end-product specification in relation to *L. monocytogenes* of not found in 15 x 25 g samples per lot. A similar code and specification has been produced for small farm based production units (17).

Similarly in their revised 'Guidelines on Cook-chill and Cook-freeze Catering Systems' (7) the Department of Health include absence of *L. monocytogenes* in 25 g as a microbiological criterion for such meals examined immediately before heating.

There is also more widespread introduction of Hazard Analysis Critical Control Point Procedures within the food industry, which should help in the production of safer foods. Greater numbers of tests on end-products and factory environment are also being carried out.

*Listeria monocytogenes* is widespread in the environment and seems well suited to persist in food production areas. The conclusions of the World Health Organization (WHO) Working Group on Foodborne Listeriosis (22) are seen to be eminently sensible — 'The elimination of *L. monocytogenes* from all food is impractical and probably impossible ... the critical issue is not how to prevent its presence but how to control its survival'.

## REFERENCES

1. Burn, C.G. 1936. Clinical and pathological features of an infection caused by a new pathogen of the genus *Listerella*. *Am. J. Path.* 12:341-348.
2. Council of the European Communities. 1992. Council Directive 92/46/EEC laying down the health rules for the production and placing on the market of raw milk, heat-treated milk and milk-based products. *Off. J. Eur. Commun.* No. L268, 92/1-32:14 Sept.
3. Creamery Proprietors' Association. 1988. Guidelines for good hygiene practice in the manufacture of soft and fresh cheeses. Creamery Proprietors Association, London.
4. Department of Health and Social Security. Advice from the Chief Medical Officer: Listeriosis and food. DHSS, London, PL/CMO (89) 3.
5. Department of Health. 1989. *Listeria* found in pâté. DoH Press Release 89/299:12 July.

6. Department of Health. 1989. Advice to vulnerable groups on pâté stands. DoH Press Release 89/369:4 Aug.
7. Department of Health. 1989. Chilled and frozen. Guidelines on Cook-Chill and Cooke-Freeze Catering Systems. Her Majesty's Stationary Office, London.
8. Department of Health and Central Office of Information. 1991. While you are pregnant: Safe eating and how to avoid infection from food and animals. Her Majesty's Stationary Office, London, 12995 H SSH J 1185NJ.
9. Food Safety: A Guide from HM Government. 1990. Her Majesty's Stationary Office, London.
10. Gilbert, R.J. 1991. Occurrence of *Listeria monocytogenes* in foods in the United Kingdom. In Proceedings of the International Conference on *Listeria* and Food Safety, Laval, France, June 1991. ASEPT, Laval Cedex, France:82-88.
11. Gilbert, R.J. 1992. Provisional microbiological guidelines for some ready-to-eat foods sampled at point of sale; Notes for PHLS Food Examiners. PHLS Microbiol. Dig. 9:98-99.
12. Gilbert, R.J., S.M. Hall and A.G. Taylor. 1989. Listeriosis update. PHLS Microbiol. Dig. 6:33-37.
13. Gilbert, R.J., J. McLauchlin and S.K. Velani. 1993. The contamination of pâté by *Listeria monocytogenes* in England and Wales in 1989 and 1990. Epidemiol. Infect. 110:543-551.
14. Great Britain. 1990. Food Hygiene (Amendment) Regulations. 1990. S.1.1431. Her Majesty's Stationary Office, London.
15. McLauchlin, J and Gilbert, R.J. 1990. *Listeria* in food. Report from the PHLS Committee on *Listeria* and Listeriosis. PHLS Microbiol. Dig. 7: 54-5.
16. McLauchlin, J., S.M. Hall, S.K. Velani and R.J. Gilbert. 1991. Human listeriosis and pâté: A possible association. Brit. Med. J. 303:773-775.
17. Milk Marketing Board and the Dairy Farmers Cooperative. 1989. Guidelines for Good Hygiene Practice for the manufacture of soft and fresh cheeses in small and farm based production units. Milk Marketing Board, Thames Ditton, United Kingdom.
18. Newton, L., S.M. Hall, M. Pelerin and J. McLauchlin. 1991. Listeriosis surveillance: 1991. Commun. Dis. Rep. 2:R142-R144.
19. Report. 1991. *Listeria* in food: Report of the West and North Yorkshire Joint Working Group on a two-year survey of the presence of *Listeria* in food. Environ. Hlth. 99:132-137.
20. Roberts, D., P. van Netten, J. Russell, R. Chatfield and R.J. Gilbert. 1992. The PHLS Food Microbiology Quality Assessment Scheme. Proceedings, 3rd World Congress Foodborne Infections and Intoxications, Berlin, 16-19 June 1992. Institute of Veterinary Medicine, Berlin. 1:526-531.
21. Van Netten, P., D. Roberts, J. Russell and S.F. Perry. 1992. The PHLS Food Microbiology External Quality Assessment Scheme. In Microbiology Accreditation and Quality Assessment Schemes in the UK. Measuring up to the standards. C. Roberts and M.C. Kelsey (eds.). Assoc. Med. Microbiol. Publication No. 2:28-30.
22. World Health Organization. 1988. Foodborne listeriosis. Report of a WHO Informal Working Group, Geneva, 15-19 February 1988. WHO/EHE/FOS/88.5. WHO, Geneva.

1994 Exhibitor  
IAMFES Sustaining Member  
Please circle No. 188 on your Reader Service Card



**Made in  
U.S.A.**

*Sterilization  
Documentation  
Available*

**NEW TAMPER EVIDENT,  
LEAK PROOF, AIR TIGHT,  
HINGED CAP, STERILE  
SAMPLE VIALS**

**Passes all FDA and USDA leak proof  
tests. Available in 2 oz., 3 oz., 4 oz. and  
10 oz. FDA approved polypropylene.**

Call or Write for a  
**Free Sample of our  
New Snap Seal**

**800-836-5520**

**Capitol Vial, Inc.**

Union Street Extension, Fultonville, NY 12072

## Australian Perspective on *Listeria monocytogenes*

Michael J. Eyles, Ph.D., Project Manager, CSIRO Division of Food Science and Technology and Director,  
Dairy Industry Quality Centre, PO Box 52, North Ryde NSW 2113, Australia.

As presented at the IAMFES 80th Annual Meeting, Atlanta, Georgia, August 2, 1993, in the symposium  
"Listeria monocytogenes: Current Issues and Concerns" sponsored by the International Life Sciences Institute

Although the number of cases of listeriosis that have been identified as foodborne in Australia is relatively small, the food industry and its associated regulatory agencies have been very active in performing research and developing appropriate responses to the hazards associated with *Listeria monocytogenes* in food products. There have been significant changes to industry practices during the last 5 years. The high priority given to the microbiological quality of Australian foods is due in part to the need to protect important export markets for some of our products.

### INCIDENCE OF LISTERIOSIS IN AUSTRALIA

Data on the incidence of listeriosis in Australia have been available only since 1991, when the infection became a notifiable infectious disease in most of our eight states and territories. Since then, cases of listeriosis have been reported at the rate of about 40 per year (Table 1). These figures almost certainly differ significantly from the true rate of infection, partly because data on listeriosis are not collected in all states and also because our reporting system suffers from the same limitations that exist elsewhere in the world.

Table 1. Number of Cases of Listeriosis Reported in Australia (Population 17 million, 1).

Year	Cases
1991	44
1992	37
1993 (Jan-Mar)	12

### FOODBORNE LISTERIOSIS INCIDENTS

Transmission of listeriosis by a specific food has been described on only two occasions. The foods that were implicated were paté and smoked mussels.

The outbreak associated with paté occurred in Western Australia, where a cluster of nine perinatal cases of listeriosis was detected at a maternity hospital from March to September of 1990 (10). There were 6 deaths among the 11 fetuses or infants affected. Paté was first implicated when one

patient was found to have eaten a certain brand of paté in the 2 weeks before she delivered a stillborn child. There was evidence that at least two of the other patients had eaten the same brand of paté. *Listeria monocytogenes* was detected in the implicated brand of paté, including a sample from the refrigerator of the patient mentioned above. The mean count of *L. monocytogenes* in paté samples collected from the manufacturer was  $8.8 \times 10^3$  CFU/g (3). After examination of the factory it was concluded that the major source of *L. monocytogenes* in the product was a mincer that came into contact with cooked ingredients.

Isolates from the outbreak were serotype 1/2a and were not typable by phage typing. The isolates have also been characterized by random amplified polymorphic DNA (RAPD) and multilocus enzyme electrophoresis (MEE) techniques. Both have shown a relationship between isolates from the paté and the patients (3).

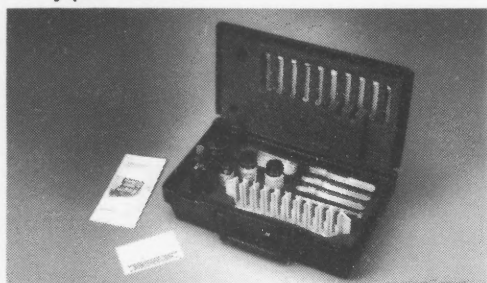
Multilocus enzyme electrophoresis compares the relative electrophoretic mobility of a number of enzymes and provides a measure of genetic relatedness between strains of bacteria. A recent study compared strains from a variety of human, animal and food sources with strains from this outbreak (9). Thirteen electrophoretic types were identified. Isolates obtained from the cases of perinatal listeriosis, the samples of paté and the mincer mentioned above were all the same electrophoretic type. Isolates from the feces of two patients who had suffered food poisoning after consuming the same brand of paté were also the same electrophoretic type.

The implicated products were withdrawn from sale and there was a community education program aimed particularly at pregnant women. The incidence of *Listeria* infections in pregnant women declined after these measures were taken.

The outbreak associated with smoked mussels occurred in 1991 in the State of Tasmania (6). Three healthy people aged 83, 37 and 10 years became ill in two separate incidents. Symptoms were malaise, chills, fever and headache, followed by diarrhea. Samples of implicated mussels from both incidents contained over  $10^6$  *L. monocytogenes* per gram. *Listeria monocytogenes* was also isolated from feces. The mussels had been imported to Australia, repackaged illegally by a retail outlet and labelled with date

## Applied Research Institute

- The ARI Scharer Rapid Phosphatase Test complete with apparatus, reagents and case.
- To determine whether dairy products are fully pasteurized.



141 Lewis Street  
Perth Amboy, New Jersey 08861-4635  
Phone (908)442-1888 Fax (908)442-1688  
**INDUSTRIAL ECONOMY - through Research**

codes that overestimated their shelf-lives by 3 months or more.

Another recent incident involving smoked mussels in the Southern Hemisphere has important implications for the food industry. Newborn twin babies died as a result of *Listeria* infection in Auckland, New Zealand in November 1992. Their death has been attributed to the consumption by their mother of smoked mussels contaminated with *L. monocytogenes*. Reports from New Zealand have indicated that the company that produced the mussels had detected contamination with *Listeria* several weeks before the death of the babies. In May, 1993 the owner of the company and a consultant to the company were charged with manslaughter by New Zealand police. The cases have not been completed.

### INDUSTRY RESPONSES TO THE EMERGENCE OF *LISTERIA* AS A FOODBORNE PATHOGEN

The Australian food industry has responded to the emergence of *Listeria* as an important pathogen with a substantial amount of research, on which changes in industry practices have been based. The following comments are concerned principally with the dairy industry. Four areas of research have received particular attention.

Predictive microbiology is perceived to have the potential to improve substantially our control of *Listeria* in food products. A collaborative program of research on predictive modelling involving four Australian institutions includes work on *L. monocytogenes*, particularly in relation to its survival and growth in processed meat products.

Research on rapid methods for the detection of *L. monocytogenes* has been given a high priority by industry and regulatory agencies. Effective methods based on enzyme immunoassays and the polymerase chain reaction have been developed (e.g., the TECRA immunoassay). This immunoassay and others have received widespread acceptance in Australian dairy industry and regulatory laboratories.

Typing techniques that improve our ability to identify sources and mechanisms of spread of *L. monocytogenes* in the community during outbreaks and in factory environments will provide substantial benefits for industry and health authorities. Techniques that are being used include multilocus enzyme electrophoresis and various techniques based on nucleic acids.

The area which has been the focus of most research has been the ecology and distribution of *L. monocytogenes* in food processing environments. The dairy, meat and egg industries have all performed a substantial amount of research in this area. In the dairy industry the findings of this research have been used in the development of quality systems, frequently HACCP-based, by the major companies. The Australian Manual for Control of *Listeria* in the Dairy Industry, which was published in May 1991 and revised when necessary, is accepted nationally (2). The manual describes procedures for preventing contamination, guidelines for cleaning and sanitizing, and sampling for laboratory analysis. The action to be taken when *Listeria* is detected in the factory or product, including detailed sampling and testing programs that must be followed before product can be released, is also described. The Manual generally describes minimum standards that are surpassed by major processors.

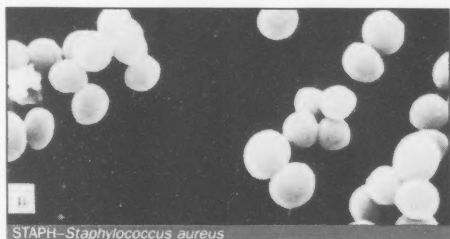
The industry's efforts to keep *Listeria* out of dairy products have generally been successful. Extensive monitoring programs show that the incidence of product contamination is very low (Table 2).

Table 2. Surveys of *L. monocytogenes* in Australian Dairy Products.

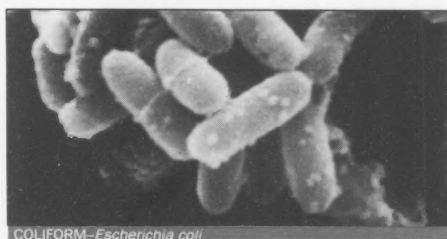
Product	Number of samples		Year	Source
	Tested	Positive		
Soft & surface-ripened cheese	255	5 (ricotta)	Pre-1989	7
Soft cheeses	193	2 (type unspecified)	1989-91	3
Ice cream	277	16	Pre-1989	7
Soft-serve confection	255	1	1991	3
Dairy products	2200	32 (most ricotta or ice cream)	1989-93	8
Pasteurized milk	3252	0	1989-93	8

Early work on the incidence of *Listeria* in dairy products in Australia identified some problem areas that required attention. Ricotta and other fresh soft cheeses from several factories were found to be contaminated and there were

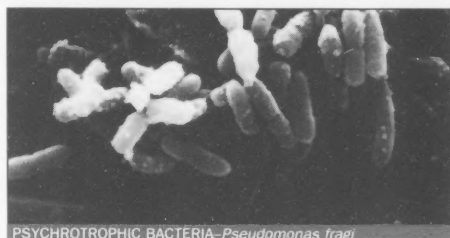
# QMI helps you identify the source of product contamination



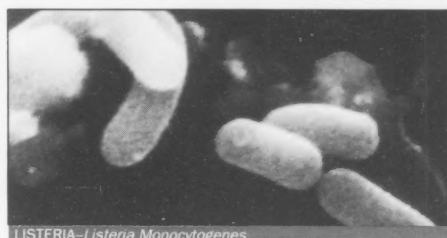
STAPH—*Staphylococcus aureus*



COLIFORM—*Escherichia coli*



PSYCHROTROPHIC BACTERIA—*Pseudomonas fragi*

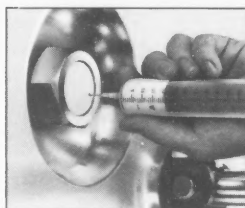


LISTERIA—*Listeria Monocytogenes*

## AND helps you avoid it!

With its patented QMI Aseptic Sampling System and Aseptic Transfer System, QMI is a fast, sure and easy solution for the threat of contamination. More importantly, QMI goes a long way to help avoid an even bigger threat—the threat of product recall due to spoiled or unsafe products.

- Using the QMI Aseptic Sampling System, you can effectively document micro-



biological process control, which is critical to an effective HACCP system.

- Using the QMI Aseptic Transfer System, you can avoid contamination during inoculation.

Don't take chances. Take action against contamination. Get all the facts on our aseptic sampling and transfer systems now.

**QMI** FOOD AND DAIRY QUALITY  
MANAGEMENT, INC.

245 E. Sixth Street • St. Paul, MN 55101 • Phone: (612) 228-0474 • FAX (612) 291-9179

QMI Products are protected by the following U.S. Patents (4,941,517; 5,086,813; 5,119,473). Manufactured under License from Galloway Company, Neenah, WI USA. Photographs of bacteria supplied by Dr. Edmund Zottola of the University of Minnesota, St. Paul, MN.

public recalls of these products. The method of manufacture and the nature of fresh soft cheeses make them particularly susceptible to contamination with *L. monocytogenes*. Reusable containers used for packaging ricotta-style cheese, and perforated containers in which the cheese was allowed to drain during production, were among the sources of contamination identified. Contamination of ice cream also caused significant losses for the industry.

Although the Australian dairy industry has a good record with respect to *L. monocytogenes*, the Australian Dairy Research and Development Corporation is supporting a substantial study of the ecology of *L. monocytogenes* in dairy factories, in order to improve the efficiency of the industry's quality assurance programs. Australian dairy factories producing a wide-range of dairy products are being examined to determine the distribution and mechanisms of dissemination of *L. monocytogenes* in their environment, with particular emphasis on routes of entry for *L. monocytogenes*. As expected, the major locations from which *L. monocytogenes* has been isolated are drains, floors, pooled liquid and conveyor systems. Important routes of entry for *Listeria* include milk and crate receival areas, employee entrances, and non-processing personnel such as workshop staff (8).

When *Listeria* was detected in the factory environment, there was usually only a single species present at sites positive for *Listeria*. A single species was isolated from 94% of positive sites. About 60% of the *Listeria* isolates have been *L. monocytogenes*.

Strains of *L. monocytogenes* isolated from dairy factories during this study are being typed by a variety of techniques. So far, most progress has been made with typing by MEE. Three-hundred strains of *L. monocytogenes* from dairy, other food, clinical, and environmental sources have been analyzed. Twenty-six electrophoretic types have been identified and split into two genetically distinct groups (8).

Analysis of collections of strains isolated from seven dairy factories has indicated that very few electrophoretic types are generally present in the environment of a dairy factory. Only a single type has been detected in the majority of the factories and the types present differ from factory to factory. Nine electrophoretic types have been detected in the seven factories and only two of these types were detected in more than one factory. These results suggest that MEE may be a very useful tool for typing *L. monocytogenes* and determining whether or not a particular food processing factory is the source of infection in a listeriosis outbreak. The clinical isolates that have been examined are grouped into uncommon electrophoretic types and a close relationship between dairy and clinical isolates has not been observed.

I think it is reasonable to conclude from the preceding discussion that dairy products are very unlikely to be a significant vehicle for listeriosis in Australia at present, but the industry must remain highly vigilant.

#### AUSTRALIAN REGULATORY APPROACHES TO *LISTERIA* IN FOODS

In Australia the responsibility for developing and enforcing food standards is shared between the national and

state governments. Australia is a federation of six states and two territories. Microbiological standards are contained within the Food Standards Code, which is developed by the National Food Authority. The code is enforced by various regulatory agencies of the state and territory governments.

A different set of requirements, the Export Control (Processed Food) Orders, applies to foods exported from Australia, which are under the control of a different Australian government agency. The roles of the FDA and the USDA are reasonably comparable to the Australian arrangements in this context.

Standards limiting *L. monocytogenes* contamination of foods have not been incorporated into the Food Standards Code yet; the National Food Authority has proceeded cautiously on this issue. The Export Control Orders are more stringent than the Food Standards Code in some respects. They already require absence of *L. monocytogenes* from  $5 \times 25$  g samples of many cheeses.

Despite the absence of specific standards requiring the absence of *L. monocytogenes* from foods on the domestic market, state government agencies intervene in the marketplace to prevent the sale of foods that are found to be contaminated with *L. monocytogenes*. In doing so they act under general provisions of the law, which prohibit the sale of foods that may be injurious to health or dangerous. Reliance on these general provisions, rather than specific requirements for *L. monocytogenes*, creates a problem in that different policies and attitudes have developed in the various state agencies.

Some food processors are required to notify regulatory authorities if *L. monocytogenes* is detected in a food product. This applies to all foods in the State of Victoria, where the action taken in response to a contamination incident is determined essentially on a case by case basis. Dairy authorities in all states must be notified if the organism is isolated from a dairy product. The response to contamination of dairy products is outlined in the manual that were mentioned earlier.

The National Food Authority is considering the introduction of standards for *L. monocytogenes* to the Food Standards Code at present. The decisions that the Authority has made so far indicate clearly that its policies on *L. monocytogenes* will have a sound basis in science and will be aimed at minimizing the health hazards associated with this organism, without imposing unnecessary and unrealistic burdens on the industry.

The Authority recently rejected an application for the inclusion in the Code of a nil tolerance for *L. monocytogenes* in liquid milk, cream and milk powder. Major reasons for rejection of the application included:

1. These foods have not been shown to present a public health hazard for *L. monocytogenes* in Australia.
2. *Listeria* is inactivated by properly controlled pasteurization processes.
3. Other requirements imposed on these products by the Code, including phosphatase and coliform requirements, give a rapid indication of the efficiency of pasteurization and the procedures in place to prevent post-pasteurization contamination.
4. The imposition of end-product testing would add to



production costs without reasonable justification.

5. The dairy industry is adhering to a code of practice.

The Authority is proposing to introduce a nil tolerance for *L. monocytogenes* in foods associated with *Listeria* outbreaks and capable of supporting growth of the organism. Draft microbiological standards for these foods have been promulgated very recently and are presently being subjected to a process of public review. The proposed standards would require absence of *L. monocytogenes* from 5 × 25 g samples of product.

The foods to which the Authority is proposing to apply a nil tolerance are certain cheeses, manufactured meats and smoked seafood products that support growth of *L. monocytogenes*. The products will be defined in terms of parameters such as water activity and pH. The Authority is investigating the feasibility of basing limits for these parameters on predictive models for growth of *Listeria* that have been developed in Europe, the United States and Australia. This approach is a milestone in Australian food microbiology, in that it is the first attempt to use predictive models in the development of food regulations.

The proposed requirements are only a part of the Authority's strategy to minimize the incidence of listeriosis. The strategy will include the amendment of existing Australian codes of practice and the development of new codes of practice for foods considered to present a high risk of transmission of listeriosis. The codes will be based on the HACCP principles. The proposed strategy also includes the further development of education and awareness programs for members of the community who are at particular risk of listeriosis.

### COMMUNITY EDUCATION

Some Australian health authorities have taken steps aimed at educating the community about the risks associated with foodborne listeriosis and the means by which it can be prevented. The first substantial step was taken by the Health Department of the State of Western Australia, which issued a brochure containing advice to pregnant women. The brochure names the foods that have been associated with

listeriosis and advises pregnant women to avoid them. It also offers more general advice. For example, it recommends that foods that are close to their "use-by" dates should not be consumed and that only homemade salads and cold meats be consumed, within 12 h of preparation. The Department also circulated advice on listeriosis to medical practitioners and other health professionals.

The Australian National Health and Medical Research Council subsequently issued two bulletins. One contained special dietary advice for pregnant women, transplant patients and other immunocompromised patients (4). The other provides information for medical practitioners on diagnosis, treatment, advice to patients and so on (5). The dietary advice is broadly similar to that in the brochure from Western Australia.

### ACKNOWLEDGMENT

I thank Ellen M. Kittson, Peter S. Sutherland and Robert J. Porritt for providing unpublished data used in the preparation of this paper.

### REFERENCES

1. Anonymous (1993). Communicable Diseases Intelligence 17:21,172.
2. Chief Dairy Officers Committee (1991). Australian Manual for Control of *Listeria* in the Dairy Industry. Victorian Dairy Industry Authority, Melbourne.
3. Kittson, E.M. Health Department of Western Australia. Personal communication.
4. National Health and Medical Research Council (1992). *Listeria*, Special Dietary Advice. National Health and Medical Research Council, Canberra.
5. National Health and Medical Research Council (1992). *Listeria*, Advice to Medical Practitioners. National Health and Medical Research Council, Canberra.
6. Misrachi, A., A.J. Watson, and D. Coleman, (1991). *Listeria* in smoked mussels in Tasmania. Communicable Diseases Intelligence 15:427.
7. Sutherland, P.S. (1989). *Listeria monocytogenes*. In Foodborne Microorganisms of Public Health Significance. 4th ed. pp. 287-312. Australian Institute of Food Science and Technology, Sydney.
8. Sutherland, P.S. and R.J. Porritt. New South Wales Dairy Corporation. Personal communication.
9. Trott, D.J., I.D. Robertson and D. J. Hampson. (1993). Genetic characterization of isolates of *Listeria monocytogenes* from man, animals and food. J. Med. Microbiol. 3:122-128.
10. Watson, C., M. Jackson, H. Kelly, K. Ott, S. Knowles and J. Wells. (1990). *Listeria* outbreak in Western Australia. Communicable Diseases Intelligence 14(24):9-11.

# Foodborne Illness (Part 6)

## Vibrios

George H. Reed, Services Manager,  
University of Massachusetts/Amherst,  
Environmental Health & Safety (EH&S),  
Environmental Health Services,  
N 414 Morrill Science Center,  
Amherst, MA 01003

*Vibrio parahaemolyticus*, *Vibrio vulnificus* and *Vibrio cholerae* have been associated with foodborne illness in the United States.

*Vibrio parahaemolyticus* is the member of this genus usually associated with foodborne illness in the United States; it was first recognized in this country in 1971. In Japan it is the most frequent cause of all foodborne illness.

This bacteria is halophilic (requires NaCl for growth) and is widely distributed in the estuarine and coastal environment. It has been isolated from sediments, plankton and fish and shellfish. It has a seasonal and temperature-related cycle: during the cold season it is found in the marine silt, while in the warm season it is found free in coastal waters and in seafoods. Most outbreaks due to this organism have occurred in Atlantic and Gulf states.

The illness is primarily transmitted through consumption of contaminated seafoods. These could be raw or inadequately cooked seafood, or food cross-contaminated by improper handling, or by rinsing with seawater. Temperature abuse is usually involved with an outbreak, with a period of time at room temperature necessary to allow multiplication of the organisms to an infective level (about 10). Raw seafood dishes prepared in the traditional Japanese culinary style have been associated with the illness.

This illness is a gastroenteritis characterized by watery diarrhea and abdominal cramps in most cases, with nausea, headache, fever and vomiting sometimes present. It is typically an illness of moderate severity, lasting about 3 days (range, 1 to 7 days), with death being rare. Fluid replacement may be indicated. The incubation period is usually 12 to 24 h (range, 4 to 96 h).

Pathogenicity is thought to occur by some strains possessing a thermostable hemolysin that produces a beta hemolysis reaction in red blood cells on a selective medium; reaction called "Kanagawa phenomenon" and the organism is Kanagawa-positive. Most isolates of *V. parahaemolyticus* are Kanagawa-negative and therefore avirulent.

**CONTROL.** To minimize the hazard, food protection and sanitation practices should emphasize the following:

- Thoroughly cook (heat/reheat) seafoods to destroy the bacteria, which is highly sensitive to heat; 15 min at 158 F (70°C) will kill the organism.

- Prevent cross-contamination by physical separation and separate handling of raw and cooked product. Emphasize handwashing between handling raw and cooked items.
- Keep all seafoods, raw and cooked, adequately refrigerated before preparing/serving, below 41°F (5°C).
- Educate consumers of the risks associated with eating raw seafood.

In summary, proper cooking and refrigeration, with careful handling, are the important factors in preventing *V. parahaemolyticus* gastroenteritis.

*Vibrio vulnificus* is also halophilic and is commonly found in the warmer Gulf states and is probably part of the normal marine flora. It has been found in water, sediments, oysters, clams, crabs and plankton.

Two distinct clinical syndromes seem to be involved with this bacterium, with transmission seeming to be seawater and shellfish:

- Wound infections — superficial wounds, from cleaning/harvesting shellfish or crabs, contaminated with seawater or seafood containing the organism; lesions often extend into adjacent body areas; most patients have a fever; a rapidly progressive cellulitis (inflammation of connective tissue) often requires amputation of an affected limb.
- Primary septicemia — ingestion of contaminated water or raw/undercooked seafood; chills, fever and malaise, with occasional diarrhea, develop in this group of patients; in this form, this marine bacterium is unusually virulent, with a death rate of around 40%; persons with preexisting liver disease are especially at risk.

### PREVENTION/CONTROL.

- Avoid exposure of wounds/cuts to seawater.
- Careful handling of raw/undercooked seafood by persons with superficial cuts.
- Avoid eating raw/undercooked seafood, especially persons with liver disease.

*Vibrio cholerae* is widely distributed in marine environments. Since January 1991 there has been an epidemic in parts of South America. It is usually a waterborne illness but can be spread by foods.

There is concern that dumping of bilge water from a ship from Central or South America in a Gulf port will release the bacteria into a harbor area, with seafood being contaminated. A 1978 outbreak in Louisiana was traced to undercooked crab. More recently, raw oysters from Gulf waters have been involved in outbreaks.

**CONTROL.** Avoid raw/undercooked crabs/shellfish from contaminated waters.

#### REFERENCES

1. Appleton, H. 1990. "Foodborne Illness. Foodborne viruses." *Lancet*. 336:1362-1364.
2. Baird-Parker, A.C. 1990. "Foodborne Illness. Foodborne salmonellosis." *Lancet*. 336:1231-1235.
3. Benenson, A.S. 1990. "Control of Communicable Diseases in Man," 15th ed. American Public Health Association, Washington, DC.
4. Cliver, D.O. 1990. "Foodborne Diseases." Academic Press, Inc., San Diego, CA.
5. Doyle, M.P. 1989. "Foodborne Bacterial Pathogens." Marcel Dekker, Inc., New York, NY.
6. Doyle, M.P. 1990. "Foodborne Illness. Pathogenic *Escherichia coli*, *Yersinia enterocolitica* and *Vibrio parahaemolyticus*." *Lancet*. 336:1111-1115.
7. Finley, J.W., S. F. Robinson and D. J. Armstrong. 1992. "Food Safety Assessment." (ACS Symposium Series). American Chemical Society, Washington, DC.
8. Food Safety and Inspection Service. 1990. "FSIS Facts. Bacteria That Cause Foodborne Illness." (FSIS-40). U. S. Department of Agriculture, Washington, DC.
9. Institute of Food Technologists. 1988. "Bacteria Associated with Foodborne Diseases." A Scientific Status Summary by the Institute of Food Technologists' Expert Panel on Food Safety & Nutrition. *Food Technol.* 42(4):181-200.
10. Institute of Food Technologists. 1988. "Virus Transmission via Foods." A Scientific Status Summary by the Institute of Food Technologists' Expert Panel on Food Safety & Nutrition. *Food Technol.* 42(10):241-248.
11. Lund, B.M. 1990. "Foodborne Illness. Foodborne disease due to *Bacillus* and *Clostridium* species." *Lancet*. 336:982-986.
12. National Restaurant Association. 1992. "Applied Foodservice Sanitation." 4th ed. John Wiley & Sons, Inc., New York, NY.
13. Roberts, D. 1990. "Foodborne Illness. Sources of infection: Food." *Lancet*. 336:859-861.
14. Skirrow, M.B. 1990. "Foodborne Illness. *Campylobacter*." *Lancet*. 336:921-923.
15. Snyder, O.P. and D.M. Poland. "America's 'Safe' Food," *Dairy, Food and Environ. Sani.* Part 1, 10(12):719-724, December 1990. Part 2, 11(1):14-20, January 1991.
16. Todd, E. 1990. "Foodborne Illness. Epidemiology of foodborne illness: North America." *Lancet*. 336:788-790.

*Part seven of the Foodborne Illness Series will be published in the May 1994 issue of Dairy, Food and Environmental Sanitation.*

# IAMFES

## Announces the Availability of the Procedures to Implement the Hazard Analysis at Critical Control Point (HACCP) System Manual

This manual, the latest in a series of procedural manuals developed by the **IAMFES Committee on Communicable Diseases Affecting Man**, provides vital information, including, procedures to:

- Implement the HACCP System
- Analyze Hazards and Assess Risks
- Determine Critical Control Points
- Monitor Critical Control Points
- Collect Samples •Test Samples for Pathogens
- Evaluate Processing Systems for Hazards
- Diagram Processing Systems
- Measure Time-Temperature Exposure of Foods
- Conduct Experimental Studies
- Measure pH •Measure Water Activity, etc.

**FOR ORDER INFORMATION, CONTACT  
IAMFES AT 800-369-6337 (U.S.),  
800-284-6336 (CANADA)  
OR FAX 515-276-8655**

# European Perspectives on *Listeria monocytogenes*

Paul Teufel, Robert von Ostertag-Institute,  
Bundesgesundheitsamt Diederdorfer Weg 1, 12277 Berlin, Germany

As presented at the IAMFES 80th Annual Meeting, Atlanta, Georgia, August 2, 1993, in the symposium  
"*Listeria monocytogenes*: Current Issues and Concerns" sponsored by the International Life Sciences Institute

## INTRODUCTION

In Europe research on listeriosis has a long history. Evidence of *Listeria monocytogenes* in animals, feed, raw milk and meat and its presence in the excretions of a high percentage of healthy human beings enlivened time and time again the discussion in the Sixties and at the beginning of the Seventies as to whether contaminated food could be the cause of listeria infections in human beings. In those days, no definitive answer to this question could be found.

It was not before 1986 when Europe realized that the listeria problem in foods reported from Canada and the United States does also affect the food production in Europe. Since then three major events in Switzerland (1), United Kingdom (2) and France (3) have confirmed an unmistakable connection between contaminated food and illness. The Vacharin Mont d'Or outbreak in Switzerland was at that time in line with the common statement that particularly soft cheeses might be the most important source for human listeriosis. The cases caused by Paté in the United Kingdom and the dramatic listeriosis outbreak in France, probably due to cured, cooked pork tongue in jelly showed that meat products are at least as important as fermented milk products.

The development of better methods for the detection of *L. monocytogenes* in foods has led to the detection in a large variety of raw and processed foods. These findings caused considerable problems for food inspection authorities with respect to the legal classification and actions to be taken.

## THE DILEMMA

An important task of the national food inspection authorities in Europe is the examination of foods at the retail level, e.g., as the consumer buys it. The detection of a pathogen in a ready-to-eat food usually results in penal consequences, recalls, and when the product is already widely distributed, in a public warning. This happened in 1986 particularly with soft cheeses that were traded within the European Community. As a rule, the presence of *L. monocytogenes* in 25 g samples of an imported cheese triggered already the public warning through the EEC Alert System.

At the same time large and small food processors were suddenly faced with complaints, unwanted publicity and considerable financial losses. Measures to reduce the *Listeria* contamination during food processing were not known.

Actions to reduce the *Listeria* contamination were frequently rendered void by the fact that incoming raw materials such as meat, are permanently introducing *L. monocytogenes* into the food plant. Smaller enterprises (e.g., butcheries) saw no possibility to arrange the processing in such a way that listeria could be definitely excluded. Even when the food was listeria free, recontamination could occur in the sales rooms due to cutting machines and handling.

Under the pressure of the publicity about foodborne listeriosis several countries drafted microbiological criteria asking for the absence of the organism in 25 or 10 g. It is not known whether these criteria were always used. A first step to solve the problems was done when the EEC drafted in 1986 the so-called "Gentleman Agreement" for cheeses by which a positive result in an importing country was referred back to the food inspection authorities in the exporting country for further action. The introduction of criteria for cheeses spurred cheese manufacturers to draft specific hygiene plans to reduce and eliminate the *Listeria* contamination.

With increasing knowledge about contamination rates of food with *L. monocytogenes* it became obvious that a consequent application of the so called "zero tolerance" which means in this connection the absence of the agent in 25 g would lead to the rejection of many foods. Some would even vanish from the market.

This dilemma underlined the need for a strategy that could be supported by both the producers and the food inspection authorities. It should aim to prevent contamination by *L. monocytogenes* as far as possible and should subject the apparently short-term contamination of some foods to a standardized assessment.

Unfortunately, there is no common EEC strategy. Up to now the EEC has set criteria for *L. monocytogenes* only within the Milk Hygiene Directive (Council Directive 92/46/EEC, 16 June 1992) asking for the absence of *L. monocytogenes* in 25 g at the end of production. The newly published Food Hygiene Directive (92/c24/13, ) focuses on the application of the HACCP-concept but a strategy for the evaluation of positive results from foods at the retail level is lacking.

Individual European countries addressed food industry to develop specific hygiene plans based on the HACCP-concept to reduce the *Listeria* contamination. At the same

time educational material was developed for the most vulnerable groups, such as pregnant women and immunocompromised patients. Another approach in discussion is the quantitative assessment of *L. monocytogenes* in foods and its feasibility in practice. Several European countries have already introduced this balanced approach for certain foods in which *Listeria* cannot be completely avoided and which support the growth of *Listeria*. A general microbiological limit of less than 100 *L. monocytogenes* per gram is applied at the point of sale to the consumer or at the end of the shelf-life as given by the "use-by-date". Similarly, positive results in products intended for consumption without further heating lead to the request to reduce the recommended shelf-life. The fixation of a numerical microbiological limit is disputed as it includes the acceptance of a certain number of a pathogenic agent. In the following, the arguments for this procedure and feasibility of the quantitative assessment are explained.

### BASIS FOR THE QUANTITATIVE APPROACH

Data from investigations show the wide distribution of *Listeria* in both the living and inanimate environment. These data have to be seen against the low incidence of listeriosis in man. In middle Europe the incidence of listeriosis is between 1 and 2 cases per 100,000 inhabitants per year. The notified cases occur sporadically and pregnant women and people with underlying diseases are affected. From microbiological investigations of specific food items that have caused outbreaks of listeriosis it is known that mostly high *L. monocytogenes* counts were reported and in all cases *Listeria* has multiplied during storage at retail and in homes. In the Paté outbreak as well as in France 1992 samples exceeded frequently  $10^4$  *L. monocytogenes* per gram. Available data are not sufficient to calculate the Minimum Infectious Dose but it can be assumed that high numbers increase the health risk. On the contrary low numbers could be considered as indicator for a hygiene problem rather than a health risk. Therefore, the presence of *L. monocytogenes* in a product that has received a listericidal treatment indicates a hygiene defect which can turn into a possible health risk in cases where growth during storage occurs. This possibility implies a different and balanced reaction of food inspection authorities, ranging from enforcement of certain hygiene regulations to specific measures regulating health hazards.

The basis for the drafting of criteria follows closely the general principles as explained by the ICMSF. In order to apply a quantitative assessment of the *Listeria* contamination one has to consider particularly the wide distribution of *Listeria* in certain foods and its absence in others. A stratification of foods must take into account:

- Raw food that may contain *Listeria*
- Food where *Listeria* are not likely to be killed during processing (e.g., fermented sausages, smoked fish).
- Processed food which has received a listericidal treatment and which could be recontaminated during subsequent processing.
- Food which is free of *Listeria* due to the process applied (aseptically packed food).

- Food intended for highly susceptible individuals (food for babies and infants, dietary food).
- The possibility of growth of *Listeria* during storage.

### THE GERMAN EXAMPLE

As an example for the quantitative approach the German recommendations are presented. These are recommendations to be used by food inspection authorities. Food processors are obliged to take all necessary measures to stay below these limits. The recommendations consist of a food catalogue, a set of microbiological limits, a standardized microbiological method for the detection of *L. monocytogenes* and measures and legal consequences when the criteria are not met.

The limits are grouped as follows:

1. Absence of *L. monocytogenes* of 25 g or ml.
2. Less than 100 CFU but positive in 1 g or ml.
3. 100-10,000 CFU per or ml.
4. Above 10,000 CFU per g or ml.

These criteria are applied to the different food categories and are aligned to specific measures and health regulations. The figures have caused considerable confusion in other countries, believing that Germany tolerates up to 10,000 cfu of *L. monocytogenes* in 1 g of food. This is, however, not the case. The figures are not tolerance values but determine the type of action to be taken by food inspection authorities.

Group I contains foods for infants and small children as well as dietary foods. Group II contains foods such as pasteurized milk and aseptically packed foods. The criterion is absence of *L. monocytogenes* in 25 g.

Group III comprises foods such as prepacked sausages, cheese made from heat-treated milk (at least pasteurized), shrimps and prawns, and frozen meals. These are products which often display a distinct difference between the level of *Listeria* contamination at the production level and that at the sales point. *Listeria* contamination happens after application of a *Listeria* destroying process (heat treatment). With many of the products in this group there is no possibility that *Listeria* multiply in the course of subsequent storage, ripening and the like. The essential limit for these products is less than 100 per gram (equals positive in 1 g). Low level contamination require follow-up actions in order to check the hygiene in the food establishment where the food was produced or the sample was drawn. Results revealing a higher contamination are evaluated as "unfit for human consumption" or in substantiated cases as health hazard.

Group IV comprises three different food groups which are (i) otherwise stabilized food (e.g., fermented sausages, smoked fish); (ii) raw food that is consumed raw (e.g., prepacked fresh salad); (iii) raw food that is heated before consumption. The latter is included to prevent highly contaminated food to enter the kitchen. These food groups are combined as the limits are almost identical. A contamination of less than 100 per gram is usually permissible, whereas in cases of higher contamination levels the food plant or food shop is subjected to an official hygiene check. In cases when food of category IV is expected to be free of listeria (e.g., raw milk cheese) even more stringent regulations can be applied. Should any of the products in this group — for example, delicatessen salads — comprise several components, it should be verified whether the catalogue of

measures and evaluation techniques for Group III is to be applied in the individual case.

The catalogue of measures comprises essentially four steps:

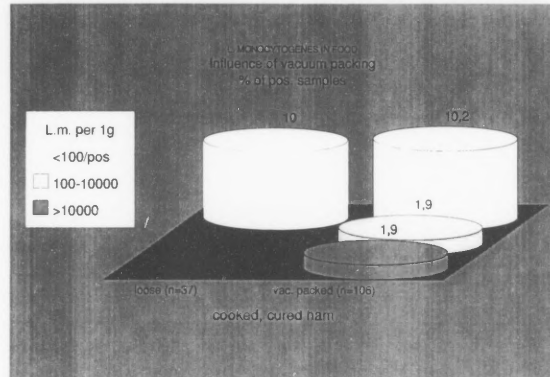
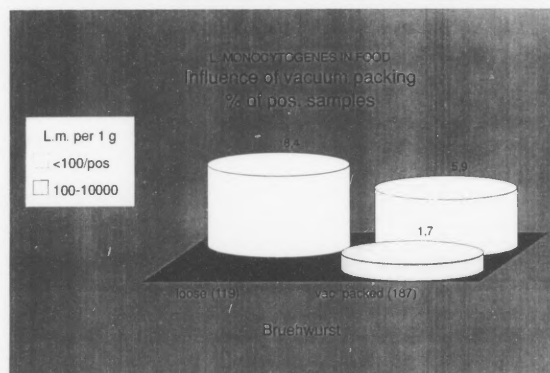
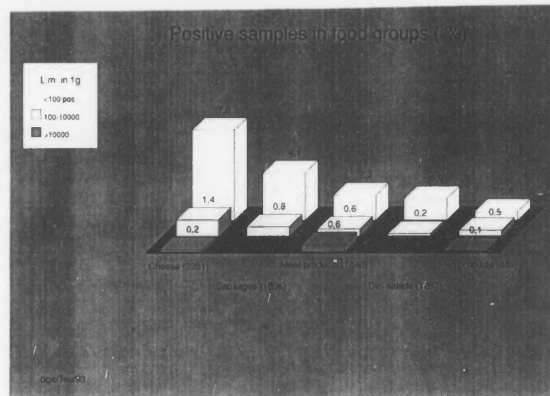
1. Reappraisal of suspicious findings by drawing up to five additional samples of the same batch or if not available of the same product. The batch must be evaluated on the basis of the worst result.
2. Hygiene checks by food inspection.
3. Internal information of other states within Germany or the EEC and internal recalls by food processors when the food is not yet at the retail level.
4. Public warnings and public recalls.

### DOES IT WORK?

In 1992 a survey was made with the aim to evaluate the recommendations that were issued in May 1991. Forty-one food inspection laboratories of Germany participated and provided quantitative results of approximately 17,000 examinations. The survey was done against a constant background of 30 to 40 notified cases of sporadic newborn listeriosis which can be calculated to a total of 1 to 2 cases of listeriosis per 100,000 inhabitants per year in Germany.

An overview over the quantitative results from the main food groups that were found contaminated are presented in Fig. 1. Only very few food items revealed a contamination of more than 10,000 CFU per gram. Fish products, especially prepacked smoked fish, which has in Europe not yet a history of having caused listeriosis showed a considerable share of highly contaminated products. For selected product categories such as soft cheeses and certain sausages (Brühwurst) the percentage of positive samples has decreased since 1986 (Fig. 2). This tendency has to be considered cautiously and cannot be applied to all food categories. These data reflect more the overall awareness of cheese makers and larger meat processors. Notwithstanding, the fact that problems still occur in these industries. Data from few producers show the well-known correlation of recontamination and subsequent growth of *L. monocytogenes*, due to an overestimated shelf-life of the product (Fig. 3 and 4).

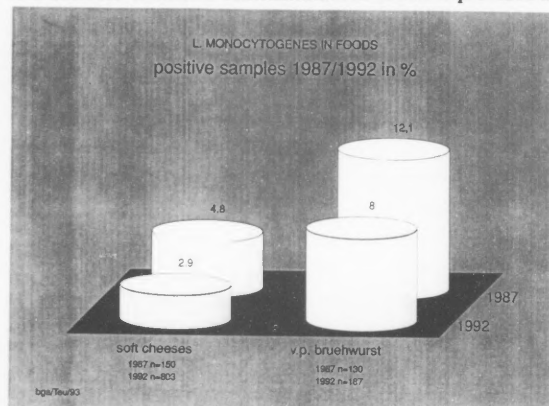
The results obtained so far justify to lower the upper limit of 10,000 to 1,000 *L. monocytogenes* per gram or milliliter without changing the legal consequences. The survey has also shown that a quantitative approach is feasible and contributes to a decrease of listeria contamination in foods. It provides a



more realistic view on *L. monocytogenes* and helps food inspection authorities to focus on products under suspicion. It also reminds food producers and food handlers to keep the contamination level as low as possible in order to prevent that a hygiene problem turns into an actual health hazard. The complete exclusion of *L. monocytogenes* from our foods is unrealistic and will not be accomplished within the foreseeable future, not even by application of the most stringent criteria.

### REFERENCES

1. Bille, J. and M. P. Glauser. 1988. Listeriose en Suisse. Bull. Bundes. Gesundheitswesen. 3:38-29.
2. McLaughlin, J., S.M. Hall, S. K. Belani and R. J. Gilbert. 1991. Human listeriosis and paté: A possible association. Brit. Med. J. 303:773-775.
3. Rocourt, J., B. Catimel, Ch. Jaquet, R. Brosch and C. Buchrieser. 1992. Epidémie de listériose en France en 1992 aspects microbiologiques. Méd. Mal. Infect. 22:35-40.



**Editor's Note:** In 1958 Carl A. Mohr was honored as the winner of the Sanitarian's Award. Mr. Mohr was given the award at the annual meeting in New York, NY. Recently it was brought to our attention that Mr. Mohr's name has been inadvertently left off of the list of past winners. Our deepest apologies are extended to Mr. Mohr for the disservice we have done by not listing his name. We have decided to congratulate Mr. Mohr once again for his outstanding achievement by reprinting the following article and photograph, which originally appeared in the 1958 *Journal of Milk and Food Technology*, p. 265.



Left, Carl A. Mohr receives Sanitarian's Award plaque from Harold S. Adams, Chairman of Committee on Recognition and Awards.

## Carl A. Mohr Winner of Annual Sanitarian's Award

Carl A. Mohr, Sanitarian and Deputy Health Officer of the Green Bay, Wisconsin Health Department was the winner of the annual Sanitarian's Award, presented by International. In addition to an appropriately engraved plaque, the recipient also received a check in the amount of \$1000.

Mr. Mohr was cited for his accomplishments in the field of milk and food sanitation in Green Bay and for his contributions and influence, state wide, in the sanitary control of milk, meat and other foods. His work in organizing and promoting the Wisconsin Conference on Intrastate Milk Shipments has been outstanding and has resulted in the solution of intrastate milk shipment problems in some 25 Wisconsin cities. He serves presently as chairman of the Conference.

He has been instrumental in the enactment of modern milk, food and meat ordinances in his home city and has greatly improved the sanitary quality of these products. Another outstanding contribution has been his program of environmental sanitation education in the high schools in Green Bay. When the Board of Education was retrenching its program in health education, Mr. Mohr personally offered his services with a planned program of sanitation education for the students. This has continued to be most successful, in fact has been expanded to the point where students carry on special field studies, take examinations and receive credit for the work.

In his home city, Mr. Mohr is active in city affairs and serves actively in clubs and associations whose objectives are civic improvement. He is looked upon in his native city as a man of outstanding organizational ability and with perseverance qualities to carry through to completion programs of public health improvement.

In addition to being awarded the Annual Sanitarian's Award by International, Mr. Mohr was also honored by the Wisconsin Association of Milk and Food Sanitarians at their recent meeting by being named outstanding sanitarian in Wisconsin for the year 1958.

Mr. Mohr is married and has three children.

---

## Erratum

*Dairy, Food and Environmental Sanitation*, Vol. 14, No. 1, pages 18-23 (January 1994). Baldwin, A. J. and Hancock, P. S., Evaluation of a Personnel Change Facility.

Printing errors on page 21.

- \* Initial count: 107 500 CFU/100 cm<sup>2</sup> (number broken by end of line).
- \* Figure 2 Y-axis logarithmic scale; lowest number 10 not 0.
- \* Table 3 Median for season swab results; Left Barrier 15; Right Barrier 27.

## *No Scientific Evidence to Support Labeling of Milk from Cows not Given BST*

A national alliance of four food science and nutrition organizations today stated that voluntary labels on dairy products claiming to be made with milk free of supplemental BST are neither meaningful nor verifiable on scientific grounds.

"The drawbacks to an 'rBST-Free' or 'rBGH-Free' label are, first, that it might be misleading by giving the impression that the labeled milk is substantially different, which it is not," said Dr. M. Susan Brewer on behalf of the Food and Nutrition Science Alliance (FANSA). "Second, it might suggest that unlabeled milk poses a possible health risk, which it does not."

The sale of milk from cows given supplemental bovine somatotropin (BST, also called BGH) becomes legal on February 4. The Food and Drug Administration in November concluded, after a decade-long review of scientific evidence, that such milk poses no human health or safety risk. Food and Drug Administration (FDA) also found that there was no scientific basis for compulsory labeling of the milk. However, FDA will permit voluntary labeling of milk from cows not treated with BST, as long as such labels meet the two standard guidelines of being truthful and not misleading.

BST is a naturally occurring protein hormone that is secreted by a cow's pituitary gland and helps the cow produce milk. By supplementing cows with additional BST, dairy farmers can increase milk yield without altering the milk's nutrient content or hormone composition.

"Label claims concerning supplemental BST allow consumers to buy milk based on their personal beliefs about how milk should be produced, not on the scientific evidence," said Brewer, assistant professor of foods and nutrition at the University of Illinois at Urbana - Champaign. "There are no laboratory tests to distinguish between milk from cows given BST and cows not given BST; thus, label claims are not verifiable."

Besides FDA, other leading scientific institutions in the United States and Europe have concluded that milk from BST-supplemented cows is safe. They include the National Institutes of Health, the U.S. Congress Office of Technology Assessment, the American Medical Association, and the American Academy of Pediatrics.

The Food and Nutrition Science Alliance (FANSA) represents the Institute of Food Technologists, the American Dietetic Association, the American Society for Clinical Nutrition, and the American Institute of Nutrition.

For more information contact Dr. M. Susan Brewer, University of Illinois at (217)244-2867.

## *Food Store Sanitation Correspondence Course Offered by Cornell University Stresses HACCP Approach*

Since food safety, food sanitation and Hazard Analysis Critical Control Points (HACCP) have been in the news lately, food retailers may be interested in knowing more about Food Store Sanitation, a correspondence course offered by the Cornell University Food Industry Management Home Study Program.

The textbook used in this course was extensively revised by Robert B. Gravani, a Cornell University professor of food science, and is designed specifically for retail food store employees and managers. All aspects of a sanitation program — from food temperature control to pest control — are presented with practicality and the food retailer in mind.

A chapter on the HACCP system includes a detailed HACCP plan for the preparation, display and storage of fried chicken in a supermarket deli department. The fried chicken example illustrates how a store's food safety assurance team can develop HACCP plans for all potentially hazardous foods sold in today's supermarket.

Revisions throughout the textbook's following 15 chapters also reinforce the HACCP system:

- Introduction to Food Store Sanitation
- The Comprehensive Food Store Safety Assurance Program
- Sanitation and Store Profits
- The Microbial World
- Foodborne Illness
- The Hazard Analysis Critical Control Point (HACCP) System
- Food Temperature Control
- Principles of Cleaning and Sanitizing
- Personal Hygiene and Employee Practices
- Effective Pest Control: Rodents and Birds
- Effective Pest Control: Insects
- Construction and Maintenance of Facilities and Equipment
- Food Laws, Regulatory Agencies and Inspections
- Departmental Sanitation
- Designing and Implementing a Sanitation Program

The enrollment fee for Cornell Home Study's Food Store Sanitation course is \$60, which covers the costs of the textbook and study guide, grading and the certificate of completion. The course requires enrollees to complete five assignments and a final examination. It does not carry Cornell University credit.

To request more information, to enroll in the Food Store Sanitation course, or to obtain a copy of the textbook for your library, contact the Cornell Home Study Program, 250 Warren Hall, Cornell University, Ithaca, NY 14850-7801, or call (607)255-3028 / FAX (607)255-9984.



# Federal Register

## Department of Health and Human Services

### Food and Drug Administration

(Docket No. 93N-0195)

#### Fish and Fishery Products, Hazards and Controls Guide; Availability

**Agency:** Food and Drug Administration, HHS.

**Action:** Notice.

**Summary:** The Food and Drug Administration (FDA) is announcing the availability of a draft guidance document entitled "Fish and Fishery Products Hazards and Controls Guide," which the agency has developed on seafood hazards and controls. The FDA has prepared this document as, among other things, an adjunct to regulations proposed by FDA on procedures for the safe processing of fish and fishery products.

**Dates:** Written comments by April 28, 1994. Comments received after April 28, 1994, will be considered in the drafting of subsequent editions of the guide, as the agency finds it necessary.

**Addresses:** Copies of the "Fish and Fishery Products Hazards and Controls Guide" may be ordered from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161. For further information on placing an order, call NTIS at 703-487-4650 for regular service, or 800-553-NTIS for rush service. Submit written comments to the Dockets Management Branch (HFA-305), Food and Drug Administration, Rm. 1-23, 12420 Parklawn Drive, Rockville, MD 20857. Comments should be identified with the docket number found in the brackets in the heading of this document.

**For Further Information Contact:** Donald W. Kraemer, Center for Food Safety and Applied Nutrition (HFS-400), Food and Drug Administration, 200 C St., S.W., Washington, D.C. 20204, 202-254-3885.

#### Supplementary Information:

The FDA is in the process of developing a guidance document entitled "Fish and Fishery Products Hazards and Controls Guide." The draft guide is now available to the public through NTIS.

The guide is designed to serve several purposes. First, FDA anticipates that it will help members of the commercial fish and fishery products industry identify and control

potential hazards associated with the fish and fishery products that they handle and process. In addition to human food safety hazards and controls, the guide will address controls associated with quality, marketability and economic fraud.

The guide also is designed to help members of the seafood industry develop and implement Hazard Analysis Critical Control Point (HACCP) plans for their operations, as will be required if FDA adopts the proposed regulations. The proposed regulations provide that seafood processors and importers must establish HACCP systems of preventive controls to ensure the safety of the food they produce. The guide provides information that processors and importers can use in the development of their HACCP plans. This information consists largely of an identification of hazards that can affect seafood and a discussion of the control measures that can keep these hazards from actually occurring or that can at least minimize the likelihood of their occurrence.

Another purpose of the guide is to help consumers and the public to understand seafood safety in terms of the hazards that are presented by seafood and the controls that can be applied to those hazards.

The FDA believes that the guide will assist Federal and State regulatory officials in developing uniform and consistent regulatory strategies and controls for seafood. This guide should be useful in the evaluation of HACCP plans and systems by both State and Federal regulatory officials.

Comments concerning the draft guide were solicited with the announcement of the proposed regulations in the **Federal Register** of January 28, 1994. The FDA will study the comments it receives, revise the draft guide as warranted, and then issue the guide. The agency intends to issue the guide by the time that the proposed HACCP regulations for seafood are issued in final form, should the agency decide to do so.

Interested persons may, on or before April 28, 1994, submit to the Dockets Management Branch written comments regarding this draft guide. Two copies of any comments are to be submitted. Comments are to be identified with the docket number found in brackets in the heading of this document. The "Fish and Fishery Products Hazards and Controls Guide" and received comments are available for public examination in the Dockets Management Branch between 9 a.m. and 4 p.m., Monday through Friday.

The FDA will publish subsequent editions based on public comments and as circumstances warrant, e.g., as new knowledge on hazards is obtained or new types of controls are developed.

*Federal Register/Vol. 59, No. 53/Friday, March 18, 1994/ Notice*

For this complete listing, please contact the IAMFES Office at 1-800-369-6337, US; 1-800-284-6336, Canada or 515-276-3344.

# Food and Environmental Hazards to Health

## Imported Cholera Associated with a Newly Described Toxigenic *Vibrio cholerae* O139 Strain — California, 1993

Epidemics of cholera-like illness caused by a previously unrecognized organism occurred recently in southern Asia. This report documents the first case of cholera imported into the United States that was caused by this organism, the newly described toxigenic *Vibrio cholerae* O139 strain.

On February 5, 1993, a 48-year-old female resident of Los Angeles County sought care at a local outpatient health-care facility for acute onset of watery diarrhea and back pain. A few hours before seeking medical care, she had returned to the United States from a 6-week visit with relatives in Hyderabad, India.

Her diarrheal illness began in India on February 4 and increased in severity while she traveled to the United States. She reported a maximum of 10 watery stools per day but no vomiting, visible blood or mucous in her stools, or documented fever. The patient was prescribed trimethoprim-sulfamethoxazole without rehydration treatment and recovered uneventfully. Duration of illness was approximately 4 days. No secondary illness occurred among family members.

When the patient sought medical care, the physician suspected cholera, and a culture of a stool specimen obtained from the patient at that time yielded colonies suspected of being *V. cholerae*. This was confirmed by the Los Angeles County Public Health Laboratory. The isolate was identified as *V. cholerae* non-O1. The isolate produced cholera toxin by Y-1 adrenal cell assay and latex agglutination in the California State Public Health Laboratory. Testing at Centers for Disease Control (CDC) identified the isolate as toxigenic *V. cholerae* serogroup O139, resistant to trimethoprim-sulfamethoxazole.

Before this illness, the patient had been in good health. In Hyderabad, she stayed with relatives and did not travel outside the city. Although the source of her infection was not confirmed, on January 30, the patient had eaten fried shrimp and prawns purchased from a local market and prepared by relatives. She also recalled drinking a half glass of unbottled water in Hyderabad on February 3.

**Editorial Note:** In October 1992, an epidemic of cholera-like illness began in Madras, India, associated with an atypical strain of *V. cholerae*. In early 1993, similar epidemics began in Calcutta (with more than 13,000 cases) and in Bangladesh (with more than 10,000 cases and 500 deaths) caused by similarly atypical strains of *V. cholerae*. These strains could not be identified as any of the 138 known types of *V. cholerae* and have been designated as a new serogroup, O139. Although the extent of the ongoing epidemic in southern Asia is unclear, this strain is now associated with epidemic cholera-like illness along a 1,000-mile coastline of the Bay of Bengal (from Madras, India, to Bangladesh) and appears to have largely replaced *V. cholerae* O1 strains in affected areas.

The emergence of this new cause of epidemic cholera represents an important shift in the epidemiology of this infectious disease. Until 1993, the only recognized causes of epidemic cholera were *V. cholerae* strains that were part of serogroup O1. *Vibrio cholerae* isolates from other serogroups (e.g., non-O1) were recognized as causes of sporadic diarrheal and invasive infections but were not considered to have epidemic potential. The relation of the new non-O1 serogroup to typical O1 strains is unclear; except for the presence of O1 antigen, the strains are nearly identical in most characteristics.

Descriptions of the symptoms associated with *V. cholerae* O139 infection suggest it is indistinguishable from cholera caused by *V. cholerae* O1 and should be treated with the same rapid fluid

replacement. Although the illness may be severe, it is treatable with oral and intravenous rehydration therapy. The new organism has been susceptible to tetracycline, which is the recommended antibiotic for treatment of cholera. However, the organism is reportedly resistant to trimethoprim-sulfamethoxazole and furazolidone, other antibiotics used to treat cholera.

Health-care providers should consider the new strain as a possible cause of cholera-like illness in persons returning from the Indian subcontinent. Although previous cases were reported from Madras and Calcutta in India and from Bangladesh, this report suggests that Hyderabad, India — which is inland — is also affected. Because of effective sewerage and water treatment, further spread of this strain is unlikely in the United States. However, the potential for epidemic cholera caused by *V. cholerae* O139 exists for much of the developing world, and further spread to other parts of Asia is probable.

The emergence of this new strain has at least three other major public health implications. First, it expands the definition of cholera beyond the illness caused exclusively by toxigenic *V. cholerae* of serogroup O1. Because it appears to cause the same illness and to have similar epidemic potential, the World Health Organization has asked all nations to report illnesses caused by this strain as cholera. In the United States, clinicians, laboratorians and public health authorities should report infections with toxigenic *V. cholerae* O139 as cholera, in addition to cases of toxigenic *V. cholerae* O1 infection.

Second, the rapid spread of the *V. cholerae* O139 epidemic in southern Asia, even among adults previously exposed to cholera caused by *V. cholerae* O1, suggests that preexisting immunity to toxigenic *V. cholerae* O1, whether the result of natural infection or cholera vaccine, offers little or no protective benefit. Travelers to areas affected by this epidemic should exercise particular care in selecting food and drink and should not assume that cholera vaccination is protective against the *V. cholerae* O139 strain.

Third, laboratory identification methods for *V. cholerae* O1 depend on detection of the O1 antigen on the surface of the bacterium, and therefore do not identify this new strain. A specific diagnostic antiserum for *V. cholerae* O139 is being prepared for use in U.S. public health laboratories and will be distributed soon. Without such antiserum, this strain might be confused with other non-O1 *V. cholerae* isolates unrelated to the newly described O139 strain that occasionally cause infections in the United States.

In 1989, a pilot surveillance effort in four states determined that the reported infection rate for non-O1 *V. cholerae* was 1 per 1-million population. Although non-O1 strains can cause illness, non-O1 strains other than the newly described O139 have not been implicated as a cause of epidemics and are not considered a major public health problem. Accordingly, CDC recommends that:

1. Sporadic clinical isolates of non-O1 *V. cholerae* should be referred to a state public health laboratory for further characterization if there is an epidemiologic link to areas of the world known to be affected by O139 (currently India and Bangladesh); if the disease is typical of severe cholera (e.g., watery diarrhea with life-threatening dehydration); or if the isolate has been linked to an outbreak (e.g., more than one linked case) of diarrheal illness.
2. Physicians should ask that specimens from persons with suspected cholera be cultured on thiosulfate-citrate-bile salts-sucrose (TCBS) medium for isolation of *V. cholerae*. All cases of suspected cholera should be reported immediately to local and state health departments.

MMWR 7/9/93

# HAZCON-Based Total Quality Management

## Retail Food Operation Food Hazard Control Checklist

O. Peter Snyder, Jr., Ph.D.  
 Hospitality Institute of Technology and Management,  
 830 Transfer Road, Suite 35,  
 St. Paul, MN 55114

The following is the second installment of the Retail Food Operation Food Hazard Control Checklist mentioned in the October 1993 column. This checklist will be continued over the next several months to cover its entirety.

### RETAIL FOOD OPERATION FOOD HAZARD CONTROL CHECKLIST [40°F - 150°F (4.4°C - 65.6°C)]<sup>1</sup>

FOOD SAFETY CONTROL REQUIREMENTS	PERFORMANCE EVALUATION	NEEDED TO ASSURE SAFETY
<ul style="list-style-type: none"> <li>At 40°F (4.4°C), food is held &lt; 5 days.</li> <li>If refrigerated food is to be held &gt; 5 days, it is stored &lt; 40°F (4.4°C) using the rules in the above table.</li> <li>Hot food is held above 130°F (54.4°C) for safety; 150°F (65.6°C) regulatory requirement.</li> <li>To conserve nutritional value, food (especially vegetables) maintained above 130°F (54.4°C) for safety; 150°F (65.6°C) regulatory requirement, is not held for more than 30 min.</li> <li>Food safety control is also extended with pathogenic microbiological growth inhibitors in the food such as <math>a_w</math> and pH, or GRAS additives when shown to be effective by laboratory analysis. A HACCP recipe is used in each case by the cook for control.</li> </ul>		
<p><b>Container disposal (Reg)</b></p> <ul style="list-style-type: none"> <li>All empty containers and packing boxes are disposed of promptly and properly in order to deprive pests of hiding and nesting places.</li> <li>All staples, plastic binders and pieces of wire are accounted for, in order to prevent these items from finding their way into foods.</li> </ul>		
<b>Pre-Preparation</b>		
<p><b>Ingredient inspection and control (Haz)</b></p> <ul style="list-style-type: none"> <li>All ingredients are inspected as they are used in food preparation.</li> <li>Any ingredients that are off-color, have strange odors, appear to have bubbles when they should not, show evidence of insect or rodent contamination, or are suspect in any other manner are rejected and returned to suppliers or discarded.</li> <li>If there is any doubt about the safety of food or how it was prepared, the food is discarded.                     <ul style="list-style-type: none"> <li>The suspect food is shown to a manager/supervisor before disposal and a record of this type of food disposal is recorded on the waste control sheet.</li> </ul> </li> </ul>		
<p><b>Food thawing (Reg)</b></p> <ul style="list-style-type: none"> <li>Thawing is accomplished by one of the following methods:                     <ol style="list-style-type: none"> <li>In a conventional or rapid thaw refrigerator at 40°F.</li> <li>Under flowing, potable water at a temperature of 70°F or below, with sufficient velocity to agitate and float off loose food particles into the overflow.</li> <li>In a microwave oven only when the food will be immediately transferred to conventional cooking facilities as part of a continuous cooking process or when the entire, uninterrupted cooking process takes place in the microwave oven.</li> <li>As part of the conventional cooking process, about 40% longer cooking time is allowed for the thawing process at the beginning of the cook cycle.</li> </ol> </li> </ul>		

**Abbreviations:** (Haz) = Hazard; (Reg) = Regulatory; (Qual) = Quality; (OSHA) = Occupational Safety and Health Agency

<sup>1</sup>Temperatures, unless otherwise stated, are food temperatures. They are measured both 1/16-inch below the surface as well as at the center of food in order to determine the degree of control and stability of hot and cold systems.

FOOD SAFETY CONTROL REQUIREMENTS	PERFORMANCE EVALUATION	NEEDED TO ASSURE SAFETY
<p><b>Chemical Additives (Haz)</b></p> <ul style="list-style-type: none"> <li>• Sulfates and sulfites are not used in the preparation of food.</li> <li>• No more than 1/8 teaspoon (1.7 g) MSG is used per 12 ounce (340 g) portion of food.</li> <li>• Any food containing yellow No. 5 is identified to the customer on the menu.</li> <li>• Nitrates and nitrites are used at a concentration of &lt;200 ppm.</li> <li>• HACCP recipe procedures are used for all recipes using food chemicals that are dangerous when used in excess.</li> </ul>		
<p><b>Raw food handling (Haz)</b></p> <ul style="list-style-type: none"> <li>• All government inspected raw food is expected to have some degree of pathogenic microorganism, chemical and hard foreign object contamination.</li> <li>• After touching raw food and containers, employees wash their hands.</li> </ul>		
<p><b>Separate raw and cooked food (Haz)</b></p> <ul style="list-style-type: none"> <li>• Raw and cooked foods are kept separate.</li> <li>• Separate, freshly cleaned and sanitized cutting boards and knives are used for raw foods and for cooked foods.</li> <li>• Equipment with any raw food contamination never contacts cooked food without first being cleaned and sanitized.</li> </ul>		
<p><b>Food washing (Haz)</b></p> <ul style="list-style-type: none"> <li>• All raw fruits and vegetables, after trimming are thoroughly washed before preparation using the following method. <ul style="list-style-type: none"> <li>- Immerse the items in a sanitized sink of cold water kept flowing with an overflow pipe.</li> <li>- Agitate.</li> <li>- A vegetable brush is used when appropriate.</li> <li>- Transfer the food to a second sink containing an adequate supply of clean cold water and agitate once more.</li> <li>- Drain items.</li> </ul> </li> </ul>		
<p><b>Cutting up raw food (Haz)</b></p> <ul style="list-style-type: none"> <li>• Raw food is prepared in small enough quantities to maintain the temperature below 50°F.</li> <li>• Preparation is not done more than 24 h in advance of use.</li> </ul>		
<b>Preparation</b>		
<p><b>Potentially hazardous food (Haz)</b></p> <ul style="list-style-type: none"> <li>• All food is considered to be potentially hazardous unless it has a pH &lt; 4.6 (to control growth of <i>Clostridium botulinum</i>), or a <math>a_w &lt; .86</math> (to control growth of <i>Staphylococcus aureus</i>), or is commercially sterilized in a sealed, approved container.</li> <li>• Food that is not pasteurized has a pH of &lt; 4.1 to control <i>Salmonella</i> spp.</li> </ul>		
<p><b>Hard foreign objects (Haz)</b></p> <ul style="list-style-type: none"> <li>• Food is inspected for the presence of any extraneous material that could cause disgust, alarm or injury to consumers.</li> <li>• The following procedures are used to prevent or minimize the presence of hard foreign objects and other unwanted material in food. <ul style="list-style-type: none"> <li>- Can opener blades are kept dull and are replaced when they get sharp.</li> <li>- Whole spices, herb seeds and leaves are wrapped in cheesecloth bags before adding to food so they can be removed.</li> <li>- Toothpicks with pants are used.</li> <li>- Food is inspected for bones, bone chips, glass.</li> <li>- All metal staples, twist-ties and nails used in packaging are accounted for.</li> <li>- All packaging material is removed from products.</li> <li>- Metal scrubbing pads are not used for cleaning food utensil or food preparation work surfaces.</li> <li>- Metal ice scoops are used for getting ice from ice machine. Beverage glasses are never used to scoop ice.</li> <li>- Fresh fruits and vegetables are washed and inspected for the presence of insects and worms.</li> </ul> </li> </ul>		

FOOD SAFETY CONTROL REQUIREMENTS				PERFORMANCE EVALUATION	NEEDED TO ASSURE SAFETY
<b>Food Pasteurization (Haz)</b> All food can be pasteurized according to the 3D-7D <i>Salmonella</i> inactivation (kill). However, in some cases, old government regulations still specify higher end-point temperatures. Unless the company or facility has government approval for a lower time-temperature standard, specified foods must be cooked to government specified temperatures. <ul style="list-style-type: none"> <li>• Raw meat, poultry and fish pieces are cooked to assure that the center temperature in the item's thickest part reaches a pasteurization temperature for an established period of time.</li> <li>• The following <b>Food Pasteurization Table</b> indicates the center temperature and the amount of time required at that temperature to reduce <i>Salmonella</i> in beef, pork, poultry and fish by at least 1,000:1/g for immune-complete people and 10<sup>7</sup>:1/g for immune compromised people.</li> </ul>					
<b>Food Pasteurization Table</b>					
	Temperature °F (°C)	HITM 3D (10 <sup>3</sup> :1)/g	USDA / FDA 7D (10 <sup>7</sup> :1)/g		
Beef:	130°F (54.4°C)	51.9 min	121 min		
	135°F (57.2°C)	16.4 min	38.3 min		
	140°F (60.0°C)	5.19 min	12.1 min		
	145°F (62.2°C)	98.4 s	3.8 min		
	150°F (65.5°C)	31.1 s	72.6 s		
	155°F (68.3°C)	9.84 s	23.0 s		
	160°F (71.1°C)	3.1 s	7.3 s		
Pork, Fish:	150°F (65.6°C)	31.1 s	72.6 s		
Poultry:	165°F (73.8°C)	.984 s	2.3 s		
<b>Safe preparation of multi-portion, thick, &gt;2-inch items (Haz)</b> <ul style="list-style-type: none"> <li>• Rare roast beef is removed from the oven when the center temperature is above 130°F and transferred to a hot holding device that is set at a temperature and at an adequate relative humidity to keep the center and surface temperature at 130°F or above.</li> <li>• Other meat, fish, and poultry is kept in a hot holding device where the center temperature can be maintained at &gt; 130°F for safety and &gt; 150°F in order to meet customer satisfaction standards and Minnesota regulatory standards.</li> <li>• Slow cooked food products with a starting center temperature of 40°F reach 130°F within &lt; 6 h to prevent hazardous growth of pathogenic microorganisms.</li> <li>• Commercial hams and pasteurized, pre-cooked crab are maintained at temperatures below 40°F, or are heated and maintained &gt; 150°F after removal from the container.</li> <li>• The facility plans to have little or no leftover roasts or other thick items, because of the hazardous possibility of spore outgrowth in these items during cooling.</li> <li>• Any leftovers from thick pieces of meat (roasts) are cut into pieces &lt;2 inches thick and chilled to 40°F in 11 h or less (in 4 h, if facility has a blast chiller).</li> </ul>					

*This Retail Food Operation Food Hazard Control Checklist will continue in subsequent issues of Dairy, Food and Environmental Sanitation. The May installment will cover: Preparation (cont.).*

# New IAMFES Members

## Alabama

**Phillip Jarnigan**  
Rudy Farm Co.  
Florence

## California

**Margaret Andersen**  
US Army  
Long Beach

**Debby Leuer**  
San Bernardino Co. Env. Health  
San Bernardino

**Karen Okusu**  
Thomas J. Payne Market Development  
Burlingame

**Nina Parkinson**  
National Food Processors Association  
Dublin

**Peter Barnes**  
Hyatt on Sunset  
W. Hollywood

## Colorado

**Annette M. Campbell**  
Imperial Holly Corp.  
Colorado Springs

## Florida

**Lori Milanesi**  
General Mills Restaurants  
Orlando

## Illinois

**Royal Delegge**  
Winn Co. Health Department  
Rockford

## Iowa

**Karla J. DeBower**  
Carroll County Environmental Health  
Carroll  
**Christopher E. Nelson**  
Kemin Industries  
Des Moines

**Silas Strother**  
General Foods  
Mason City

## Kansas

**Jeff Frank**  
Resers Fine Foods  
Topeka

## Kentucky

**Karen L. Asher**  
Aquionics  
Erlanger

## Louisiana

**India (McLin) Graham**  
Louisiana State Dept. of Health  
Baton Rouge

## Maryland

**Michael Ellison**  
Food and Drug Administration  
Rockville

**Patti Nedoluha**  
University of Maryland  
College Park

**Gary W. Thompson**  
Balto County Health Department  
Towson

## Minnesota

**Brian J. Anderson**  
Davisco International  
Le Sueur

**Dan Erickson**  
Minnesota Dept. of Agriculture  
St. Paul

**Jay Juergens**  
Rosemount, Inc.  
Eden Prairie

## Missouri

**Paul J. Bronander**  
Good Humor-Breyers Ice Cream  
Sikeston

## New York

**Kevin Dunnigan**  
Rich Products Corporation  
Buffalo

**Scott Hall**  
Leprino Foods  
Waverly

**Bill Holmberg**  
Dellwood Foods, Inc.  
Yonkers

**Kathleen O'Donnell**  
Wegman's Food Markets, Inc.  
Rochester

## Ohio

**Kurt Kaupisch**  
HIYSON  
Cincinnati

## Oklahoma

**Laura Fenton**  
Oklahoma State University  
Stillwater

## Pennsylvania

**Lisa Kafferlin**  
Erie County Health Department  
Erie

## Texas

**Araceli Caudle**  
Tarrant County Health Dept.  
Fort Worth

**Nancy Turnage**  
Tarrant County/Ft. Worth Health Dept.  
Azle

## Virginia

**Kelly J. Karr**  
American Meat Institute  
Arlington

**Larry A. Leach**  
Virginia Department of Health  
Danville

**James L. Marsden**  
American Meat Institute  
Arlington

## Vermont

**Paul Richards**  
Ben & Jerry Ice Cream  
N. Springfield

## Wisconsin

**Chris Hermann**  
Northland Food Lab, Inc.  
Ft. Atkinson

## Argentina

**Susana Binotti De Piaggio**  
Veterinarian  
Buenos Aires, Capital Federal

## Canada

**Edie Ashton**  
University of Alberta  
Edmonton, Alberta

**Kelly E. Buckley**  
Burger King Canada  
Mississauga, Ontario

**Brian P. Gregory**  
North Okanagan Health Unit  
Enderlay, British Columbia

**Stephen R. Wilson**  
Kraft General Foods Canada, Inc.  
Ingleside, Ontario

## Denmark

**Susanne Knoechel**  
RVAU Center for Food Research  
Frederiksberg

## Ontario Food Protection Association Holds Annual Meeting

"Total Quality Confusion . . . What's It All About?" was the topic of the Annual Meeting of the Ontario Food Protection Association, held November 17, 1993, at the Valhalla Inn, Toronto, Ontario. The meeting was convened by Debbie Labelle, J. M. Schneider Inc., and Anna Lammerding, Agriculture and Agri-Food Canada. The audience of 140 listened to speakers discuss ISO 9000, TQM and HACCP and their applications in manufacturing, food service and regulatory fields. Dr. Subhash Puri, Chief Statistician with Agriculture and Agri-Food Canada, and author of several books, began the program with his talk on *ISO 9000 + TQM + HACCP — the Trilogical Connection* — an excellent overview of how these programs complement each other to ensure quality in manufacturing. *Maximizing Value from ISO 9000 Using TQM* followed the theme, presented by Mr. Dennis Beecroft, Managing Director of the Institute for Improvement in Quality and Productivity at the University of Waterloo, Ontario. *ISO 9000 Registrations in North America* were discussed by Mr. Terry Ascott of the Quality Management Institute, one of the Registrars for ISO 9000 certification in Canada. Maureen Howes, Special Projects Inspector of the York Regional Health Department, provided insights from her experiences in the food service arena — *The Good, the Bad and the Ugly — The Positives and Pitfalls of Implementing HACCP*. Ms. Howes noted that successful implementation of HACCP requires internal staff training programs as well as general education of the food establishment operators. She also emphasized that data collection from HACCP pilot programs can provide a direction for food safety education programming. Mr. Brian Anderson, of Campbell Soup, Canada, discussed HACCP Implementation at Campbell's. For the past two years, Mr. Anderson has been responsible for providing corporate guidance and support for the implementation of HACCP programs in the Canadian operations, and he noted that Campbell works closely with the regulatory agencies to develop and promote HACCP concepts. The day was wrapped up with a joint presentation on *Federal Food Inspection Systems - Where are We Heading?* by Dr. Anne MacKenzie, Director General of the Food Inspection Directorate, Agriculture and Agri-Food Canada, and Janice Hopkins, Acting Director General, Health Protection Branch, Health Canada. Together they presented an overview of programs designed to coordinate and streamline the federal inspection systems for food manufacturers. Comments from the audience underlined the value of the meeting as an industry-government forum, and that ISO 9000, TQM and HACCP are current key concerns of food industry professionals.

Drawing for door prizes is a longstanding tradition of the OFPA, and so it was again this year that Debbie Labelle coordinated the donations with tremendous success. Many companies and individuals generously donated for this year's meeting.

The OFPA business portion of the annual meeting featured the presentation of OFPA Awards. The Sanitarian of the Year Award was presented to John Lytwyn, Auditor/Food Processing, Health Protection Branch, for his contributions to the milk and food industry. John has been instrumental in conveying the concepts of HACCP to regulatory agencies and industry.

Peter Boleszczuk, Ontario Ministry of Health, was presented with the Award of Merit for his many outstanding contributions to the OFPA as a past member of the Board of Directors and as an Executive Officer.

## Upcoming IAMFES Affiliate Meetings

1994

### MAY

**\*4-5, Wisconsin Association of Milk and Food Sanitarians** will present a two-day workshop on HACCP programs. The workshop will be presented at the Sheraton Inn, Madison, WI. Registration information is available from Neil Vassau, PO Box 7883, Madison, WI 53707.

### JUNE

**\*2, Tennessee Association of Milk, Water and Food Protection's Annual Meeting** will be held at the Nashville Ramada Airport. For more information please contact Dennis Lampley at (615)360-0157.

### SEPTEMBER

**\*19-21, Indiana Environmental Health Association, Inc. Annual Meeting** will be held in Muncie, IN. For more information, contact Tami Barrett at (317)633-8400.

**\*20-22, New York State Association of Milk and Food Sanitarians Annual Conference** will be held at the Sheraton Inn-Buffalo Airport, Buffalo, NY. For more information contact Janene Gargiulo (607)255-2892.

### OCTOBER

**\*12-13, Iowa Association of Milk, Food and Environmental Sanitarians Annual Meeting** will be held at the Best Western Starlite Village (formerly the Ramada Hotel), Waterloo, IA. For more information call Dale Cooper at (319)927-3212.

### NOVEMBER

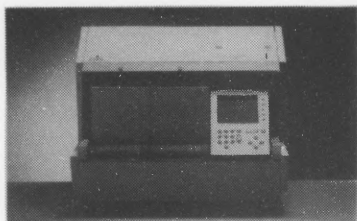
**\*2-3, North Dakota Environmental Health Assn. Annual Educational Conference** will be held at the International Inn, Williston, ND. For more information, contact Deb Larson at (701)221-6147.

Michael Brodsky, Ontario Ministry of Health, was presented with the Lifetime Achievement Award to acknowledge his many contributions to the objectives of the OFPA through his many years of active service with the organization.

The OFPA promotes excellence in food safety education through an undergraduate scholarship program, funded in part by OFPA sustaining member companies. The 1994 OFPA Scholarships of \$500 each and a 1-year OFPA membership were presented to: Kelley Leclair, Dept. of Food Science, University of Guelph; Sandra Abram, in the Food and Drug Technology program at Durham College, Oshawa; Kevin Haley, of Ryerson Polytechnical; Cathy Inkster, a student in the Food Service Supervision program at George Brown College, Toronto; and John Shelvey of Centennial College.

Michael Brodsky, as chair of the nominating committee, presented the nominees for OFPA Executive Officers and new members of the Board of Directors. The nominees were accepted by the membership. The 1994 Board members are: Krista Mountjoy, Past President; Anna Lammerding, President; Sue Fraser, Vice-President; Linda Harris, Secretary; Debbie Labelle, Treasurer; Board members: Janet Avery, Bruce Ciebin, Charles LeBer, Marilyn Lee, Murray Paul and Chris Redden. Krista Mountjoy was presented with the Past President's plaque and pin. Krista expressed her appreciation to the Board of Directors for their support during the past year, and thanked out-going board members Sandra Noonan and Andrew Cavasin for their contributions. The gavel was presented to the incoming president, Anna Lammerding, who outlines goals for the next year, and then adjourned the business meeting.

# Industry Products



## Test Detects Salmonellae in Less Than an Hour

bioMérieux Vitek's VIDAS® *Salmonella* (SLM) Assay allows food processors to detect *Salmonellae* in foods and environmental samples much faster than standard cultural methods. This qualitative enzyme-linked fluorescent immunoassay is performed in the company's fully automated VIDAS or mini VIDAS instruments.

A patented solid phase receptacle and special reagent test strip contain all pre-dispensed reagents required for on-line processing within the VIDAS. Following a standard enrichment protocol, results are available in approximately 45 min.

VIDAS SLM detects both motile and non-motile *Salmonellae*.

bioMérieux Vitek, Inc. - St. Louis, MO

Please circle No. 241  
on your Reader Service Card

## Free Hand Sanitation Video From World Dryer

World Dryer Corporation, the leading manufacturer of warm air hand dryers for over 40 years, is currently offering a video that highlights the company's new Wash Station. Designed to improve hand sanitation practices in foodservice, food processing and healthcare facilities, the Wash Station's completely automatic features lead employees through proper handwashing techniques to ensure safety.

The informative video provides a step-by-step guide to the touchless wash system. In less than 4 minutes, the color video illustrates proper handwashing procedures for fighting hand-to-food contamination and other sanitation problems. The unique "logic system" of the Wash Station features sensors that provide a complete soap and water wash, activating water only after soap has been applied - eliminating a "water only" wash.

World Dryer's video also explains product features which make the Wash Station so easy to use. Highlighted are: lighted low soap indicator, on-off switch for cleaning the fixture without triggering the sensors, and a water over-ride. The compact Wash Station can be installed using existing water and electrical lines.

World Dryer Corp. - Berkeley, IL

Please circle No. 242  
on your Reader Service Card

## Unipath Announces New AnaeroGen™ Anaerobic Atmosphere Generation System

Unipath Limited is pleased to announce a new Anaerobic Atmosphere Generation System, the first product in the new Oxoid brand Atmosphere Generation System.

The unique Oxoid AnaeroGen System employs new technology that replaces oxygen with carbon dioxide in a sealed jar more easily, quickly, and safely than with any other system. With no water, hydrogen, or catalyst to add, the AnaeroGen sachet absorbs oxygen (to a final atmosphere of less than 1% oxygen) from a 3.5 L jar in 30 to 40 min. No hydrogen is generated, heat does not exceed 65°F, and no hazardous pressure build-up occurs.

The fast action of the AnaeroGen System aids presumptive identification by improving colony growth during the first 24-48 h, especially with fastidious and obligate anaerobes.

The Oxoid AnaeroGen System includes everything needed for the transport, culture, selective isolation and susceptibility testing of anaerobic organisms: Oxoid AnaeroGen sachets in 2.5 L or 3.5 L format; 3.5 L anaerobic jar; wide range of special, high quality Oxoid dehydrated and prepared culture media and selective supplements.

Unipath provides the industrial food industry with a complete line of dehydrated culture media, an innovative range of selective culture media, and a wide range of diagnostic kits for the identification of organisms and/or their toxins.

UNIPATH - Ogdensburg, NY

Please circle No. 243  
on your Reader Service Card

## Klenzade Retains Mona Meyer McGrath & Gavin

Klenzade, a division of St. Paul-based Ecolab, Inc., has selected Mona Meyer McGrath & Gavin to provide marketing communications and trade media relations services.

Klenzade is the market leader in developing and marketing sanitation products, systems and services for the on-farm dairy, dairy processing and food and beverage processing industries. Ecolab, Inc. is a billion dollar, world-wide Fortune 500 corporation and the market leader in global institutional sanitation products and services.

Mona Meyer McGrath & Gavin, headquartered in Minneapolis, employs more than 90 people and is the largest public relations firm in the North Central United States. The firm is part of the London-based Shandwick, which has more than 70 principal offices throughout the world.

Klenzade, Division of Ecolab -  
St. Paul, MN

Please circle No. 244  
on your Reader Service Card

## APV Fluid Handling Expands to Include APV Rosista Valves

Effective February 1, 1994, APV Fluid Handling, Lake Mills, WI, assumed the responsibilities for the sales, application, manufacture and service of all APV Rosista Single Seat, Double Seat and Butterfly Valves as well as related fluid handling components formerly supplied by APV Rockford.

This move consolidates all APV North American Fluid Handling capabilities at one location for more efficient operation and improved customer service. APV fluid handling equipment is sold and serviced by a network of local authorized distributors and regional APV sales offices supported by a team of product managers, application engineers and design engineers. Users of all APV valves may now order new or replacement parts direct by calling the Lake Mills factory at 1-800-358-4100.

In addition to valves, APV Fluid Handling provides the processing industries with a complete line of Rotary and Centrifugal Pumps, Powder Mixers and Special Pumping Assemblies.

APV Fluid Handling - Lake Mills, WI

Please circle No. 245  
on your Reader Service Card

## Pall Corporation and New Logic International, Inc. Agreement for Membrane Separation System

Pall Corporation and New Logic International, Inc. have entered into an exclusive agreement under which Pall has acquired manufacturing and sales rights under New Logic's Vibratory Shear Enhanced Processing filtration system patents and know how. Pall will market the system under the name Pall-Sep VMF™ filter. Pall has obtained exclusive rights to manufacture and sell the separations system worldwide.

The Pall-Sep VMF filter offers high flux rates, high concentration limits, low power requirements and mechanical simplicity in separations ranging from low molecular weights through 30 microns. These features, offered for the first time in a membrane system, provide a new standard in rapid separation. The Pall-Sep VMF filter can replace many conventional separation processes, such as evaporation, rotary drum vacuum filtration, centrifugal separation and crossflow membrane filtration.

The Pall-Sep VMF filter can be configured with reverse osmosis, ultrafiltration and microfiltration removal rated membranes and is designed to accommodate pilot and industrial scale filtration applications.

Pall Corporation - East Hills, NY

Please circle No. 246  
on your Reader Service Card



# 81st IAMFES Annual Meeting Exhibitors

**ABC Research Corporation**, 3437 S.W. 24th Ave., Gainesville, FL 32607, (904)372-0436, FAX (904)378-6483

Full service food laboratory - microbiology, chemistry, HACCP programs, imports and exports, plant audits, consulting and problem solving, product development.

**Aquionics, Inc.**, 21 Kenton Lands Road, Erlanger, KY 41018; (606)341-0710, (800)925-0440, FAX (606)341-2302

High intensity ultraviolet systems for disinfection of fluids, air and packaging will be showcased. Ultraviolet is a non-chemical, non-heat exchange method for killing bacteria, yeast, molds and viruses commonly found in food processes.

**Atkins Technical, Inc.**, 3401 S.W. 40th Blvd., Gainesville, FL 32608-2399; (904)378-5555, (800)284-2842, FAX (904)335-6736

Atkins "New" Start-Stop Digital Recorder allows the food professional to start and stop recordings on demand.

**Becton Dickinson Microbiology Systems**, P. O. Box 243, 250 Schilling Circle, Cockeysville, MD 21030; (410)771-0100, FAX (410)584-2806

Becton Dickinson Microbiology Systems will exhibit products utilized for the cultivation and identification of foodborne pathogens, including *Salmonella* and *Listeria*.

In addition, an innovative new identification system that was recently introduced, will be presented as well as a new line of disposable dilution bottles.

**BioControl Systems, Inc.**, 19805 North Creek Parkway, Bothell, WA 98011-8214; (800)245-0113, (206)487-2055, FAX (206)487-1476

BioControl provides rapid diagnostic test systems for microbiology including the 1-2 Test, Assurance EIA, ColiTrak, and ColiComplete.

**Bentley Instruments, Inc.**, 327 Lake Hazeltine Drive, Chaska, MN 55318; (612)448-7600, FAX (612)368-3355

Bentley Instruments manufactures analytical instruments for the dairy industry.

**bioMérieux Vitek**, 595 Anglum Drive, Hazelwood, MO 63042, (800)638-4835, (314)731-8500, FAX (314)731-8700.

On display will be the miniVIDAS fully automated immunoanalysis system for the pathogen screening of *E. coli*, *Listeria* Staphylococcal enterotoxin and *Salmonella*.

**Charm Sciences, Inc.**, 36 Franklin Street, Malden, MA 02148; (617)322-1523, (800)343-2170, FAX (617)322-3141

Quality Management tools including Antibiotics, Sanitation Hygiene, Alkaline Phosphatase, Transit Test, Shelf-Life Prediction, Pesticides, Aflatoxins, Software, Yeast and Mold.

**Crouch Supply Co., Inc.**, P. O. Box 163829, 305 S. Main Street, Ft. Worth, TX 76161; (800)825-1110, (817)332-2118, FAX (817)332-6511

Since our business began in 1914, we are able to provide the necessary supplies, equipment and chemicals for food, beverage, dairy and pharmaceutical industries.

**Charles Felix Associates**, P. O. Box 1581, Leesburg, VA 22075; (703)777-7448, FAX (703)777-4453

Charles Felix Associates is a consulting firm specializing in public health promotion, particularly in the area of food safety. The CFA exhibit offers samples of CFA publications: Food Protection Report and Food Talk.

**Custom Control Products, Inc.**, 1300 N. Memorial Drive, Racine, WI 53404; (414)637-9225, FAX (414)637-5728

CCPI, process control automation for food, dairy, beverage automation. "CCPI setting new standards in control designs, customer commitment and product performance."

**Dairy & Food Labs, Inc.**, 3401 Crow Canyon Road, Suite 110, San Ramon, CA 94583-1307; (510)830-0350, FAX (510)830-0379

Dairy & Food Labs, Inc. (DFL) is a client driven service laboratory offering microbiological testing, chemical analyses, and nutritional labeling services.

**Decagon Devices, Inc.**, NE 1525 Merman Drive, P. O. Box 835, Pullman, WA 99163; (509)332-2756; FAX (509)332-5158

AquaLab from Decagon for measurement of water activity is accurate over a wide range with the fastest measurement time.

**Diversey Corporation**, 12025 Tech Center Drive, Livonia, MI 48150; (800)521-8140, (313)458-5000, FAX (313)458-2471

Diversey Corporation is the global leader in the cleaning and sanitation industry, with products and services tailored to suit your needs.

**DQCI Services, Inc.**, 5205 Quincy Street, St. Paul, MN 55112-1400; (612)785-0484, FAX (612)785-0584

DQCI Services provider of top quality component calibration samples and confirmed reliability with milk testing laboratories across the nation.

**The Educational Foundation of the National Restaurant Association**, 250 S. Wacker #1400, Chicago, IL 60606; (312)715-7010, (800)765-2122, FAX (312)715-0807

SERVSAFE® Applied Foodservice Sanitation certification coursebook; Managing a Food Safety System; HACCP Reference Book; Serving Safe Food Video Series.

**Electro-Steam Generator Corporation**, 1000 Bernard Street, Alexandria, VA 22314-1299; (703)549-0644, (800)634-8177, FAX (703)836-2581

Electro-Steam Generator Corporation manufactures an ALL-ELECTRIC steam generator, steam for sterilization, cooking, and cleaning - wherever quality steam is needed.

**EM Science**, 480 S. Democrat Road, Gibbstown, NJ 08027; (800)222-0342, FAX (609)423-4389

The Reflectoquant Analysis System - a hand held analysis system composed of ion specific test strips (including peroxide, peracetic acid, and nitrate) and a reflectance meter.

**Foss Food Technology Corporation**, 10355 West 70th Street, Eden Prairie, MN 55344; (612)941-8870, FAX (612)941-6533

Foss Food Technology provides high quality analytical instruments, consumables, and diagnostic kits for QC, Production and Online Process Control to the Dairy, Food, Feed and Beverage industries. Sales locations throughout North America.

**Gardex Chemicals, Ltd.**, 246 Attwell Drive, Etobicoke, Ontario, Canada M9W 5B4; (416)675-1638, (800)563-4273, (416)675-6727

Gardex not only offers a complete line of insecticides, baits, glue boards, equipment and light traps, but is able to offer ancillary services such as application training and consultation on pest management.

**G&H Products Corp.**, 7600 57th Avenue, Kenosha, WI 53142; (414)694-1010, (800)558-4060, FAX (414)694-2907

Pumps: Centrifugal, Positive CIPable; Valves: Mixproof, Manual, Actuated; Magnetic Flowmeter: for use in a meterbased timing system. Used in a grade "A" milk-plant.

**Gist-brocades Food Ingredients**, N93 W14560 Whittaker Way, Menomonee Falls, WI 53051; (414)255-7955, (800)423-7906, FAX (414)255-7732

Delvo-X-Press and Delvotest P/SP, test for detecting antibiotics in bulk milk and individual cow samples.

**IDEXX Laboratories, Inc.**, 1 Idexx Drive, Westbrook, ME 04092; (207)856-0300, FAX (207)856-0346

IDEXX Laboratories manufactures and markets advanced biotechnology-based, rapid detection systems for health and quality assurance applications in the food and environmental industries.

**Integrated BioSolutions, Inc.**, 4270 US Route One, Monmouth Junction, NJ 08852; (908)274-1778, (800)222-8260, FAX (908)274-1733

*Microbiology - The Next Generation:* Integrated BioSolutions invites you to experience the future of microbiology. Where speed, automation, and simplicity become reality!

**International BioProducts, Inc.**, 14780 NE 95th Street, Redmond, WA 98052; (206)883-1349, FAX (206)881-6880

International BioProducts offers TECRA diagnostic products for the rapid detection of *Salmonella*, *Listeria*, Staphylococcal Enterotoxins A-E and *Bacillus* Diarrheal Enterotoxin. We also sell over 1000 general use laboratory supplies.

**Klenzade, Ecolab, Inc.**, Ecolab Center - N/14, St. Paul, MN 55102; (612)293-2549, FAX (612)293-2260

Sanitation products, systems and services.

**Nasco**, 901 Janesville Avenue, Fort Atkinson, WI 53538-0901; (414)563-2446, FAX (414)564-8296

Nasco manufactures Whirl-Pak, sterile, polyethylene bags used for product sampling, QA testing and R & D.

**Nelson-Jameson, Inc.**, 2400 E. 5th Street, PO Box 647, Marshfield, WI 54449; (800)826-8302, (715)387-1151, FAX (715)387-8746

Nelson-Jameson offers a wide range of unique products to help food and dairy processors integrate QA/QC with plant operations.

**Organon Teknika Corp.**, 100 Akzo Avenue, Durham, NC 27712; (800)654-4682, FAX (919)620-2410

Organon Teknika will exhibit rapid identification systems, Micro-ID and Micro-ID Listeria. We also provide rapid screening kits and confirmatory tests - Listeria-Tek, Salmonella-Tek and EHEC-Tek (for *E. coli* O157:H7).

**Q Laboratories, Inc.**, 2014 Harrison Avenue, Cincinnati, OH 45214; (513)662-1300, FAX (513)662-1380

Q Laboratories, Inc. is an independent testing and consulting laboratory providing microbiological and analytical support to the food, beverage, cosmetic, pharmaceutical and dairy industries.

**R-TECH**, P. O. Box 116, Minneapolis, MN 55440-0116; (612)481-2207, (800)328-9687, FAX (612)486-0837

R-TECH's staff has a diverse background with experience in the areas of meats, dairy, cereals, oils, feeds and environmental issues.

**Ralston Analytical Laboratories**, Checkerboard Square, St. Louis, MO 63164; (314)982-2806, (800)423-6837, FAX (314)982-1078

Ralston Analytical Laboratories provides chemical and microbiological testing to the food industry, including microbial challenge studies and nutrition label testing.

**REMEL**, 12076 Santa Fe Drive, Lenexa, KS 66215; (913)888-0939, (800)255-6730, FAX (913)888-5884

Microbiology products including prepared culture media (plate and tubes), sterility testing media and contact plates for environmental sampling.

**Silliker Laboratories Group**, 900 Maple Road, Homewood, IL 60430; (708)957-7878, FAX (708)957-8449

Silliker Laboratories is an international network of 13 labs which specializes in assessing the safety, quality and nutritional value of foods. New for '94: "The Heart of HACCP: In-Plant Application of HACCP Principles" training video.

**SmithKline Beecham Animal Health**, 812 Springdale Drive, Exton, PA 19341; (610)363-3100, (800)877-6250, FAX (610)363-3284

SmithKline Beecham Animal Health offers technology to enable food and milk processors to test products for antibiotic residues. The Penzyme Farm Test and Penzyme III Antibiotic Residue Test detects beta-lactam antibiotics in milk. Both of these products are AOAC certified.

**Sparta Brush Co., Inc.**, 402 S. Black River Street, Sparta, WI 54650-0317; (800)356-8366, (608)269-2151, FAX (608)269-3293

Sparta brushes and accessories are custom-designed for each specific application. Our primary purpose is offering you ultimate quality products and outstanding performance.

**Spiral Biotech, Inc.**, 7830 Old Georgetown Road, Bethesda, MD 20814; (301)657-1620, FAX (301)652-5036

New Autoplate™ Spiral plater (eliminates serial dilutions); diluflo™ (automates sample dilutions); Automatic bacteria counters; MikroClave™ (rapid media sterilization); Microbial air samplers.

**The Sterilex Corporation**, 10315 South Dolfield Road, Owings Mills, MD 21117; (410)581-8860, FAX (410)581-8864

Proven effective against biofilms, Sterilex unique patented products represent a new generation of technologies for safe food plant and farm decontamination.

**3-A Symbol Council**, Executive Plaza Building, Suite 404, 4403 1st Avenue, S.E., Cedar Rapids, IA 52402; (319)395-9151, FAX (319)393-1102

Information relating to 3-A Sanitary Standards for processing equipment and authorization to use the 3-A Symbol will be available at the Symbol Council booth.

**3M Microbiology Products**, 3M Center, Building 275-4E-01, St. Paul, MN 55144-1000, (800)228-3957, FAX (612)733-9596

Petriefilm™ plates increase efficiency to raise your productivity. They reduce microbial testing to three simple steps.

**Troy Biologicals, Inc.**, 1238 Rankin Street, Troy, MI 48083, (800)521-0445, (810)585-9720, FAX (810)585-2490

Troy Biologicals is a distributor of microbiological products for industry and research.

**Unipath**, 217 Colonnade Road, Nepean, Ontario, Canada K2E 7K3; (800)567-8378, (613)226-1318, FAX (613)226-3728

We will introduce a diagnostic kit for detection of *Listeria* from enrichment broth within 15 minutes.

**VICAM**, 313 Pleasant Street, Watertown, MA 02172, (617)926-7045, (800)338-4381, FAX (617)923-8055

VICAM manufactures microbiological and mycotoxin testing systems for the food industry.

**Weber Scientific**, 2732 Kuser Road, Hamilton, NJ 08691; (800)328-8378, (609)584-7677, FAX (609)584-8388

Weber Scientific specializes in equipment for bacteria and antibiotic residue detection, butterfat, temperature and sanitation testing, as well as general laboratory equipment.

**West Agro, Inc.**, 11100 North Congress Avenue, Kansas City, MO 64153; (816)891-1600, (816)891-1558, FAX (816)891-1606

West Agro, as a Tetra Laval Company, is dedicated to serving the food, dairy and beverage industries with a complete line of high quality chemicals.

**ZEP Manufacturing Co.**, 1310 Seaboard Industrial Blvd., Atlanta, GA 30318; (404)352-1680, FAX (404)350-6232

National Manufacturer of specialty chemicals - acid sanitizers, peroxide and quat, hand cleaners, dispensers and cleaners.



# ANNOUNCING

## AN ILSI NORTH AMERICA SYMPOSIUM SERIES

### *TRENDS IN* **FOOD MICROBIOLOGY**

#### **WHAT**

Three international symposia providing the perspectives of scientists in government, academia, and industry regarding the application of concepts important to the microbiological aspects of food safety and quality

Sponsored by the ILSI North America Technical Committee on Food Microbiology

In collaboration with the International Association of Milk, Food and Environmental Sanitarians (IAMFES)

#### **WHEN**

July 31 - August 3, 1994, in conjunction with the 81st IAMFES Annual Meeting

#### **WHERE**

Hyatt Regency Hotel, San Antonio, Texas, USA

#### **SYMPOSIUM TOPICS**

- ◆ Quantitative Risk Assessment in Food Microbiology
- ◆ Applications for Predictive Microbiology
- ◆ Natural Antimicrobials and Inhibitors for Food Applications

Participation is open to individuals attending the 1994 IAMFES Annual Meeting. You must register with IAMFES in order to attend these symposia.

For more information regarding the IAMFES Annual Meeting, contact IAMFES, 200 W. Merle Hay Center, 6200 Aurora Avenue, Des Moines, Iowa 50322, USA. Telephone: 800/369-6337 (U.S.), 800/284-6336 (Canada), or 515/276-3344 (international).  
Telefax: 515/276-8655.

For questions about the symposium programs, contact Ms. Catherine Nnoka, ILSI North America, 1126 Sixteenth Street, N.W., Washington, D.C. 20036, USA. Telephone: 202/659-0074. Telefax: 202/659-3859.

PASTE UP LOGO

## PRELIMINARY PROGRAM

# *81st Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc.*

*In Cooperation with the Texas Association of Milk, Food and Environmental Sanitarians*

**Hyatt Regency Riverwalk, San Antonio, Texas  
July 31 - August 3, 1994**

### REGISTRATION TIMES

Saturday, July 30 ..... 12:00 - 5:00 p.m.  
Sunday, July 31 ..... 8:30 a.m. - 7:00 p.m.  
Monday, August 1 ..... 8:00 a.m. - 4:00 p.m.  
Tuesday, August 2 ..... 8:00 a.m. - 4:00 p.m.  
Wednesday, August 3 ..... 8:00 a.m. - 12:00 p.m.

### EXHIBITOR HOURS

Sunday, July 31 ..... 7:45 - 10:00 p.m.  
(Following the Opening Session)  
Monday, August 1 ..... 9:30 a.m. - 3:30 p.m.  
Tuesday, August 2 ..... 9:30 a.m. - 3:30 p.m.

### IAMFES BOARD MEETINGS

Saturday, July 30 ..... 8:00 a.m. - 5:00 p.m.  
Tuesday, August 2 ..... 7:00 a.m. - 8:30 a.m.  
Thursday, August 4 ..... 7:00 a.m. - 9:00 a.m.

### COMMITTEE/PROFESSIONAL DEVELOPMENT GROUP MEETINGS

#### SUNDAY, JULY 31

7:00 - 10:00 a.m. Affiliate Council  
10:00 - 11:00 a.m. Dairy Quality & Safety (Farm Section)  
10:00 - 11:00 a.m. Audio Visual Library  
10:00 - 11:00 a.m. Baking Industry Sanitary Standards  
10:00 - 11:00 a.m. Past Presidents Advisory  
10:00 - 12:00 a.m. Poultry Safety and Quality  
10:00a.m - 5:00 p.m. Communicable Diseases Affecting Man  
11:00 - 12:00 a.m. Dairy Quality and Safety (Plant Section)  
11:00 - 12:00 a.m. Foundation Fund  
11:00 - 12:00 a.m. Nominating  
1:30 - 2:30 p.m. Constitution and By-Laws  
1:30 - 2:30 p.m. Sanitary Procedures  
1:30 - 3:00 p.m. Meat Quality and Safety  
1:30 - 3:00 p.m. Dairy, Food & Environmental Sanitation  
1:30 - 3:30 p.m. Seafood Safety and Quality  
1:30 - 3:30 p.m. Applied Laboratory Methods  
1:30 - 3:30 p.m. Food Service Sanitation  
3:00 - 4:00 p.m. Environmental Issues in Food Safety  
3:00 - 4:30 p.m. Journal of Food Protection Management  
3:00 - 5:00 p.m. Food Safety Network  
4:00 - 6:00 p.m. Program Advisory

#### WEDNESDAY, AUGUST 3

12:00 - 4:00 p.m. Program Advisory (members only)

## SUNDAY EVENING, JULY 31

### Opening Session

- 7:00 **Welcome to the 81st Annual Meeting** - H. BENGSCHE, President of IAMFES and, R. RICHTER, Chairperson of the Local Arrangements Committee
- 7:15 **Introduction of the Ivan Parkin Lecture** - D. CLINGMAN, President-Elect of IAMFES
- 7:20 **Ivan Parkin Lecture**
- The Ivan Parkin Lecture is sponsored by the IAMFES Foundation Fund and is supported by the Sustaining Members
- 8:00 **Nachos and Margaritas Reception** - Held in the Exhibit Hall. An opportunity to greet old friends, make new ones and view the excellent technical displays.

## MONDAY MORNING, AUGUST 1

### Quantitative Risk Assessment in Food Microbiology *Sponsored by the ILSI North America Technical Committee on Food Microbiology*

- 8:30 **Overview - the International Commission on Microbiological Specifications for Foods (ICMSF) Approach** - T. ROBERTS, Institute of Food Research, Reading, U.K.
- 9:00 **Risk Assessment Terms and Definitions** - M. POTTER, Centers for Disease Control and Prevention, Atlanta, GA
- 9:30 **Health Risk Analysis of Food in Canada** - E. TODD, Health Protection Branch, Ottawa, Ontario, Canada
- 10:20 **Process Reliability and Risk - A Food Industry Perspective** - M. COLE, Unilever Research, Bedford, U.K.
- 10:50 **Council for Agricultural Science and Technology (CAST) Report on Risk Assessment** - P. FOEGEDING, North Carolina State Univ., Raleigh, NC
- 11:20 **Risk and Regulatory Affairs** - T. KINDRED, U.S. Dept. of Agriculture, Washington, DC

### Technical Session — Dairy

- 8:30 **Vitamin Fortification of Milk** - R. BYRNE, International Dairy Foods Assn., Washington, DC

- 8:45 **Shelf-life of Commercial Conventionally Packaged Cottage Cheese** - S. MURPHY, R. Ledford, D. Bandler, S. Kozlowski, Cornell University, Ithaca, NY

- 9:00 **Computer Models for Thermal Inactivation of Native Milk Enzymes** - R. McKELLAR, Agriculture & Agri-Food Canada, Ottawa, Ontario, Canada

### Technical Session — Risk Assessment

- 9:15 **Application of Sewage Sludge to Food Crops** - H. EMERY, San Antonio Water System Regulatory Programs Dept., San Antonio, TX

- 9:30 **Effect of Hydrostatic Pressure, in Combination with Heat and/or Irradiation, on the Survival of *Clostridium sporogenes* in Chicken** - Y. CRAWFORD and E. Murano, Iowa State University, Ames, IA

- 9:45 **Safety and Food Excellence (S.A.F.E.): A Program for Food Service Workers and Care Givers, who prepare Food for the Chronically Ill** - R. GRAVANI, D. Scott, P. Kendall and D. Schmidt, Cornell University, Ithaca, NY

- 10:20 **Environmental Testing for *Listeria*: the Quantitative Edge** - B. JACKSON, VICAM, Watertown, MA

- 10:35 **The Practical and Educational Role of Environmental Monitoring of Food Premises** - I. LINJACKI, University of Guelph, Guelph, Ontario, Canada

- 10:50 **Food Facility Plan Review** - J. SCHRADE, Food and Drug Administration, Brooklyn, NY

- 11:05 **Regulatory Inspection HACCP vs. Food Operation HACCP Self-Control** - O. SNYDER, Hospitality Institute of Technology, St. Paul, MN

- 11:20 **Growth of *Shigella flexneri* in Foods: Comparison of Observed and Calculated Growth Kinetics Parameters** - L. ZAIKA and O. Scullen, U.S. Department of Agriculture, ARS, Philadelphia, PA

### Technical Session — Analytical

- 8:30 **Comparison of Enrichment Protocols for Use with VIDAS to Detect *Salmonellae*** - J. BAILEY and N. Cox, U. S. Department of Agriculture, ARS, Athens, GA

- 8:45 **Fluorometric Acid Phosphatase Method for Verifying End-Point Temperature in Cooked Poultry** - C. DAVIS, W. Townsend and C. Lyon, U. S. Department of Agriculture, ARS, Athens, GA

- 9:00 **Improved Medium and Method for Growing *E. coli*** - R. FIRSTENBERG-EDEN, S. Allen, M. Averill and N. Sullivan, Difco Laboratories, Inc., Ann Arbor, MI

- 9:15 **Comparison of a Micro Identification System to Conventional Biochemical Procedures for the Identification of *Salmonella*, *Escherichia coli* and other Gram Negative Enterobacteriaceae from Food Origin** - M. KNIGHT, M. Newman and J. Agin, Q Laboratories, Inc., Cincinnati, OH
- 9:30 **A New Rapid Coliform Detection Method. Petrifilm 2000 Coliform Count Plate** - G. KREJCAREK, K. Hesselroth, P. Mach, and Y. Yang, 3-M Company, St. Paul, MN
- 9:45 **A Murine Monoclonal Antibody Specific to D-serogroup *Salmonella*** - A. MASI and J. Zawistowski, University of Manitoba, Winnipeg, Manitoba, Canada
- 10:20 **ATP Luminescence as a Means to Rapidly Detect Microbial and Fecal Contamination on Carcass Tissue** - G. SIRAGUSA and C. Cutter, U. S. Department of Agriculture, ARS, Clay Center, NE
- 10:35 **Rapid Assessment of *Listeria* Control Using Bioluminescence** - A. WALKER, G. Stewart and J. Holah, Campden Food & Drink Research Assn., Chipping Campden, Glos., U.K.
- 10:50 **Effect of Monolaurin on *L. monocytogenes* Scott A at 37 and 8°C** - M. JOHNSON, D. Scott and A. Bhunia, University of Arkansas, Fayetteville, AR
- 11:05 **An isolation method for *Arcobacter butzleri* from Poultry** - A. LAMMERDING, Agriculture and Agri-Food Canada, Guelph, Ontario, Canada
- 11:20 **Improved Enrichment Recovery of *Campylobacter* spp. from Broiler Chicken Carcasses** - N. STERN, U. S. Department of Agriculture, ARS, Athens, GA
- 11:35 **DNA Probe-HGMF Methods to Detect Enterohemorrhagic *E. coli* and *Shigella* in Foods** - E. TODD, R. Szabo, J. Khattri, L. Dube, D. Helmersen, D. Granville, A. Boville, H. Lior and J. MacKenzie, Health Protection Branch, Ottawa, Ontario, Canada

**Technical Session — Antimicrobials**

- 8:30 **Decontamination of Beef Carcass Tissue with Bacteriocins Using a Model Carcass Washer** - C. CUTTER and G. Siragusa, U. S. Department of Agriculture, ARS, Clay Center, NE
- 8:45 **Evaluation of Methods to Deliver Bacteriocins during Wiener Manufacturing for Controlling *Listeria monocytogenes*** - A. DEGNAN and J. Luchansky, Food Research Institute, Madison, WI
- 9:00 **Chemical and Microbiological Qualities of Restructured Vacuum-Packaged Lamb Roasts Containing Sodium or Potassium Lactates** - D. FUNG, I. Sl-Sheddy and C. Kastner, Kansas State University, Manhattan, KS

- 9:15 **Growth Inhibition of *Penicillium* species by Lactic Acid Bacteria** - H. GOURAMA, The Pennsylvania State University, Reading, PA
- 9:30 **Mechanism of Inhibition of Aflatoxin Biosynthesis by *Lactobacillus Casei Pseudopiantarum*** - H. GOURAMA and L. Bullerman, The Pennsylvania State University, Reading, PA
- 9:45 **Optimization of Parameters for Production of Nisin and Inhibition of *Lactobacillus plantarum* in a Model Mixed-Culture Fermentation** - L. HARRIS and M. Vieira, University of Guelph, Guelph, Ontario, Canada
- 10:20 **Control of *Salmonella*, *Listeria monocytogenes*, *Campylobacter jejuni*, and Psychrotrophs on Chicken Skin with Lactic Acid and Sodium Benzoate** - C. HWANG and L. Beuchat, University of Georgia, Griffin, GA
- 10:35 **Influence of Sodium Chloride on Thermal Inactivation and Recovery of Non-proteolytic *Clostridium botulinum* Type B Spores** - V. JUNEJA, B. Marmer and B. Eblen, U. S. Department of Agriculture, ARS, Philadelphia, PA
- 10:50 **A Field Study Evaluating the Effectiveness of Different Hand Soaps and Sanitizers** - M. MILLER, L. James-Davis and L. Milanesi, General Mills Restaurants, Inc., Orlando, FL
- 11:05 **Development of Bacteriocin-Based Packaging to Reduce Pathogenic Organisms in Fresh Poultry** - N. NATRAJAN and B. Sheldon, North Carolina State University, Raleigh, NC

**MONDAY AFTERNOON, AUGUST 1**

**Microbiology vs. Epidemiology:  
Complementary or Incompatible  
Disciplines Symposium**

- 1:30 **Worldwide Surveillance of Foodborne Disease Based on Epidemiological and Microbiological Findings** - E. TODD, Health Protection Branch, Ottawa, Ontario, Canada
- 2:00 **Microbiology Versus Epidemiology: Who Do You Trust?** - D. SIMPSON, State Epidemiologist, Austin, TX
- 2:30 **Human and Armadillo Leprosy in the Southern United States** - M. HUGH-JONES, Louisiana State University, Baton Rouge, LA
- 3:20 **A Microbiological Paradox: Viable but Non-Culturable Bacteria** - R. COLWELL, Maryland Biotechnology Institute, College Park, MD
- 3:50 **Hazard Analysis: The Link between Epidemiology and Microbiology** - F. BRYAN, Food Safety Consultation and Training, Lithonia, GA

- 4:20 **Summary of the Issues: the Experience of a Lifetime** - S. MILLER., Health Sciences Center, San Antonio, TX
- 4:50 **Panel of the Speakers: Questions and Conclusions**

**Technical Session — General Food Microbiology**

- 1:30 **Incidence of *Arcobacter* spp. in Ground Pork** - C. COLLINS, I. Wesley and E. Murano, Iowa State University, Ames, IA
- 1:45 **Commercial Field Trials Demonstrating Salmonellae Reduction in Broilers Using a Mucosal Competitive Exclusion Treatment** - N. COX, J. Bailey and N. Stern, U. S. Department of Agriculture, ARS, Athens, GA
- 2:00 **The Attachment of Viable and Nonviable *Salmonella typhimurium* to Poultry Skin** - K. KIM, H. Lillard, J. Frank and S. Craven, University of Georgia, Athens, GA
- 2:15 **Effect of Irradiation of Survival of *Salmonella enteritidis* in Whole Eggs and Liquid Eggs** - L. SERRANO and E. Murano, Iowa State University, Ames, IA
- 2:30 **Microbiological Evaluation of Reprocessed Broiler Carcasses** - C. POWELL, G. Blank and R. Gallop, University of Manitoba, Winnipeg, Manitoba, Canada
- 2:45 **Cider Composition versus Heat Resistance of *Escherichia coli* O157:H7** - D. SPLITTSTOESSER, J. Churey and M. McLellan, Cornell University, Geneva, NY
- 3:20 ***Staphylococcus intermedius*: Etiologic Association with Foodborne Intoxication from Butter Blend and Margarine** - R. BENNET, F. Khambaty and D. Shah, Food and Drug Administration, Washington, DC
- 3:35 **Irradiation Inactivation of *Listeria monocytogenes* and *Staphylococcus aureus* in Ground Beef as Affected by Fat Content and Temperature** - J. MONK, M. Clavero, L. Beuchat, M. Doyle and R. Brackett, University of Georgia, Griffin, GA
- 3:50 **Trichinosis Outbreak Associated with Smoked Wild Boar Meat, Ontario, Canada** - B. MARSHALL and S. Isaacs, Wellington-Dufferin-Guelph Health Unit, Guelph, Ontario, Canada
- 4:05 **Enterobacteriaceae from the Chicken Intestine that use Phosphatidylserine for Growth and Inhibit *Salmonella typhimurium*** - S. CRAVEN, U. S. Department of Agriculture, ARS, Athens, GA
- 4:20 **Characterization of Pyocyanine Produced by *Pseudomonas Aeruginosa*** - N. NABBUT, American University of Beirut Medical Center, Beirut, Lebanon

- 4:35 **Effects of Ionizing Radiation and Anaerobic Refrigerated Storage on Indigenous Microflora, *Salmonella* and *Clostridium botulinum* types A and B in Mechanically-deboned Chicken** - D. THAYER, G. Boyd and C. Huhtanen, Eastern Regional Research Center, Philadelphia, PA
- 4:50 **Efficacy of Cultured Whey of Antagonistic Microorganisms to Inhibit Psychrotrophic Pathogens in Refrigerated, Cooked Beef and Poultry** - Y. HAO, R. Brackett and M. Doyle, University of Georgia, Griffin, GA

**Stainless Steels for Dairy and Food Equipment Symposium**

- 1:30 **Utilizing Stainless Steels in the Food and Dairy Industries** - P. ELLIOTT, P.E. Corrosion and Materials Consultancy, Inc., Colts Neck, NJ
- 2:00 **Fabrication and Application of Stainless Steel Equipment for Sanitary Applications** - V. MILLS, Evergreen Packaging Equipment, Cedar Rapids, IA
- 2:30 **Orbital Welding of Stainless Steel Tubing for Food and Dairy Applications** - B. HENON, ARC Machines, Inc., Pacioma, CA
- 3:20 **The Effect of Surface Finish on the Behavior of Stainless Steel in Food and Dairy Science** - A. TUTHILL, Tuthill Associates, Inc., Blacksburg, VA
- 3:50 **Hygiene and Other Health and Safety Aspects of Stainless Steel in Food-Handling and Processing Plants** - J. LILLY, Nickel Development Institute, Toronto, Ontario, Canada

**Meat Quality and Safety: Effect of Production and Processing on the Microbial Quality of Meat Symposium**  
Sponsored by the Ontario Food Protection Assn.

- 1:30 **Innovations in Australian Meat Processing Practices and Slaughter Operations: Their Impact on Microbial Status** - B. SHAY, CSIRO Australia, Meat Safety Laboratory, Bristane, Queensland, Australia
- 2:00 **Verocytotoxigenic *Escherichia coli*: The Dairy Farm as a Model for Animal - Human Transmission** - R. CLARKE, Agriculture and Agri-Food Canada, Guelph, Ontario, Canada
- 2:30 **FSIS Nationwide Beef Microbiological Baseline Data Collection Program: Survey of Steers and Heifers** - A.M. McNAMARA, U. S. Department of Agriculture, FSIS, Washington, DC



- 3:20 **Canadian Meat Industry Perspectives on How to Address Foodborne Illness** - G. SUNDEEN, Canadian Meat Council, Islington, Ontario, Canada
- 3:50 **HACCP from Pen to Plate** - R. USBORNE, Caravelle Foods, Mississauga, Canada

Monday Poster Session

- **Summary of Standard Plate Counts of Plant Obtained Chocolate Milk and Drinks After 14 Days at 7.2°C (45°F)** - S. BARNARD and R. Bicher, The Pennsylvania State University, University Park, PA
- **Rapid Colorimetric Method for Estimation of Rancidity in Dairy Products** - T. BAUER and P. Vasavada, University of Wisconsin, River Falls, WI
- **Survival of *Brucella abortus* in the Mexican White Soft Cheese** - M. DÍAZ, Centro De Investigacion En Alimentacion y Desarrolla, Sonora, Mexico
- **S-Value and Epifluorescence Determination of Bacterial Attachment on the Cleaning Brush of an Automatic Milking System\*** - C. LIU and D. Westhoff, University of Maryland, College Park, MD
- **Effect of Temperature and Cell Concentration on Radiosensitivity of *Listeria monocytogenes*** - L. ANDREWS, D. Marshall and R. Grodner, Louisiana State University, Baton Rouge, LA
- **Rapid Detection of Enterotoxigenic *Clostridium perfringens* in Beef Using an Alkaline Phosphatase Microcolony Technique** - L. BAEZ and V. Juneja, U. S. Department of Agriculture, ARS, Philadelphia, PA
- **Development of Two Simple Methods for the Recovery of *Salmonella* from Food for Detection by PCR** - W. BARBOUR and H. Zanecosky, DuPont Co., Wilmington, DE
- **Comparative Study for Detection of *Listeria monocytogenes* in Foods by a Colorimetric DNA Method and Conventional Culture Methods** - G. DURBIN, K. Keough and G. Reynolds, GENE-TRAK Systems Corp., Framingham, MA
- **Rapid Assay System for the Detection of Beta-lactam Residues in Milk** - S. FAUST, S. Clark and L. Chaney, IDEXX Laboratories, Westbrook, ME
- **Reduction of Hydroxymethylfurfural of Honey Exposed to Different Sources of Radiation** - J. FARIA, Campinas State University, Campinas, Brazil
- **Estimation of Coliform Counts using the BacT/Alert Microbial Detection System** - S. JEFFREY, K. Read and B. Robison, Organon Teknika Corp., Durham, NC
- **Enrichment Procedures Affecting the Sensitivity of the EHEC-Tek™ ELISA System** - S. JEFFREY, R. Durham, B. Robison, Organon Teknika Corp., Durham, NC
- **Efficacy of the Microcolony Immunoblot Technique to Detect Heat-Injured *Listeria monocytogenes*** - J. PATEL and L. Beuchat, University of Georgia, Griffin, GA
- **Use of the BacT/Alert® Microbial Detection System to Monitor Sterility of Aseptically Processed Pudding** - B. ROBISON, Organon Teknika Corp., Durham, NC
- **The Development of a PCR Based Assay for the Detection of *Salmonella*** - G. TICE, M. Jensen, R. Jackson and J. Nozcek, DuPont Co., Wilmington, DE
- **Identifying and Typing *Listeria* Species with Patterns of Eco R1 Fragments Containing Ribosomal RNA Operon Sequences** - J. WEBSTER, E. Cole, J. Bruce, C. Iem and R. Hubner, DuPont Co., Wilmington, DE
- **A 43 hour Test for Detecting *Listeria* in Foods Using the Unipath *Listeria* Clearview Immunoassay** - R. HOLBROOK, T. Briggs, J. Anderson, J. Blades and P. Sheard, Unilever Research, Bedfordshire, U.K.
- **The Rapid Clearview™ *Listeria* Immunoassay for Detection of *Listeria* Species** - S. PARRY, T. Briggs, J. Blades, M. Gani and J. Piron, Unilever Research, Bedfordshire, U.K.
- **Optimization of Commercial Sterility Testing** - M. ROBART, J. David, S. Alles, T. Weaver, S. Chang and T. VanArman, Gerber Products Co., Fremont, MI
- **Cold Temperature Stress Response of Psychrotrophic *Bacillus cereus*** - E. BERRY and P. Foegeding, North Carolina State University, Raleigh, NC
- **Model for the Non-Thermal Inactivation of *Listeria monocytogenes* in a Reduced Oxygen Environment** - R. BUCHANAN and M. Golden, U. S. Department of Agriculture, ARS, Philadelphia, PA
- **The Synergistic Effect of Sodium Acetate or Sodium Propionate Used in Combination with EDTA and Ascorbic Acid on the Inactivation of *Listeria monocytogenes*** - M. GOLDEN, R. Buchanan and R. Whiting, U. S. Department of Agriculture, ARS, Philadelphia, PA
- ***Aeromonas hydrophila* and Psychrotroph Population of Case- and Pond-Raised Channel Catfish** - Y. HUANG, C. Huang and G. Burtle, University of Georgia, Athens, GA
- **The Use of Response Surface Methodology to Model Non-Linear Survival Curves and to Predict the Effects of Temperature, pH and Sodium Chloride on the Heat Resistance of *Listeria monocytogenes*** - R. LINTON, W. Carter, C. Gennings and M. Pierson, Virginia Tech University, Blacksburg, VA
- **Validation of Predictive Mathematical Models to Demonstrate Applicability to Foods** - I. WALLS, V. Scott and D. Bernard, National Food Processors Assn., Washington, DC
- **The Economics of Federal HACCP Regulations** - D. ZORN, Food and Drug Administration, Washington, DC
- **An Expert System for HACCP Implementation** - F. BARRON and J. Acton, Clemson University, Clemson, SC
- **Influence of Temperature on Hemorrhagic *Escherichia coli*: Verotoxin Production and Minimum Temperature of Growth** - S. PALUMBO, F. Schultz and A. Williams, U. S. Department of Agriculture, Philadelphia, PA

## TUESDAY MORNING, AUGUST 2

### Applications For Predictive Microbiology Symposium

*Sponsored by the ILSI North America Technical Committee on Food Microbiology*

- 8:30 **Overview — Risk Assessment and Predictive Microbiology** - R. BUCHANAN, U. S. Department of Agriculture, Philadelphia, PA
- 9:00 **Modeling Applications** - T. McMEEKIN, University of Tasmania, Hobart, Tasmania, Australia
- 9:30 **Food Micromodel Update - UK and European Perspectives** - T. ROBERTS, Institute of Food Research, Reading, U.K.
- 10:20 **Model Validation (and Confidence in Models) — an Industry Perspectives** - M. COLE, Unilever Research, Bedford, U.K.
- 10:50 **Cold Storage Temperature Fluctuations and Predicting Microbial Growth** - C. GILL, Agrifood and Agriculture Canada, Lacombe, Alberta, Canada
- 11:20 **Predictive Microbiology and HACCP** - P. ELLIOTT, Campbell Soup Company, Camden, NJ

### Reduction of Foodborne Pathogens on Poultry Symposium

- 8:30 **Salmonellae Importance and Detection in Poultry Feeds** - A. WALDROUP, University of Arkansas, Fayetteville, AR
- 9:00 **Control of Salmonellae During Poultry Production** - J. BAILEY, U. S. Department of Agriculture, ARS, Athens, GA
- 9:30 **The Application of Process Modifications, Chemical Treatments, and Biopeptides to Inhibit Foodborne Pathogens Associated with Poultry Products** - B. SHELDON, North Carolina State University, Raleigh, NC
- 10:20 **Reduction of Foodborne Pathogens on Poultry by Treatment with Ionizing Radiation** - D. THAYER, U.S. Department of Agriculture, ARS, Philadelphia, PA
- 10:50 **Development of a Comprehensive Total Quality Assurance Program for use in Fully Integrated Poultry Companies** - M. ROBACH, Continental Grain, Duluth, GA
- 11:20 **Foodborne Industry Perspective on Pathogen Reduction in Poultry** - R. HARRINGTON, National Restaurant Assn., Washington, DC

### Pesticides in the Food Industry Symposium

- 8:30 **The Impact of Sanitation on Pest Control in the Food Establishments** - R. GRAVANI, Cornell University, Ithaca, NY
- 9:00 **IPM — Trends in Pesticide Use and Indoor Environmental Quality** - A. FRISHMAN, AMF Pest Management Services, Inc., Farmingdale, NY
- 10:20 **Rodent Control for Food Processing** - E. MARSHALL, Lipha Tech, Milwaukee, WI
- 10:50 **Future of Pesticides for Use in Food Handling Establishments** - J. TUCKER, Urban Entomologist, Houston, TX

### Meat Quality and Safety: Concerns and Solutions throughout Distribution Systems Symposium

- 8:30 **Update on Epidemiology of Food Poisoning Outbreaks Caused by Meat Products** - P. SPARLING, Centers for Disease Control and Prevention, Atlanta, GA
- 9:00 **Microbiological Controls for Safety and Quality of Meats During Manufacture** - J. MARSDEN, The American Meat Institute, Washington, DC
- 9:30 **Status of Consumer Education Programs Regarding the Safety of Meat Products** - S. CONLEY, U. S. Department of Agriculture, FSIS, Washington, DC
- 10:20 **The Challenge of HACCP Implementation in Fast Food Operations** - R. HARRINGTON, National Restaurant Assn., Washington, DC
- 10:50 **Safety and Quality of Meat Products at Retail and Deli Operations** - J. FARQUHAR, The Food Marketing Institute, Washington, DC

## TUESDAY AFTERNOON, AUGUST 2

### General Session — The New FDA Model Food Code: How Will We Implement It?

- 1:30 **The New FDA Food Code** - J. KVENBERG, Food and Drug Administration, Washington, DC
- 1:45 **The Restaurant Industry Perspective** - R. HARRINGTON, National Restaurant Assn., Washington, DC
- 2:00 **The Food Store Perspective** - J. FARQUHAR, Food Marketing Institute, Washington, DC
- 2:15 **The Vending Machine Industries Perspective** - L. EILS, National Automatic Merchandising Association, Chicago, IL

- 2:30 **The Agricultural Agencies Perspective** - E. HEFFRON, Michigan Department of Agriculture, Lansing, MI
- 2:45 **The Health Agencies Perspective** - D. SOWARDS, Texas Department of Health, Austin, TX

**IAMFES Annual Business Meeting**

- 3:15 **Welcome and Introduction** - D. CLINGMAN, President-Elect
- 3:30 **Report from the President** - H. BENGSCHE
- 3:45 **Business Meeting** - H. BENGSCHE, Presiding
- Moment of Silence in Remembrance of Departed Association Members
  - Minutes of Previous Business Meeting
  - Report of Executive Manager
  - Affiliate Council Report
  - Journal Management Committee Report
  - Old Business
  - New Business
  - Presentation of Resolutions - M. DOYLE, Past President

**Tuesday Poster Session**

- **Purification and Characterization of a Bacteriocin Produced by *Carnobacterium piscicola* LK5** - L. BAGI and R. Buchanan, U. S. Department of Agriculture, ARS, Philadelphia, PA
- **Biofilm formation by *Escherichia coli* O157:H7 on Stainless Steel Surface: Effect of Chemical Agents** - R. DEWANTI and A. Wong, Food Research Institute, Madison, WI
- **Cooling Rate and Outgrowth of *Clostridium perfringens* Spores in Cooked Ground Beef** - V. JUNEJA, O. Snyder and B. Eblen, U. S. Department of Agriculture, ARS, Philadelphia, PA
- **Isolation and Characterization of Enterocin EL1 A Bacteriocin Produced by a Strain of *Enterocin faecium*** - W. LYON, E. Murano and D. Olson, Iowa State University, Ames, IA
- **Effect of Temperature, Salt and pH on Growth Inhibition of *Listeria monocytogenes* by Sodium Polyphosphate** - O. SCULLEN and L. Zaika, U. S. Department of Agriculture, ARS, Philadelphia, PA
- **Evaluation of Different Phosphates to Control Microbial Growth in Meat Products** - S. SUMNER, L. Flores, D. Peters and R. Mandigo, University of Nebraska-Lincoln, Lincoln, NE
- **Inhibitory Activity of Caffeic Acid Against *Clostridium botulinum* Spores** - A. WILLIAMS, B. Bowles, and A. Miller, U. S. Department of Agriculture, ARS, Philadelphia, PA
- **Antimicrobial Effect of Sodium Lactate, Trisodium Phosphate, and Sodium Glutamate Monohydrate Pre-Treatments in Combination with Organic Acids on *Escherichia coli* O157:H7** - P. WIXOM and J. Dickson, Iowa State University, Ames, IA
- **Microbiological Shelf-Life Stability of Textured**

- **Supro™ Granules** - V. COLLETT, Ralston Purina Co., St. Louis, MO
- **Shelf-life and Microbial Ecology of Precooked Poultry Stored Under Modified Atmosphere at 4°C** - R. BARAKAT and L. Harris, University of Guelph, Guelph, Ontario, Canada
- **Effect of Water Activity and Humectant Identity on the Growth Kinetics of *Escherichia coli* O157:H7** - R. BUCHANAN and L. Bagi, U. S. Department of Agriculture, ARS, Philadelphia, PA
- **Resistance of Acid Adapted Salmonellae to Organic Acid Rinses on Beef** - J. DICKSON and M. Kunduru, Iowa State University, Ames, IA
- **Survival of *E. coli* O157:H7 in Refrigerated and Frozen Low Fat Ground Beef and Thermal Inactivation by Microwave Energy** - L. FLORES, S. Sumner and L. Bullerman, University of Nebraska, Lincoln, NE
- **The Fate of *Listeria monocytogenes* and *Clostridium botulinum* in Minimally-Processed Packaged Vegetables** - J. FARBER, Y. Cai, C. Addison, B. Blanchfield, S. Wang and K. Dodds
- **Use of Time-Temperature Indicator to Monitor the Shelf-Life of Packaged Fresh Catfish** - L. HE and Y. Huang, University of Georgia, Athens, GA
- **Recovery of *Arcobacter* from Broiler Carcasses** - H. LILLARD and N. Stern, U. S. Department of Agriculture, ARS, Athens, GA
- **Monoclonal Antibody for Rapid Detection of *Clostridium botulinum* Toxin Type B** - R. CRAWFORD, J. Ferreira, S. McCay and H. Hamdy, Food and Drug Administration, Atlanta, GA
- **Susceptibility of *Listeria* sp. to Cell Bound Pediocin AcH in BHI Broth, Turkey Frank Slurries, and on Chicken Breast Meat** - J. FERGUSON, A. Bhunia and M. Johnson, University of Arkansas, Fayetteville, AR
- **The Fate of *Listeria monocytogenes* during the Manufacture of Manchego Cheese with Bacteriocin-producing Lactic Acid Bacteria and Commercial Lactic Starters** - E. GARCÍA, J. Rodríguez, P. Gaya, M. Medina and M. Nunez, Tecnología de Alimentos, Madrid, Spain
- **Microbial Changes of Osmotically Dehydrated Green Beans Coupled with Modified Atmosphere Packaging Stored at 10°C** - W. TAN, D. Grinstead, J. Mount and F. Draughon, University of Tennessee, Knoxville, TN
- **Mold Content of Stored Popcorn** - L. BULLERMAN and S. Katta, University of Nebraska, Lincoln, NE
- **Effect of Dry Milling on *Fusarium* Counts and Fumonisin in Corn** - A. CAGAMPANG and L. Bullerman, University of Nebraska, Lincoln, NE
- **Isolation of the Zearalenone-producing Strains from Agricultural Products in Southern Korea** - D. CHUNG, S. Kim and S. Kim, Gyeongsang National University, Gyeongnam, Korea
- **Inhibition of Phosphate on Mold Growth and Mycotoxin Production (T-2 Toxin, Zearalenone)** - D. CHUNG, I. Kim and S. Chung, Gyeongsang National University, Gyeongnam, Korea
- **Immunolocalization of Aflatoxin B1 in Liver of Chick Embryo Intoxicated with Aflatoxin B1** - Y. KO, S. Shu, J. Che and D. Chung, Hanyang University, Seoul, Korea

- **The Mycoflora and Mycotoxin-Producing Potential of Fungi from Foods in Burundi** - C. MUNIMBAZI and L. Bullerman, University of Nebraska, Lincoln, NE
- **Application of Immunohistochemical Technique to Visualize Zearalenone Formation of *Fusarium greminearum*** - J. KANG, S. Kang and D. Chung, Jinju Junior College, Gyeongnam, Korea
- **Use of TECRA® Unique® for the Detection of *Salmonella* in a Range of Food Products within 22 hours** - D. KERR, M. Ash, D. Hughes and C. Fitzgerald, TECRA Diagnostics, Roseville, Australia
- **A Predictive Model with Improved Statistical Analysis of the Interactive Effects of Factors Affecting the Growth of *Staphylococcus aureus* 196E** - J. EIFERT, C. Gennings, W. Carter and C. Hackney, Virginia Tech, Blacksburg, VA
- **Automated Detection of Foodborne Pathogens Using the TECRA® OPUS® System** - M. ASH, D. Chee and U. Gasanov, TECRA Diagnostics, Roseville, Australia
- **Agglutination Behavior of Lactic Starter Cultures** - S. IBRAHIM and A. Nabulsi, University of Jordan, Jordan
- **Effects of Packaging System on Lactate Treated Tilapia Fillet stored at 4°C** - C. Huang and Y. Huang, National I-Lan Institute of Agriculture and Technology, I-Lan, Taiwan

## WEDNESDAY MORNING, AUGUST 3

**A Symposium on Risk Management**  
*Sponsored by the Grocery Manufacturer's of America*

### RISK ASSESSMENT The Risk Analysis Approach

- 8:30 **Risk Analysis and Management Defined**
- 9:00 **Risk Analysis and Foodborne Illness**

### Issues in the Assessment of Food Safety Risks

- 9:30 **Infectious Dose and Susceptible Populations**
- 10:20 **The Role of Epidemiology in Estimating Risk and Risk Exposure**
- 10:50 **Acceptable Risk and the Risk/Benefit Equation**
- 11:20 **The "Cost" of Foodborne Disease**

### Dairy Symposium

Topics to be announced

**Natural Antimicrobials and Inhibitors  
for Food Applications**  
*Sponsored by the ILSI North American Technical  
Committee on Food Microbiology*

- 8:30 **Bacteriocins for *Listeria* Control** - P. MURIANA, Purdue University, West Lafayette, IN
- 9:00 **Antimicrobials for Meat Applications** - M. STILES, University of Alberta, Alberta, Canada
- 9:30 **Efficacy of Naturally Occurring Food Flavors as Inhibitors of Foodborne Pathogens** - B. BOWLES, U. S. Department of Agriculture, Philadelphia, PA
- 10:20 **Regulatory Perspectives on the Use of Bacteriocins in Foods** - F. FIELDS, U.S. Food and Drug Administration, Washington, DC
- 10:50 **USDA's Regulatory Perspective on the Use of Bacteriocins in Foods** - R. POST, U. S. Department of Agriculture, FSIS, Washington, DC
- 11:20 **Industry Perspective on the Use of Natural Antimicrobials and Inhibitors for Food Applications** - Speaker to be announced

**The Quality and Safety of  
Aquacultured Fishery Products Symposium**

- 8:30 **Introduction of Aquaculture** - R. MARTIN, National Fisheries Institute, Fairfax, VA
- 8:50 **Chemical/Physiological Perspectives** - G. FINNE, Silliker Laboratories of Texas, College Station, TX
- 9:10 **Microbiological Perspective - Fin-Fish** - D. WESTHOFF, University of Maryland, College Park, MD
- 9:30 **Microbiological Perspective - Crustaceans** - R. NICKELSON, Silliker Laboratories, Homewood, IL
- 9:50 **Microbiological Perspective - Molluscan** - G. RODRICK, University of Florida, Gainesville, FL
- 10:30 **Residues in Aquacultured Products** - I. HIGUERA, Consultores En Alimentos, Sonora, Mexico
- 10:50 **Value-Added Aquaculture Products** - Y. HUANG, University of Georgia, Athens, GA
- 11:10 **HACCP in Aquaculture** - E. GARRETT, National Marine Fisheries Service, Pascagula, MS

## WEDNESDAY AFTERNOON, AUGUST 3

A Symposium on Risk Management (cont.)  
Sponsored by the Grocery Manufacturer's of America

### RISK MANAGEMENT Control Practices and Their Impact

- 1:30 **Managing Risks from the Industry Perspective**  
2:00 **Economic Impact of Control Practices**

### Education and Communication of Risks

- 2:30 **Education and the Public's Understanding of Risk  
- the Role of Industry, Government and Academia**  
3:00 **Communicating Food Safety Risks to the Public**

### Current Regulatory Approaches

- 3:50 **Short Presentation and Roundtable**

### Dairy Symposium II

Topics to be announced

### European Food Processing Equipment Hygiene Standards Symposium

- 1:30 **Food Industry Perspective** - M. MOSTERT, Unilever Research Laboratorium, Vlaardingen, The Netherlands  
2:00 **Equipment Manufacturers Perspective** - P. SKUDDER, APV Baker Ltd., Crawley, U.K.

- 2:30 **CEN and EHEDG Perspective** - D. TIMPERLY, Campden Food and Drink Research Association, Chipping Campden, U.K.  
3:20 **The Government Perspective** - B. MITCHELL, Ministry of Agriculture, Fisheries & Food, London, U.K.  
3:50 **Test Methods and Their Development** - J. HOLAHA, Campden Food and Drink Research Association, Chipping Campden, U.K.  
4:20 **The 3-A Viewpoint on European Standards** - T. GILMORE, Dairy and Food Industries Supply Association, Rockville, MD  
4:50 **The Challenge - Harmonization of Hygienic Design Criteria** - R. MALLER, Thomas J. Lipton Co., Englewood Cliffs, NJ

### Current Food and Health Related Safety Issues Symposium

- 1:30 **The Impact of International Free Trade on Food Safety Standards** - K. TING, U. S. Department of Agriculture, Washington, DC  
2:00 **International Food Safety and Quality Standards** - C. CARNEVALE, Food and Drug Administration, Washington, DC  
2:30 **Does International Fair Trade Mean Compromised Food Safety Standards? - Impact on Seafood Safety** - C. HACKNEY, Virginia Polytechnic Institute and State University, Blacksburg, VA  
3:20 **Poultry Safety After NAFTA** - J. MARCY, University of Arkansas, Fayetteville, AR  
3:50 **Hantavirus Pulmonary Syndrome (HPS) - An Emerging Public Health Threat** - R. GRINNEL, United States Public Health Service, Albuquerque, NM  
4:20 **Use of Foodborne Disease Data for HACCP Risk Assessment: A New Approach in the State of New York** - J. GUZEWICH, New York State Department of Health, Albany, NY

# 81st IAMFES Annual Meeting

## Spouse/Companion Tours and Special Events

### *BIENVENIDOS*

Sunday, July 31 — 9:00 a.m. - It's up to you

Cost: \$25 (\$30 on-site) Lunch on your own

Welcome to San Antonio . . . one of America's four unique cities . . . where the east meets the west, where the romance and tradition of old Spain meet the sound and energy of a high tech society, where the river dances through the heart of the city and the fiesta never ends. A chartered transit bus will be your magic carpet and Convention Coordinators guide will be your key as you are met at the Hyatt Regency Riverwalk at 9:00 o'clock in the morning for this introductory tour.

First, we'll drive through Hemisfair Plaza to the Institute of Texan Cultures. This "hands-on" museum is for the interpretation and assimilation of Texas history and folk culture and tells about the 26 ethnic groups who were the pioneers of this great state.

We'll drive through the King William Historic District, which was one of San Antonio's early residential neighborhoods. Built at the turn of the century by German "merchant princes," the area has been "re-awakened" and is once again a gracious and friendly old-fashioned neighborhood.

On to the new IMAX Theater, featuring "Alamo - The Price of Freedom," located in Rivercenter Mall. The movie is a stunning experience, shown on a six-story screen with a six-track sound system that lets you "feel" the action. "Alamo - The Price of Freedom" is the most historically accurate depiction of the famous battle in existence. The 45-minute movie "puts you in the middle of the battle of the Alamo."

Walk next door to the "Cradle of Texas Liberty," the Alamo, tucked in among downtown hotels, office buildings and crowded streets. The Alamo's roughly pitted, sandstone facade belies its quiet, churchlike limestone interior where even the most casual visitor experiences an awe while viewing the names of the Alamo heroes inscribed in bronze on the walls.

Continue to San Jose, Queen of the Texas Missions, for a tour of the Indian compound in this extensively restored mission. You will see Indian living quarters, Spanish officer's quarters, the convent, the beautiful church with its elaborately carved entrance, and the famous Rosa's Window.

There will be time for lunch on your own, shopping and browsing in El Mercado where the shops are loaded with curios from the Southwest. Items include: Dresses, shirts, pinatas, dolls, jewelry, straw hats, leather goods, and many other "goodies." Our guide will tell us how to ride the trolley back to the hotel for ten cents. Return to the Hyatt at your leisure.

### *LBJ RANCH & FREDERICKSBURG*

Monday, August 1 — 8:45 a.m. - 4:30 p.m.

Cost: \$25 (\$30 on-site) Lunch on your own

The beautiful Texas Hill Country has never been so well known as when Lyndon B. Johnson was President of the United States. His barbecues under the oak and pecan trees of his ranch were seen by all in those days. So that you can taste a little of "Pedernales country" for yourselves, we have arranged a day in this legendary part of Texas. A chartered motor coach with a Convention Coordinators guide on board will meet you at the Hyatt Regency Riverwalk at 8:45 in the morning for the drive to the LBJ Ranch. There will be a 90 minute educational tour of this National Historic Park including the Junction School, the Johnson birthplace and cemetery, the LBJ ranchlands with its registered Hereford cattle, the Show Barn, and the exterior of the Texas White House where Mrs. Johnson still resides.

On to the historic Fredericksburg for lunch on your own, shopping and browsing on Main Street in this quaint German town, or visiting the Admiral Chester Nimitz Museum of the War of the South Pacific (a Recorded Texas Historic Landmark) with the Japanese Peace Garden.

See the historic "Sunday Houses", where farmers and ranchers stayed on weekends. Return to the hotel at 4:30 in the afternoon.

### *MIL COLORES*

Tuesday, August 2 — 9:00 a.m. - 3:00 p.m.

Cost: \$25 (\$30 on-site) Lunch on your own

Capture the spirit and the many colors of San Antonio as you depart the Hyatt Regency Riverwalk at 9:00 in the morning. We'll follow the Mission Trail, pausing at Mission Concepcion, and San Jose, Queen of the Texas Missions. We'll proceed to historic Fort Sam Houston, established in 1876, and now Headquarters for the Fifth Army. We'll see the enormous parade field, the Quadrangle where Chief Geronimo was once held captive, and General's Row where many famous military personalities have resided.

On to the San Antonio Botanical Center, 38-acres representing, in miniature, the diverse Texas landscape - from the wild flowers of the Texas Hill Country to the formal rose gardens of East Texas. A Biblical Garden, Children's Garden, and a Fragrance Garden are also featured. A highlight of the center is the new underground conservatory, with rare and exotic plants and flowers.

There will be time for lunch on your own and shopping at Los Patios, an oasis on the banks of Salado Creek. Shop in the boutiques located on the park-like grounds, including: The Flower Forest, Marisol Boutique, Tejas Gifts, Tienda, Big Sky Clothing Company, The Gallery, Vega's Jewelry and Lo Singular. Enjoy lunch at the Gazebo, the Hacienda or the Brazier Restaurants.

The McNay Art Museum is a "treasure house of art," religiously dedicated to discriminating taste. Housed in a magnificent Mediterranean mansion built around a lush courtyard and reflecting pool, you'll view works by Van Gogh, Gauguin, Matisse, Picasso, Renoir - to name a few. The McNay is rated one of the best small museums in the country.

We'll pause on Alpine Drive which affords a beautiful view of the city skyline and the Japanese Sunken Garden below. Arrive back at the Hyatt Regency Riverwalk at 3:00 in the afternoon.

### **SHOPPER'S PARADISE**

**Wednesday, August 3 — 9:00 a.m. - 4:00 p.m.**

**Cost: \$20 (\$25 on-site) Lunch on your own**

"Shop till you drop!" Today you will see some of the most interesting shops in the area as you depart the Hyatt Regency Riverwalk at 9:00 a.m. in a chartered motorcoach to search for bargains galore! First, we'll journey to San Marcos, Texas, to a new and exciting outlet mall, one of the nation's largest. Clothing, accessories, housewares - in such shops as Adolpho, Perry Ellis, Coach, Mikasa, Eddie Bauer, Etienne Aigner, Nike, Sara Coventry, Fitz & Floyd - and much, much more. On to the Tanger Factory Outlet Center where you'll find items for the entire family. Buy directly from 31 upscale designers and manufacturers outlet stores and save 30 to 70% off retail prices.

Then to the quaint German town of New Braunfels, Texas where "Life is Beautiful." The Langston House, a symmetrical Greek Revival style house, was built in 1854 by Franz Moreau. The log and "fachwerk" construction was common in those days. The house was later occupied by the Gross family, the Frieze Family and then the Langston Family.

We'll continue to the nearby town of Gruene, founded in 1872 by Henry D. Gruene from Germany, who built a home and cotton gin and the town grew. It was known for its dance hall and saloon built in the 1880's which is the oldest dance hall in Texas still in existence. Death came to Henry Gruene in 1920 and this also marked the end of the development of the town. In 1925 the boll weevil and the depression struck and it became a ghost town. The untouched town was purchased in 1974 and businesses were once again established in the old buildings. We'll enjoy stepping back in time as we visit the many shops in town including: Texas Homegrown, The Bush Whacker, Nature's Alliance, The Gruene Antique Company, The Back Porch, Buck Pottery and others. Guests can eat on their own at one of the three restaurants located in Gruene. Arrive back at the Hyatt Regency Hotel at 4:00 o'clock in the afternoon.

---

## **Monday Night Social Event**

### **"A LITTLE BIT TEXAN"**

**August 1 — 6:00 - 10:00 p.m.**

**Cost: Adults \$35 (\$40 on-site)**

**Children \$20 (\$25 on-site)**

Get your boots, jeans, western shirts and cowboy hats (no six-shooters, please) and head on out for a "little bit of Texas — The Rio Cibolo Ranch."

We'll board our Grey Line buses at 6:00 p.m. and head for the wild, wild east. A short ride later, we'll cross the Rio Cibolo River and pull into the ranch. A Texas style Barbeque dinner - beef brisket and chicken quarters, cole slaw, beans, relish tray, bread and butter and fruit cobbler — will await us.

Work up an appetite by learning or dancing the Texas National past-time — line dancing. A band and dance instructor will be there to show you how its done — the real way. Or there's the Rol-A-Roper, horse shoes, volleyball, basketball, cow-chip toss or wagon rides. Or just chat with your friends under a beautiful Texas sky — (it isn't really any bigger, it just seems like it!)

We'll mosey on back to the Hyatt Regency between 9:30-10:00 p.m.

## **Traditional IAMFES Gatherings**

### **IVAN PARKIN LECTURESHIP**

**Sunday, July 31 — 7:00 p.m.**

Followed by the **Nachos and Margaritas Reception** for the Opening of the Education Exhibits.

*An opportunity to greet old friends, make new ones and view the excellent technical displays.*

### **IAMFES ANNUAL AWARDS RECEPTION AND BANQUET**

**Wednesday, August 3**

**Reception: 6:00 p.m.**

**Banquet: 7:00 p.m.**

**Cost: \$30 (\$35 on-site)**

# 81st IAMFES Annual Meeting Registration Form

Hyatt Regency Riverwalk — San Antonio, Texas — July 31 - August 3, 1994

(Use photocopies for extra registrations)

FOR OFFICE USE

Date Rec'd. \_\_\_\_\_ First initial \_\_\_\_\_ Last name \_\_\_\_\_  
 Registration # \_\_\_\_\_

**\*Sign up to become  
 a NEW member**  
 and take advantage of the  
 member discount.

First Name (will appear on badge) \_\_\_\_\_ (please print) \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Employer \_\_\_\_\_

Mailing Address (Please specify: \_\_\_\_\_ Home \_\_\_\_\_ Work \_\_\_\_\_)

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Fax # \_\_\_\_\_ Area Code & Telephone \_\_\_\_\_

**Credit Card  
 payments may  
 be sent via  
 Fax today!  
 515-276-8655**

**Please check where applicable:**  
 IAMFES Member  
 Non-Member  
 Local Arrangements  
 30 Yr. Member  
 50 Yr. Member  
 Past President  
 Executive Board  
 Speaker  
 Honorary Life Member  
 Exhibitor

**Registration**

IAMFES Member (Banquet included)	Amount	Total
Non-Member (Banquet included)	\$150 (\$185 on-site)	Amount
IAMFES Student Member	\$210 (\$245 on-site)	_____
IAMFES Member One Day (Circle: Mon/Tues/Wed)	\$ 20 (\$ 25 on-site)	_____
Non-Member One Day (Circle: Mon/Tues/Wed)	\$ 80 (\$100 on-site)	_____
Spouse/Companion (Name): _____	\$105 (\$130 on-site)	_____
Children (14 & Under), Name: _____	\$ 25 (\$ 25 on-site)	_____
	FREE	_____

**\*New Membership Fees:**

Membership (Dairy, Food & Environmental Sanitation) \$ 50  
 Membership Plus (Dairy, Food & Env. Sanitation & Journal of Food Protection) \$ 80  
 \*Student Membership  Dairy, Food & Env. San. or  Journal of Food Protection \$ 25  
 \*Student Membership Plus (Dairy, Food & Environmental Sanitation & Journal of Food Protection) \$ 40  
 \*Full-time student verification required.  
**POSTAGE CHARGES: OUTSIDE THE U.S. - SURFACE RATE**  
**AIRMAIL**

**Other Fees: (Per Person)**

Naehos and Margaritas Reception (Sun., 7/31) \_\_\_\_\_  
 Rio Cibolo Ranch Evening (Mon., 8/1) \_\_\_\_\_  
 IAMFES Awards Banquet (Wed., 8/3) \_\_\_\_\_  
 # of tickets \_\_\_\_\_

**Spouse/Companion Events:**

Bienvenidos (Sun., 7/31) \_\_\_\_\_  
 LBJ Ranch & Fredericksburg (Mon., 8/1) \_\_\_\_\_  
 Mil Colores (Tues., 8/2) \_\_\_\_\_  
 Shopper's Paradise (Wed., 8/3) \_\_\_\_\_  
 # of tickets \_\_\_\_\_

Please indicate here if you have a disability requiring special accommodations.

Credit Card Payments: Please Circle:  VISA/MASTERCARD/AMERICAN EXPRESS

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Name on Card \_\_\_\_\_ Signature \_\_\_\_\_

Total Amount Enclosed \$ \_\_\_\_\_  
 U.S. FUNDS DRAWN ON U.S. BANK

**Registration Information**

Send payment with registration to IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322. Make checks payable to IAMFES. Pre-registration must be post-marked by July 1, 1994. The pre-registration deadline will be strictly observed. For additional information contact Julie Heim at 1-800-369-6337.

**Refund/Cancellation Policy**

The IAMFES policy on meeting cancellation/refunds is as follows: \*Registration fees, minus a \$25 processing fee, will be refunded for written cancellations post-marked at least two (2) weeks prior to the start of the meeting. No refunds will be made for cancellations made less than two (2) weeks prior to the start of the meeting, however, the registration may be transferred to colleague with written

**Exhibitor Information**

An exhibition of products and consultant services will be at the Hyatt Regency Riverwalk. For more information on exhibiting at the conference, please contact Scott Wells at 1-800-369-6337.



To receive information on membership with IAMFES Circle 360 on this card

## IAMFES

DFES  
4/94

International Association of Milk, Food and Environmental Sanitarians Inc

The Advertisements included herein are not necessarily endorsed by the International Association of Milk, Food and Environmental Sanitarians, Inc.

Reader requests for information are sent to the appropriate company. Follow-up on reader requests are the responsibility of the company advertising.

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State/Prov. \_\_\_\_\_  
 Country \_\_\_\_\_ Zip \_\_\_\_\_  
 Phone Number \_\_\_\_\_

Please send information on items circled below: Deadline 60 days from issue date

101	114	127	140	153	166	179	192	205	218	231	244	257	270	283	296	309	322	335	348
102	115	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323	336	349
103	116	129	142	155	168	181	194	207	220	233	246	259	272	285	298	311	324	337	350
104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
106	119	132	145	158	171	184	197	210	223	236	249	262	275	288	301	314	327	340	353
107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
113	126	139	152	165	178	191	204	217	230	243	256	269	282	295	308	321	334	347	360

This second Reader Service Card is provided to allow co-workers to also respond to companies of interest.

## IAMFES

DFES  
4/94

International Association of Milk, Food and Environmental Sanitarians Inc

The Advertisements included herein are not necessarily endorsed by the International Association of Milk, Food and Environmental Sanitarians, Inc.

Reader requests for information are sent to the appropriate company. Follow-up on reader requests are the responsibility of the company advertising.

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State/Prov. \_\_\_\_\_  
 Country \_\_\_\_\_ Zip \_\_\_\_\_  
 Phone Number \_\_\_\_\_

Please send information on items circled below: Deadline 60 days from issue date

101	114	127	140	153	166	179	192	205	218	231	244	257	270	283	296	309	322	335	348
102	115	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323	336	349
103	116	129	142	155	168	181	194	207	220	233	246	259	272	285	298	311	324	337	350
104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
106	119	132	145	158	171	184	197	210	223	236	249	262	275	288	301	314	327	340	353
107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
113	126	139	152	165	178	191	204	217	230	243	256	269	282	295	308	321	334	347	360

Place  
Stamp  
Here

---

# IAMFES

200W Merle Hay Centre  
6200 Aurora Ave.  
Des Moines, Iowa 50322

Place  
Stamp  
Here

---

# IAMFES

200W Merle Hay Centre  
6200 Aurora Ave.  
Des Moines, Iowa 50322

Guest Room Commitment  
GOOD UNTIL JUNE 29, 1994  
Make Your Reservation Now

Please check accommodation requested:

- Single (1 person)     Triple (3 persons)  
 Double (2 persons)     Quad (4 persons)

Bed type:

- King Bed  
 2 Queen Beds

**HOTEL RESERVATIONS  
I AM FES**  
81st Annual Meeting  
July 31-August 3, 1994  
Hyatt Regency Riverwalk  
San Antonio, Texas

Please indicate here if you have a disability requiring special accommodations.  
All room rates are subject to prevailing taxes.  
Reservations must be received by hotel prior to arrival.

NAME \_\_\_\_\_

SHARING WITH (Name) \_\_\_\_\_

COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

STATE/PROVINCE \_\_\_\_\_

TELEPHONE \_\_\_\_\_

ARRIVAL DATE \_\_\_\_\_

SPECIAL REQUESTS \_\_\_\_\_

After June 29, 1994 reservations will be accepted on a space availability basis only. Reservations will be held until 6:00 p.m. on the date of arrival, unless guaranteed by one night advance deposit, payable by certified check or a Major Credit Card.

CREDIT CARD # \_\_\_\_\_

EXPIRATION DATE \_\_\_\_\_

CARD HOLDERS SIGNATURE \_\_\_\_\_

COUNTRY \_\_\_\_\_

(Check-In Time  
is after 3 p.m.)

DEPARTURE DATE \_\_\_\_\_

(Check-out  
Time is 12 p.m.)

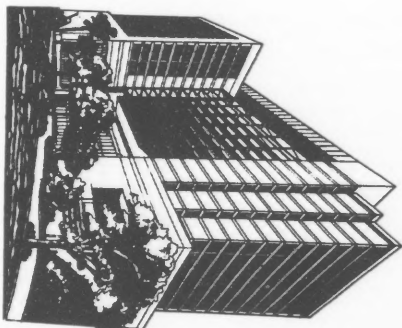
CITY \_\_\_\_\_

ZIP \_\_\_\_\_

CREDIT CARD \_\_\_\_\_

**SPECIAL ROOM RATES** for this convention:  
\$95 plus tax . . . single, double, triple or quad occupancy

**HYATT**  
REGENCY  
SAN ANTONIO  
ON THE RIVERWALK™



**MAIL DIRECTLY TO:**

HYATT REGENCY RIVERWALK  
C/O RESERVATIONS  
123 LOSOYA STREET  
SAN ANTONIO, TX 78205

For Reservations Call:

(210)222-1234

OR FAX:

(210)227-4925

# Business Exchange "Classifieds"

## Equipment For Sale



Model III ss x

\*U.S. Pat. No. 4,380,166

**The CDT™ Test Device\***  
For testing all differential controls on H.T.S.T. pasteurizers  
**Model III ss x now shipping!**  
New adapters\*\* connect directly to HTST's sanitary pressure sensors



**The Crombie Company**  
521 Cowles Ave., Joliet, IL 60435-6043  
815-726-1683 (Voice & FAX)

\*\*Adapters may be ordered separately - fit all previous models.

CIRCLE READER SERVICE NO. 339

IAMFES Sustaining Member  
1994 Exhibitor

**Food Safety,  
better,  
faster with  
AquaLab**



AquaLab CX-2  
for Water Activity

**Decagon Devices, Inc.**  
Post Office Box 835  
Pullman, WA 99163  
509/332-2756  
FAX509/332-5158

CIRCLE READER SERVICE NO. 320

## Services / Products

IAMFES Sustaining Member

1994 Exhibitor



**DQCI  
Services, Inc.**

Bacteriological & Chemical Testing

- Component Samples for Infrared Equipment
- ESCC Control Samples
- Chemical & Bacteriological Testing of Milk & Milk Products

Moundsview Business Park 5205 Quincy Street St. Paul, MN 55112-1400

(612) 785-0484

FAX (612) 785-0584

CIRCLE READER SERVICE NO. 356

**GOSSELIN & BLANCHET**  
Butter-Making Equipment  
New and used.

Sales. Service. Parts.

**B & J REPAIR SERVICE**

• 4818 N. Bailey Rd. •

Coral, MI 49322

(616) 354-6629

CIRCLE READER SERVICE NO. 329



**Michelson Laboratories, Inc.**

6280 Chalet Drive, Los Angeles, CA 90040  
Telephone: (310) 928-0553 / (714) 971-0673 / FAX (310) 927-6625

COMPLETE DAIRY ANALYSIS  
SPECIALIZING IN:

- Chemical
- Microbiological
- Sugar Profile
- Fatty Acid Profile
- Vitamin A & D
- Quality Assurance
- Consulting
- IMS-USPHS-FDA  
Approved 06143



TECHNIQUES AVAILABLE:

- Infrared Milk Analyzer
- Mass Spectrometry
- Gas Chromatography
- Atomic Absorption
- Spectrophotometry
- Spectrofluorometry
- Spiral Plater
- Laser Counter
- Microscopy
- Vitek & Bactometer
- Inductively Coupled Plasma

\*\*\*\*\*  
Also Offering: Milk Calibration Samples for Infra-red Milk Analyzer and Electronic Somatic Cell Counter

CIRCLE READER SERVICE NO. 340

**COMPLETE  
LABORATORY  
SERVICES**

**Ingman Labs, Inc.**  
2945 - 34th Avenue South  
Minneapolis, MN 55405  
612-724-0121

CIRCLE READER SERVICE NO. 315

## Services / Products

### For Food Plant Operations

#### Employee Training Materials



- GMP & GSP booklets, slides and video tapes in English & Spanish

#### L. J. BIANCO & ASSOCIATES

(Associated with L.J.B. Inc.)

#### FOOD PRODUCT QUALITY CONTROL AND ASSURANCE CONSULTANTS

850 Huckleberry Lane

Northbrook, IL 60062

708-272-4944 / FAX 708-272-1202

Over 40 years Food Operation Experience

CIRCLE READER SERVICE NO. 297

### Cargill Analytical Services

- Accurate Food, Feed and Water Analysis
  - Quality Microbiological and Chemical Testing, plus a wide variety of Technical Services
  - Includes Nutrition Labeling, Pathogens, Shelf-life Studies, Mycotoxins, HACCP Programs, and problem-solving capabilities
  - Reliable Results, Personal Service, & Competitive Pricing
- Call Today for More Information!*

Deb Paulsen-Hogue

319/366-3570

405 Eighth Ave., SE

Cedar Rapids, IA 52401

Jon Gray

417/451-5973

4301 Doniphan Dr.

Neosho, MO 64850

CIRCLE READER SERVICE NO. 287



### ENVIRONMENTAL SYSTEMS SERVICE, LTD.

- Testing for Listeria and other Pathogens
- Drug Residue Analysis by H.P.L.C. and GC/MS
- Dairy, Poultry and Food Product Testing
- Water and Wastewater Analysis
- Vitamin Analysis of Dairy Products and Concentrates.

218 N. Main Street

703-825-6660

Culpeper, VA 22701

800-541-2116

CIRCLE READER SERVICE NO. 349

IAMFES Sustaining Member

**THIS IS YOUR GOOD MILKING Guarantee**

... and we back this claim with a money back offer unlike any in the industry!

**ECI** soft design

## INFLATIONS

ECI will eliminate the problems you may be having with

- FALLING OFF
- LEAKING AIR
- DETERIORATION
- INKING OFF

Start using ECI scientifically tested inflations now for faster, cleaner milking.

**ECI INDUSTRIES, INC.**  
VERNON, N. Y. 13476

CIRCLE READER SERVICE NO. 317

## IAMFES Offers the Northeast Dairy Practices Council (NDPC) "Guidelines for the Dairy Industry"

At the urging of our Dairy Quality and Safety Professional Development Group, IAMFES has entered into an agreement with the Northeast Dairy Practices Council (NDPC) to distribute their "Guidelines for the Dairy Industry."

NDPC is a non-profit organization of education, industry and regulatory personnel concerned with milk quality and sanitation throughout 15 northeastern/mid-Atlantic states. Interestingly, its membership and subscriber rosters list individuals and organizations throughout the United States, Canada and Japan.

For the past 25 years, NDPC's primary mission has been the development of and the distribution of educational guidelines directed to proper and improved sanitation practices in the production, processing, and distribution of high quality fluid milk and manufactured dairy products.

The NDPC Guidelines are written by professionals who comprise five permanent Task Forces. Prior to distribution, every Guideline is submitted for approval to the key milk control sanitarian in each of the 15 states which are now active participants in the NDPC process. Should any official have an exception to a section of a proposed guideline, that exception is noted in the final document.

Although the Guidelines are developed east of the Mississippi River, clearly they have a high degree of applicability wherever cows are milked and milk is transported, processed and distributed.

The Guidelines are renowned for their common sense, useful approach to proper and improved sanitation practices. We think that they will be a valuable addition to your professional reading library.

---

### The entire set consists of 48 guidelines including:

- |  |  |
|--|--|
| 1. Dairy Cow Free Stall Housing  | 32. Fat Test Variations in Raw Milk  |
| 2. Effective Installation, Cleaning and Sanitizing of Milking Systems                            | 33. Brucellosis and Some Other Milkborne Diseases                                  |
| 3. Selected Personnel in Milk Sanitation   | 34. Butterfat Determinations of Various Dairy Products                             |
| 7. Sampling Fluid Milk   | 35. Dairy Plant Waste Management   |
| 8. NE Ext. Publ., Conferences, Short Courses, Correspondence Courses and Visual Aids in Dairying | 36. Dairy Farm Inspection  |
| 9. Fundamentals of Cleaning and Sanitizing Farm Milk Handling Equipment                          | 37. Planning Dairy Stall Barns   |
| 10. Fluid Milk Shelf Life  | 38. Preventing Off-flavors in Milk   |
| 11. Sediment Testing and Producing Clean Milk  | 39. Grade A Fluid Milk Plant Inspection  |
| 13. Environmental Air Control & Quality for Dairy Food Plants                                    | 40. Controlling Fluid Milk Volume and Fat Losses                                   |
| 14. Clean Room Technology  | 41. Milkrooms and Bulk Tank Installation   |
| 16. Handling Dairy Products From Processing to Consumption                                       | 42. Stray Voltage on Dairy Farms   |
| 17. Causes of Added Water in Milk  | 43. Farm Tank Calibrating and Checking   |
| 18. Abnormal Milk--Fieldman's Approach   | 44. Troubleshooting Dairy Barn Ventilation Systems                                 |
| 21. Raw Milk Quality Tests   | 45. Gravity Flow Gutters for Manure Removal in Milking Barns                       |
| 22. Control of Antibacterial Drugs and Growth Inhibitors in Milk and Milk Products               | 46. Dairy Odor Control   |
| 23. Preventing Rancid Flavors in Milk  | 47. Naturally Ventilated Dairy Cattle Housing                                      |
| 24. Troubleshooting High Bacteria Counts of Raw Milk   | 48. Cooling Milk on the Farm   |
| 25. Cleaning and Sanitizing Bulk Pickup and Transport Tankers                                    | 49. Postmilking Teat Dips  |
| 28. Troubleshooting Residual Films on Dairy Farm Milk Handling Equipment                         | 50. Farm Bulk Milk Collection Procedures   |
| 29. Cleaning and Sanitizing in Fluid Milk Processing Plants                                      | 51. Controlling the Accuracy of Electronic Testing Instruments for Milk Components |
| 30. Potable Water on Dairy Farms   | 52. Emergency Action Plan for Outbreak of Milkborne Illness in the Northeast       |
| 31. Composition and Nutritive Value of Dairy Products  | 53. Vitamin Fortification of Fluid Milk Products                                   |
|  | 54. Selection and Construction of Herringbone Milking Parlors                      |
|  | 56. Dairy Product Safety (Relating to Pathogenic Bacteria)                         |
|  | 57. Dairy Plant Sanitation   |
|  | 58. Sizing Dairy Farm Water Heater Systems   |
- 

If purchased individually, the entire set would cost \$174. We are offering the set, packaged in three loose leaf binders for \$125 plus \$9 shipping and handling (outside the US, \$21 for shipping and handling).

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) it to IAMFES.

Please enclose \$125 plus \$9 shipping and handling for each set of Guidelines. Shipments outside the US are \$125 plus \$21 shipping and handling.

Payment in US Funds drawn on a US Bank or by credit card.

Name: \_\_\_\_\_

Phone No. \_\_\_\_\_

Company: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State/Province, Code: \_\_\_\_\_

Signature: \_\_\_\_\_

VISA/MC/AE No.: \_\_\_\_\_

Exp. Date: \_\_\_\_\_

# Coming Events

1994

## May

- 2-6, Electrical Troubleshooting**, sponsored by the American Institute of Baking, will be held at AIB, 1213 Bakers Way, Manhattan, KS 66502. For more information please contact AIB at (913)537-4750, (800)633-5137.
- 3-4, Food Plant Sanitation**, sponsored by the American Institute of Baking, will be held in Seattle, WA. For more information please contact AIB at (913)537-4750, (800)633-5137.
- 3-5, Extending Food Product Quality and Shelf-Life**, sponsored by the American Institute of Baking, will be held at AIB, 1213 Bakers Way, Manhattan, KS 66502. For more information please contact AIB at (913)537-4750, (800)633-5137.
- 4-5, Wisconsin Association of Milk and Food Sanitarians** will present a two-day workshop on HACCP programs. The workshop will be presented at the Sheraton Inn, Madison, WI. Registration information is available from Neil Vassau, PO Box 7883, Madison, WI 53707.
- 4-6, HACCP - A Basic Concept for Food Protection**, presented by The Food Processors Institute, in cooperation with The Texas Food Processors Association and Texas A&M University, to be held at The Gunter Hotel, San Antonio, TX. For more information please contact The Food Processors Institute, 1401 New York Avenue, NW, Suite 400, Washington, DC 20005; (202)393-0890, FAX (202)639-5932.
- 6, How to Write Your Own OSHA Programs**, sponsored by the American Institute of Baking, will be held in Kansas City, MO. For more information please contact AIB at (913)537-4750, (800)633-5137.
- 7-12, Food Structure Annual Meeting** will be held at the Holiday Inn Downtown City Hall, Toronto, Ontario, Canada. For more information, please contact Dr. Om Johari, SMI, Chicago (AMF O'Hare), IL 60666-0507, USA (or call 708-529-6677, FAX: 708-980-6698).
- 9-11, Introduction to Food Industry Quality Management**, sponsored by the University Extension, University of California-Davis, will be held on the UC-Davis campus. For more information or to enroll, call toll free in California (800)752-0881, from Davis, Dixon, Woodland or outside California, call (916)757-8777.
- 9-13, Fundamentals of Programmable Controllers**, sponsored by the American Institute of Baking, will be held at AIB, 1213 Bakers Way, Manhattan, KS 66502. For more information please contact AIB at (913)537-4750, (800)633-5137.
- 14-15, Progressive Management Seminars held at the Hotel-Motel Show**, sponsored by The Educational Foundation of the National Restaurant Association, to be held at McCormick Place North, (lower level), Chicago, IL. For more information please call The Educational Foundation's Customer Service Department at 1-800-765-2122.
- 16-20, Refrigeration Technology**, sponsored by the American Institute of Baking, will be held at AIB, 1213 Bakers Way,

Manhattan, KS 66502. For more information please contact AIB at (913)537-4750, (800)633-5137.

- 17-18, Food Plant Sanitation**, sponsored by the American Institute of Baking, will be in Atlanta, GA. For more information please contact AIB at (913)537-4750, (800)633-5137.
- 18-21, Purdue Better Process Control School** will be sponsored by the Food Science Department at Purdue University. For more information, contact James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907, Phone: (317)494-8279.
- 25-27, International Conference on Food Physics**, sponsored by the International Society of Food Physicists and the Editorial Board of Journal of Food Physics, will be held at the University of Horticulture and Food Industry, Budapest, Hungary. For further information, contact A. S. Szabo, President of the Organizing Committee, H-1118 Budapest, Somloi Street 14-16, Phone: 361-1850-666/470, Fax: 361-166-6220.

## June

- 2, Tennessee Association of Milk, Water and Food Protection's Annual Meeting** will be held at the Nashville Ramada Airport. For more information please contact Dennis Lampley at (615)360-0157.
- 6-9, Safety School**, sponsored by the American Institute of Baking, will be held at AIB, 1213 Bakers Way, Manhattan, KS 66502. For more information please contact AIB at (913)537-4750, (800)633-5137.
- 6-10, Baking for Allied and Non-Production Personnel**, sponsored by the American Institute of Baking, will be held at AIB, 1213 Bakers Way, Manhattan, KS 66502. For more information please contact AIB at (913)537-4750, (800)633-5137.

## July

- 8-15, Rapid Methods and Automation in Microbiology International Workshop XIV**, to be held at Kansas State University, Manhattan, KS. For more information contact Dr. Daniel Y. C. Fung at (913)532-5654, FAX (913)532-5681. A mini-symposium will occur on July 8th and 9th.

•**31-August 3, 81st Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians** will be held at the Hyatt Regency Hotel, San Antonio, TX. For more information, contact: Julie Heim — Registration; Scott Wells — Exhibits; at (800)369-6337 (US), (800)284-6336 (Canada), or (515)276-3344.

## August

- 20-25, 41st International Congress of Meat Science and Technology**, hosted by the American Meat Science Association, to be held in San Antonio, TX. For more information contact Ken Johnson, ICoMST Secretariat at (312)467-5520.

**•23-24, Microbiological Concerns in Food Plant Sanitation & Hygiene**, a two day interactive lecture course, sponsored by Silliker Laboratories Group, Inc., will be held in Chicago, IL. For further information, contact Silliker Laboratories, Education Services Department at (800)829-7879.

## September

**•14-16, International Dairy Federation Annual Sessions** to be held in Adelaide, Australia. **18-22 International Dairy Congress** to be held in Melbourne, Australia. For more information please contact IDF, 1601 Malvern Road, Glen Iris 3146, Victoria, Australia, Telephone (03)885-9781, FAX (03)885-0017.

**•18-21, 1995 National Educational Conference**, sponsored by the Canadian Institute of Public Health Inspectors, "Approaching the 21st Century - Challenges in Health Protection", to be held in Victoria, British Columbia, Canada. For more information please contact Mr. R. W. Bradbury (604)478-0523, FAX (604)478-9363.

**•19-21, Indiana Environmental Health Association Fall Annual Educational Conference** will be held in Muncie, IN. For additional information, contact Tami Barrett at (317)633-8400.

**•20-22, New York State Association of Milk and Food Sanitarians Annual Conference**, Sheraton Inn-Buffalo Airport, Buffalo, NY. For more information contact Janene Gargiulo (607)255-2892.

## October

**•5-7, New York State Registry of Sanitarians 1994 Educational Conference** will be held at the Villa Roma Resort Hotel, Callicoon, NY. For more information please contact

Susan Jones (516)727-8947 or Michele Hecht (516)349-5816.

**•5-8, 1994 International Dairy Show**, sponsored by the International Dairy Foods Association, Milk Industry Foundation, National Cheese Institute and International Ice Cream Association, co-sponsored by the American Butter Institute, will be held at the Minneapolis Convention Center, Minneapolis, MN. For more information, contact International Dairy Show Convention Management at (703)876-0900.

**•12-13, Iowa Association of Milk, Food and Environmental Sanitarians Annual Meeting** will be held at the Best Western Starlite Village (formerly the Ramada Hotel), Waterloo, IA. For more information, call Dale Cooper at (319)927-3212.

**•19-20, North Central Cheese Industries Association Annual Conference** to be held at the Holiday Inn., Brookings, South Dakota. For further information contact E. A. Zottola, Executive Secretary, NCCIA, Box 8113, St. Paul, MN 55113.

**•25-26, HACCP for Meat and Poultry Processors**, a two day interactive workshop designed for those responsible for implementing a HACCP plan in a processing plant, will be held in Dallas, TX. Sponsored by Silliker Laboratories Group, Inc., more information is available by calling Silliker's Education Services Dept. at (800)829-7879.

## November

**•2-3, North Dakota Environmental Health Assn. Annual Educational Conference** will be held at the International Inn, Williston, ND. For more information, contact Deb Larson at (701)221-6147.

To insure that your meeting time is published, send announcements at least 90 days in advance to: IAMFES, 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, IA 50322.

## ADVERTISING INDEX

COMPANY .....	PAGE
Acumedia Manufacturers, Inc. ....	191
Applied Research Institute .....	206
Atkins Technical, Inc. ....	199
Bentley Instruments, Inc. ....	201
bioMérieux Vitek, Inc. ....	189
Capitol Vial, Inc. ....	204
Charm Sciences, Inc. ....	Back Cover
Dairy & Food Labs, Inc. ....	195
Educational Foundation of the National Restaurant Assn .....	197
Envirocon .....	201
Food and Dairy Quality Management Inc. ....	207
Gardex Chemicals Ltd. ....	201
Gist-brocades Food Ingredients, Inc. ..	Inside Front Cover
IDEXX Laboratories, Inc. ....	Inside Back Cover
Marcor Development Corp. ....	195
McGlaughlin Oil Co. ....	194
Nasco .....	200

Nelson-Jameson, Inc. ....	203
Novamann Int./Smith Laboratory Service Ltd .....	194
Prosser/Enpo .....	201
VICAM .....	199
Wold Dryer .....	194

### BUSINESS EXCHANGE "CLASSIFIEDS"

B&J Repair Services .....	242
L. J. Bianco & Associates .....	243
Cargill Analytical .....	243
The Crombie Co. ....	242
DQCI Services, Inc. ....	242
Decagon Devices .....	242
Environmental Systems Service .....	243
Eastern Crown .....	243
Ingman Labs, Inc. ....	242
Michelson Labs .....	242



# IAMFES

International Association of Milk, Food and Environmental Sanitarians, Inc.

## IAMFES Booklets

Quantity	New Prices Effective May 1, 1994	Total \$
_____	Procedures to Investigate Waterborne Illness \$6.00/member; \$9.00/non-member	_____
_____	Procedures to Investigate Foodborne Illness - 4th Edition \$6.00/member; \$9.00/non-member	_____
_____	Procedures to Investigate Arthropod-borne and Rodent-borne Illness \$6.00/member; \$9.00/non-member	_____
_____	Procedures to Implement the Hazard Analysis Critical Control Point System \$6.00/member; \$9.00/non-member	_____
_____	Pocket Guide To Dairy Sanitation \$.50/member; \$.75/non-member (minimum order of 10) (\$2.50 shipping for each order of 10)	_____

Multiple copies available at reduced prices.  
Phone our order desk for pricing information  
on quantities of 11 or more.

### Shipping/Handling

U.S. \$2.00 for first item. \$1.00 for each additional item  
Outside U.S. \$4.00 for first item. \$1.00 for each additional item

Booklet Total \_\_\_\_\_

## 3-A Sanitary Standards

Quantity	New Prices Effective May 1, 1994	Total \$
_____	Complete set 3-A Dairy Standards \$48 member; \$72 non-member	_____
_____	Complete set 3-A Dairy & Egg Standards \$70 member; \$105 non-member	_____
_____	3-A Egg Standards \$40 member; \$60 non-member	_____
_____	Five-year Update Service on 3-A Sanitary Standards 3-A Dairy & Egg Standards \$62 member; \$93 non-member	_____

### Shipping/Handling

U.S. \$6.25 each item  
Outside U.S. \$10.25 each item

3-A Sanitary Standards Total \_\_\_\_\_

PRINT OR TYPE . . . ALL AREAS MUST BE COMPLETED IN ORDER TO BE PROCESSED

Name \_\_\_\_\_ Company Name \_\_\_\_\_  
FIRST MI LAST

Job Title \_\_\_\_\_ Office Phone # \_\_\_\_\_

Address \_\_\_\_\_ FAX # \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_ Country \_\_\_\_\_ Postal Code \_\_\_\_\_

MAIL ENTIRE FORM TO:

IAMFES  
6200 AURORA AVENUE, STE 200W  
DES MOINES, IA 50322-2838

OR USE YOUR CHARGE CARD

515-276-3344  
800-369-6337  
FAX 515-276-8655

**U.S. FUNDS**  
on U.S. BANK

**PAYMENT MUST BE ENCLOSED  
IN ORDER TO PROCESS**

\_\_\_\_ CHECK OR MONEY ORDER  
\_\_\_\_ MASTERCARD  
\_\_\_\_ VISA  
\_\_\_\_ AMERICAN EXPRESS

CARD # \_\_\_\_\_

EXPIRATION DATE \_\_\_\_\_

YOUR SIGNATURE \_\_\_\_\_

# IAMFES

International Association of Milk, Food and Environmental Sanitarians, Inc.

## MEMBERSHIP APPLICATION

### MEMBERSHIP

- Membership Plus \$80**  
(Includes *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection*)
- Membership with *Dairy, Food and Environmental Sanitation* \$50**
- Check here if you are interested in information on joining your state/province chapter of IAMFES**

### SUSTAINING MEMBERSHIP

- Membership with BOTH journals \$450**  
Includes exhibit discount, July advertising discount, company monthly listing in both journals and more.

### STUDENT MEMBERSHIP\*

- Membership Plus including BOTH journals \$40**
- Membership with *Dairy, Food and Environmental Sanitation* \$25**
- Membership with the *Journal of Food Protection* \$25**

\*Full-time student verification must accompany this form.

#### Shipping Charges: Outside U.S.

- Surface** \$22.50 per journal
- AIRMAIL** \$95.00 per journal

PRINT OR TYPE . . . ALL AREAS MUST BE COMPLETED IN ORDER TO BE PROCESSED

Name \_\_\_\_\_ Company Name \_\_\_\_\_  
FIRST MI LAST

Job Title \_\_\_\_\_ Office Phone # \_\_\_\_\_

Address \_\_\_\_\_ FAX # \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_ Country \_\_\_\_\_ Postal Code \_\_\_\_\_

Membership: New \_\_\_\_\_ Renewal \_\_\_\_\_

**PAYMENT MUST BE ENCLOSED  
IN ORDER TO PROCESS**

#### MAIL ENTIRE FORM TO:

IAMFES  
6200 AURORA AVENUE, STE 200W  
DES MOINES, IA 50322-2838

**U.S. FUNDS  
on U.S. BANK**

#### OR USE YOUR CHARGE CARD

515-276-3344  
800-369-6337  
FAX 515-276-8655

- \_\_\_\_\_ CHECK OR MONEY ORDER
- \_\_\_\_\_ MASTER CARD
- \_\_\_\_\_ VISA
- \_\_\_\_\_ AMERICAN EXPRESS

CARD # \_\_\_\_\_

EXPIRATION DATE \_\_\_\_\_

YOUR SIGNATURE \_\_\_\_\_

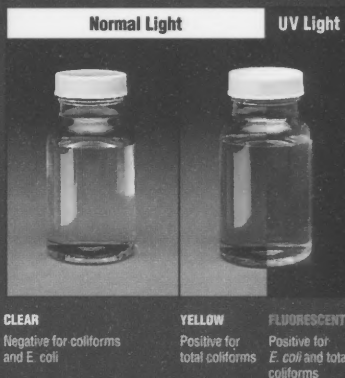
# Water testing with Colilert®



1. Add reagent

2. Incubate  
24 hours

3. Read results



If water plays an important part in your business, Colilert should play an important part in your water testing.

Colilert is rapidly becoming the method of choice around the world for detecting and confirming total coliforms and *E. coli*.

*Millions of tests run annually*

## Simple

- Easy-to-read results
- Pre-measured, ready-to-use 100ml, 50ml, and 10ml unit doses
- Easily adapted to field use

## Quick

- 2 test results in 24 hours or less
- Less than 1 minute hands-on time
- No preparation or cleaning time

## Accurate

- 1 CFU/100ml sensitivity
- No heterotrophic interference

## Economical

- Shown to be less expensive than MF or MTF
- No expensive equipment required
- 12-month shelf life reduces waste

## Proven

- In *Standard Methods*
- Approvals include: USEPA, AOAC, NCIMS and MOH Japan

To order a starter kit now, or for more information, call, fax or write:

### IDEXX Laboratories, Inc.

One IDEXX Drive  
Westbrook, ME 04092

Tel 207-856-0300 or 800-321-0207  
Fax 207-856-0630

**IDEXX**

IDEXX Laboratories, Inc. — Makers of SNAP™ Residue Tests

© IDEXX 1994 202.601E-ES 1.94

# We can help you sleep at night.



**Are changing regulations keeping you up at night? Do you worry that inaccurate tests may make you unnecessarily discard milk? Do you worry about certification?**

### **Stop worrying!**

Charm Tests have never let you down. And they won't now. The FDA Study and every study to date have shown that no other technology can match Charm Tests for:

#### **Selectivity**

Charm achieved 0/30 selectivity for all tests approved. No other test can match that record - no false positives.

#### **NAPS**

For all the major drugs in use, Charm tests produce the fewest NAPS (Non-Actionable Positives).

#### **Interferences**

No interference from: butterfat; legal metabolites of ceftiofur; bacteria; sanitizers, etc.

#### **Reliability**

From lot to lot, operator to operator, assay to assay

### **Multi-Matrix**

Charm tests work on frozen milk, pasteurized milk, skim milk, condensed milk, powdered milk, bucket milk, cream, whey, tissue, urine, feed, etc.

### **Data Collection**

C1Soft and C2Soft Charm software automate data collection and reporting.

### **Broad Use**

Charm Tests include the only test that detects all six target beta-lactam drugs in a single assay. Charm tests also detect sulfa drugs, tetracyclines, chloramphenicol, aminoglycosides, novobiocin, spectinomycin, and macrolides. Charm Tests meet *all* drug testing requirements of PMO Appendix N.

Dairies, regulators and government agencies around the world rely on Charm Tests. They can sleep at night. How about you?

## CHARM SCIENCES INC.

36 FRANKLIN STREET MALDEN MA 02148 U  
617 322-1523 FAX 617 322-31

Please circle No. 186 on your Reader Service Card  
IAMFES Sustaining Member  
1994 Exhibitor

**Nothing works like a Char**

