

ISSN: 1043-3546

EXP 91/12
UNIVERSITY MICROFILMS
INTERNATIONAL
300 NORTH ZEEB ROAD
ANN ARBOR, MI 48106

May • 1991

502 E. Lincoln Way • Ames • Iowa • 50010

Vol • 11 • No. 5 • Pages 245-296

DAIRY, FOOD AND ENVIRONMENTAL

SANITATION

MAY 1991



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

The Best Defense is a Good Offense

Especially when you have three proven
offensive weapons in your arsenal to detect milk
that's contaminated by antibiotic residue.

Signal® ForeSite™ gives you a rapid and accurate determination of sulfamethazine or gentamicin in milk, urine, serum, tissue or feed.

You can see results in only four minutes. This reliable screen test is an enzyme immunoassay that works fast to give you a clear and accurate answer to whether you do or do not have unacceptable residue levels in your milk. Simply put, when you use the Signal ForeSite test, seeing is believing.

User friendly. Signal ForeSite comes with an easy-to-follow procedure sheet.

Penzyme® III detects all beta-lactam and cephalosporin antibiotics in milk.

Penzyme is a quick, simple, economical and reliable screen test. It's enzymatic, colorimetric method rapidly determines the presence of antibiotic residues in milk. How quick? Penzyme gives you a "yes" or "no" answer in about 15 minutes. Beef up your defense with good, offensive weapons that will defend you from the problems that could result from undetected antibiotic residues.

In your lab or on your producer's farm, establish your antibiotic residue avoidance program with Signal ForeSite and Penzyme.

Contact your SmithKline Beecham Representative or call or write us for additional information on Signal Foresite or Penzyme.

SB
SmithKline Beecham
Animal Health

812 Springdale Drive • Exton, PA 19341
1-800-366-5288

Stop by our Exhibit at the IAMFES Annual Meeting

Please circle No. 218 on your Reader Service Card

Penzyme is licensed from UCB Bioproducts

Other IAMFES Publications

IAMFES also publishes:

- Procedures to Investigate Foodborne Illness
- Procedures to Investigate Waterborne Illness
- Procedures to Investigate Arthropod-borne and Rodent-borne Illness
Used by health department and public health personnel nationwide, these manuals detail investigative techniques and procedures based on epidemiologic principles for the identification and analysis of illness outbreaks and their sources.
- 3-A Sanitary Standards for Dairy and Egg Processing Equipment
Formulated by the cooperative effort of industry and regulatory groups, the standards represent criteria for the cleanability of dairy and egg processing equipment. The standards cover materials and fabrication of the equipment design.

For order information, check the appropriate boxes, complete the return address and return to IAMFES.

MOVING? IAMFES would like to know.

Please affix the mailing label from this issue or print your old address here.

Name _____
Company _____
Address _____
City _____ State/Province _____ Zip _____

Print or type your new mailing address here.

Name _____
Company _____
Address _____
City _____ State/Province _____ Zip _____
New Phone Number _____

Mail this form to:
IAMFES - Membership Dept.
502 E. Lincoln Way
Ames, IA 50010

Or call us at:
(800)369-6337
(515)232-6699
FAX (515)232-4736

Name _____
Address _____
City _____ State/Prov. _____
Zip _____ Phone _____

Place
Stamp
Here

DFES
5/91

IAMFES

502 E. Lincoln Way
Ames, Iowa 50010

Place
Stamp
Here

DFES
5/91

IAMFES

502 E. Lincoln Way
Ames, Iowa 50010

SERVING-UP PEACE OF MIND



Real peace of mind comes from going with the best. That's what you get when food service managers are certified by the Food Protection Certification Program from Educational Testing Service (ETS).

No one has a better reputation for developing tests than ETS. In forty years, we've built a solid international reputation in testing—and meeting the changing needs of business, industry, and education.

Put us to the test. We've earned the respect of our clients—both large and small. How? With a highly reliable, nationally recognized test, and efficient, flexible service. Consider what we offer:

Fast test turnaround—Just two weeks to set up your test program with final score reports delivered promptly.

Built-in security safeguards—Our test is also virtually tamper-proof and secure.

You also benefit from our many critical links to the food industry. An independent national Advisory Council, whose members include representatives from state and federal agencies, as well as private industry, is one example. Another is our representation on committees working to set national industry standards for food sanitation.

Find out for yourself the many ways our program can help you develop a better-trained, more knowledgeable staff of food industry professionals.

Call us toll-free at 1-800-251-FOOD or write: (3663)

Ms. Betsy Willey, Program Director
Educational Testing Service
PO Box 6515
Princeton, NJ 08541-6515



**Food Protection
Certification Program**
from Educational Testing Service

Thoughts From The President . . .



By
Bob Sanders
IAMFES President

We have just completed the spring board meeting and I am sitting in the airport at Louisville on Sunday morning waiting for my flight back to Washington. I might as well get out the laptop and put down some of my thoughts while they are still fresh in my mind - as long as the battery holds out.

The board and the local arrangements committee had an opportunity to take a tour of the facilities at the Galt House and they appear to be more than adequate to meet our needs for the annual meeting. The exhibition area will very easily accommodate more than 60 exhibitors and the meeting rooms will be more than adequate for our general sessions and symposia. In reviewing the preliminary program with Damien Gabis, the board had decided to add an additional symposium to the Wednesday session. The topic will be Aseptic Packaging. The final details have not been worked out at this time but I'm sure that it will be an interesting and informative session.

Considerable time was spent in reviewing the budget for the coming year. The good news is that we should be in the black again this year, unless of course we encounter some unexpected costs. The flip side of this is that because of rising costs of postage, printing and other costs and the need to expand, we were forced to increase dues for the coming year. The increase will be small in nature and will raise the regular membership dues from \$40 to \$50. Other classes of membership also will be raised proportionally. There was considerable discussion by the board members on this subject before a final decision was reached. However, we realized that if IAMFES is going to continue to grow and to continue providing the present rate of services to the membership we must do this. In my opinion, even at this rate, it is still very inexpensive to be a member and reap the benefits of the world's outstanding Sanitarians organization.

Mike Doyle, although unable to attend due to another scheduled commitment, did report by correspondence that several of our committees have been hard at work since our last meeting. The committee for Communicable Diseases Affecting Man is in the final stages of completing their new booklet on HACCP. Hopefully this will be printed and available for sale by the time of our annual meeting in July. The Dairy Quality and Safety committee is hard at work on a Dairy Employees Pocket Guide, this also may be available for the meeting. The Sanitary Procedures committee will be meeting with the 3-A Sanitary Standards committee in May in Milwaukee and hopes to wrap up the final revision of the 3-A Accepted Practices for HTST and HHTS Pasteurization Systems. This revision will not be available for the July meeting but should be available next year.

Steve Halstead reported that the ballots are coming in for the vote on the new IAMFES Secretary and for the vote on the name change. It looks like my battery is getting low so I will close for now and finish this when I get home.

Well here it is Monday morning and I'm back at the office. I will add a few more notes on the board meeting activities and get this off to Margie.

The Affiliate Council will meet on Saturday, July 20th this year. The change was made so this meeting would not conflict with the many committee meetings that are usually held on Sunday. Efforts are still going on to establish several new affiliates. A group from Oregon has met and are planning to reestablish the Oregon Affiliate. Meetings have been held in Maryland and there is hopes for a Maryland Affiliate. Work is continuing with the members in England and Europe to form a European Affiliate. I have also received an inquiry from the Health Officers Association of South Africa asking what would be necessary for them to become affiliated with IAMFES. Correspondence is continuing with them. Perhaps I will have something further to report on new affiliates at the annual meeting.

The Board has submitted a proposed addition to the Bylaws to the Constitution and Bylaws committee for their review and submission to the members for vote at the annual meeting. This addition deals with Indemnification of officers, employees and agents of IAMFES.

That's about all the news I can think of for this month. See you next month.

(CORRECTION: The March column stated that the workshop on "Investigation of Foodborne Disease Outbreaks" will be held on July 28th and 29th. The correct dates are Friday, July 19th and Saturday, July 20th).

On My Mind . . .

By
Steven K. Halstead
IAMFES
Executive Manager



. . . is the state of science education

I went to a science fair last night. I had to. My 12-year old son had a project in it. He had to. It gave me a chance to assess the state of science education, at least in our school district.

In our school (K-12 enrollment is less than 700), all sixth graders are required to have a science fair project. (It is optional with the junior and senior high students). James' project was a study of the anti-bacterial properties of three kinds of hand soap.

His dad insisted that he follow the scientific method and control as many of the variables as possible. Aside from consulting and support (read that "threats") he did the work himself. He did it well and won first place. (Sure, I'm proud of him. Why else would I write this?)

That also meant that he was to take his project to the show at the Junior-Senior High Science Fair. (And that meant that I got to go.) He wasn't in competition this time - he was just there to show his project and to bask in the recognition.

Since one can spend just so much time standing around saying "That's my son ... Ya, first place," I looked at the other projects. I ended up wishing that James had been in the competition. I think he would have done very well.

Keep in mind that these 7th-12th graders had volunteered to enter the science fair. This implies that they have an above average interest in science. Judging by the knowledge of the scientific method (and of science in general) demonstrated, the future had better be user friendly. Very user friendly!

The second project I looked at caught my eye. "Which is the Best Replacement for a Fuse?" The choices: a penny, a nickel, a screwdriver or a nail. "Procedure: Hook up a battery, a meter and a fuse with wires. Read the meter reading. Take out the fuse and replace it with the test object. Record the meter reading and compare that to the reading

with the fuse in place." Conclusion: All of the test objects were just as good as a fuse! The kid wants to be an electrician! Since he was just a seventh grader, maybe he will learn why fuses are used before he finishes his BS. I hope so!

Another one that interested me was whether a lens could be made out of ice. The conclusion was "No" because it wouldn't reflect enough sunlight to catch a piece of paper on fire! Another seventh grader.

My favorite was the tenth grader (obviously taking biology) who wanted to test the effects of microwaves on the growth rate of plants. Her procedure was to place various kinds of seeds in the microwave and zap them. She then planted the seeds and recorded the results.

None of them grew so her conclusion was that radiation is harmful to living things and we should outlaw nuclear weapons. (For you science fans, had she used corn seeds, she would have popped them with the length of exposure she used!)

In fairness, there were some well thought-out and well done projects where the methodology, data, analyses, and conclusions were proper. But they were outnumbered.

What can be done? Believing that change comes about just one small step at a time, I have volunteered to either help the kids with next year's projects or to judge the entries. (I'd rather do the former!) I also said I'd come teach a class or two at any level on "What's a Science Fair Project." If the school will let me do this, I guarantee that those kids will know what the scientific method is when I get done with them!

When was the last time you went to a science fair? I urge you to seek one out and go. But be prepared to be shocked and maybe a little upset with what you see. Who knows, you might be upset enough that you'll be motivated to make an effort to cause a change. I know I was.

**When was the last time you went to
a science fair? Be prepared to be shocked.**

IAMFES Sustaining Members

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

Access Medical Systems, Inc., 21 Business Park Drive, Branford, CT 06405; (203)481-3073

Acculab, Inc., 700 Barksdale Road, Newark, DE 19711; (302)292-8888

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

Alpha Chemical Services, Inc., PO Box 431, Stoughton, MA 02072; (617)344-8688

Amersham International P.L.C., Little Chalfont, Buckinghamshire, England HP7 9NA; 0494-432930

AMPCO Pumps, Inc., 1745 S. 38th Street, Milwaukee, WI 53215; (414)645-3750

Analytical Luminescence Laboratory, Inc., 11760 E. Sorrento Valley Road, San Diego, CA 92121

Anderson Chemical Co., Box 1041, Litchfield, MN 55355; (612)693-2477

Anderson Instrument Co., RD #1, Fultonville, NY 12072; (518)922-5315

Applied Microbiology Inc., 455 1st Avenue, RM 953, Brooklyn, NY 10016; (212)578-0851

APV Crepac, 9525 W. Bryn Mawr Avenue, Rosemont, IL 60018; (708)678-4300

Associated Milk Producers, Inc., PO Box 397, Schaumburg, IL 54166; (715)526-2131

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

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

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

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

Carnation Co., 5045 Wilshire Boulevard, Los Angeles, CA 90036; (213)932-6159

Centrico Inc., 725 Tollgate Road, Elgin, IL 60123; (708)742-0800

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

Chem-Bio Labs, 5723 W. Fullerton, Chicago, IL 60639; (813)923-8613

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

Commercial Testing Lab., Inc., PO Box 526, Colfax, WI 54730; (800)962-5227

Control One, Inc., 26 Lafayette Street, Stamford, CT 06902; (203)359-0909

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

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

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

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

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

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

Diversey Corp., 1532 Biddle Avenue, Wyandotte, MI 48192; (313)281-0930

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

Educational Testing Services, 2250 Langhorne-Yardley Road, Langhorne, PA 19047; (215)750-8434

F & H Food Equipment Co., PO Box 398595, Springfield, MO 65808; (417)981-6114

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

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

FRM Chem, Inc., PO Box 207, Washington, MO 63090; (314)583-4366

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

Gene Trak Systems, 31 New York Avenue, Framingham, MA 01701; (617)872-3113

Gist-brocades Food Ingredients, Inc., 2200 Renaissance Boulevard, King of Prussia, PA 19406; (800)662-4478

Go-Jo Industries, Inc., PO Box 991, Akron, OH 44309; (800)321-9647

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

Iowa Testing Laboratories, Inc., P.O. Box 188, Eagle Grove, IA 50533; (515)448-4741

Integrated BioSolutions, Inc., 4270 U.S. Route 1, Monmouth Junction, NJ 08852, 908-274-1778

KENAG/KENVET, 7th & Orange Street, Ashland, OH 44805; (800)338-7953

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

Kraft General Foods, 801 Waukegan Road, Glenview, IL 60025; (708)998-3620

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

Michelson Labs Inc., 6280 Chalet Drive, Commerce, CA 90040; (213)928-0553

Micro Diagnostics, Inc., 421 Irmen, Addison, IL 60101; (800)634-7656

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

Milk Industry Foundation, 888 16th Street, NW, Washington, DC 20006; (202)296-4250

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

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

The Pillsbury Company, 311 Second Street, SE, Minneapolis, MN 55414; (612)330-5427

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, Inc., 1304 Halsted Street, Chicago Heights, IL 60411; (708)756-3210

SmithKline Beecham Animal Health, 812 Springdale Drive, Exton, PA 19341; (800)877-6250, ext. 3756

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

The Stearns Tech Textile Co., 100 Williams Street, Cincinnati, OH 45215; (513)948-5292

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

Troy Biologicals, Inc., 1238 Rankin, Troy, MI 48083; (313)585-9720

Unipath Co., Oxoid Div., 9200 Rumsey Road, Columbia, MD 21045-1934; (301)997-2216

Vicam, 29 Mystic Avenue, Somerville, MA 02145 (617)623-0030

Vitek Systems, 595 Anglum Drive, Hazelwood, MO 63042; (800)638-4835

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

Webb Technical Group, Inc., 4320 Delta Lake Drive, Raleigh, NC 27612; (919)787-9171

Weber Scientific, 658 Etra Road, East Windsor, NJ 08520; (609)426-0443

West Agro Inc., 11100 N. Congress Avenue, Kansas City, MO 64153; (816)891-1558

Westreco Inc., 140 Boardman Road, New Milford, CT 06776; (203)355-0911

Dairy, Food and Environmental Sanitation **CONTENTS**

Articles:

- The Role of the Food Service Operator in Primary Health Care at the Food Consumption Point**250
Satyakam Sen

- Workings of An Environmental Health Court**256
Larry E. Potter

- Milking Hygiene, Milking and Mastitis**260
Jörn Hamann

- The Yogurt Story - Past, Present and Future Part II**265
Ebenezer R. Vedamuthu

News268

- Dupont Announces Food Packaging and Environmental Awards Winners; "Safe Food: You Make the Difference" Video Available; Tight Regulatory Budget will Challenge Food Safety Efforts
*** and much more ***

- Food and Environmental Hazards to Health**272

- National Mastitis Council Update**276
Teat Dip Testing Methods

Association News:

- Thoughts From the President246
On My Mind247
Sustaining Members248
Synopsis of Papers for the 78th Annual Meeting283
Affiliate News284
Foodborne Workshop285
Procedures to Investigate Foodborne Illness Workshop Announcement285
Affiliate Officers286
IAMFES Annual Meeting Registration Forms288
New IAMFES Members291

Industry Products277

Federal Register281

Updates282

Book Review290

- "Food Service Sanitation - A Certification Coursebook"

Business Exchange292

- "Classifieds"

Coming Events293

Index of Advertisers294

IAMFES Booklet Form295

IAMFES Membership Application296

ABOUT THE COVER . . . Photo courtesy of Michigan Travel Bureau, Lansing, MI.

Dairy, Food and Environmental Sanitation (ISSN-1043-3546) is published monthly by the International Association of Milk, Food and Environmental Sanitarians, Inc., executive offices at 502 E. Lincoln Way, Ames, IA 50010. Printed by Heuss Printing, Inc., 911 N. Second St., Ames, IA 50010. Second-class Postage paid at Ames, IA. **POSTMASTER:** Send address changes to Dairy, Food and Environmental Sanitation C/O IAMFES, 502 E. Lincoln Way, Ames, IA 50010-6666.

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.

Manuscripts: Correspondence regarding manuscripts and other reading materials should be addressed to Margaret Marble, 502 E. Lincoln Way, Ames, IA 50010-6666. 515-232-6699.

"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. 502

E. Lincoln Way, Ames, IA 50010-6666. Note: 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, 502 E. Lincoln Way, Ames, IA 50010-6666.

Subscription Rates: \$100.00 per year. Single copies \$10.00 each. No cancellations accepted. U.S. FUNDS ONLY.

Sustaining Membership: A sustaining membership in IAMFES is available to companies at a rate of \$400 per year, which includes \$100 credit toward an ad in the "annual meeting issue" of the Journal, the July issue. For more information, contact IAMFES, 502 E. Lincoln Way, Ames, IA 50010-6666, 515-232-6699.

The association is available to individuals only. Direct dues are \$40 per year and include a subscription to Dairy, Food and Environmental Sanitation. Direct dues and the Journal of Food Protection are \$70.00. Affiliate and International Membership include both journals for \$70, plus affiliate dues. Student membership is \$20.00

per year, with verification of student status, and includes Dairy, Food and Environmental Sanitation or Journal of Food Protection. No cancellations accepted.

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., 502 E. Lincoln Way, Ames, IA 50010-6666, 515-232-6699.

Postage: Canada and foreign add \$15 PER journal subscription. U.S. FUNDS ONLY. ON U.S. BANK. Single copies add \$7.00.

IAMFES EXECUTIVE BOARD

President, Robert Sanders, PHS/FDA, 200 C St. SW, Washington, D.C. 20204, 202-485-0138.
President-Elect, Damien A. Gabis, Silkler Labs, Inc., 1304 Halsted St., Chicago Heights, IL 60411, 708-756-3210.
Vice-President, Michael P. Doyle, Dept. of Food Science, GA Exper. Station, University of Georgia, Griffin, GA 30223; 404-228-7284
Secretary, Harold Bengsch, Springfield/

Green Co. Health Dept., 921 W. Turner, Springfield, MO 65803, 417-864-1657.
Past President, Ron Case, Kraft General Foods, 801 Waukegan Rd., Glenview, IL 60025, 708-998-3630
Affiliate Council Chairperson, Dr. Ronald H. Schmidt, Food Science Dept., University of Florida, Gainesville, FL 32611, 904-392-1991.

Executive Mgr., Steven K. Halstead, 502 E. Lincoln Way, Ames, IA 50010, 515-232-6699.

EDITORS

STEVEN K. HALSTEAD, *Managing Editor*, 502 E. Lincoln Way, Ames, IA 50010, 515-232-6699.
MARGARET THORNTON MARBLE, *Associate Editor*, 502 E. Lincoln Way, Ames, IA 50010, 515-232-6699.
HENRY ATHERTON, *Technical Editor*, 8 E. Terrace, S. Burlington, CT 05403

EDITORIAL BOARD

K. ANDERSON Ames, IA
H.V. ATHERTON Burlington, VT
K.J. BAKER Rockville, MD

S. BARNARD University Park, PA
H. BENGSH Springfield, MO
F. BODYFELT Corvallis, OR
J. BRUHN Davis, CA
J. BURKETT Sioux City, IA
J. CHAMBERS West Lafayette, IN
W. CLARK Chicago, IL
W.W. COLEMAN St. Paul, MN
O.D. COOK Rockville, MD
R. DICKIE Madison, WI
F. FELDSTEIN Culpeper, VA
R. FUQUA Mt. Juliet, TN
J. GERBERICH Eau Claire, WI
P. HARTMAN Ames, IA
C. HINZ Le Roy, WI
D. JOLLEY Bradenton, FL
W. LAGRANGE Ames, IA
J. LITTLEFIELD Austin, TX
P. MARTIN Warrenville, IL
J. MIRANDA Los Angeles, CA
D. NEWSLOW Orlando, FL
D. PEPPER Sioux City, IA
M. PULLEN St. Paul, MN
J. REEDER Arlington, VA
D. ROLLINS Springfield, MO
R. SANDERS Washington, DC
P.C. VASAVADA River Falls, WI
E.O. WRIGHT Bella Vista, AR

The Role of the Food Service Operator in Primary Health Care at the Food Consumption Point

Satyakam Sen M.A., M.S., D. Phil.
80 Dogwood Lane, Bristol, Connecticut 06010

Introduction

The most significant event during the twentieth century in the health care service area was the formation of the World Health Organization. Since its inception the emphasis has been on providing "basic health services"(1) in the primary health care center. The goal is to achieve the optimal state of health for all. Primary health care is a grassroots approach to improve the health status for all people. The food-health service activity in primary health care can take place in the work environment, or food service establishment; whenever and wherever the individual comes in contact with the ingestion of food substances. The critical elements of the food supply system and their relationship with the customers health and well-being are addressed at the primary health care level.

A food service establishment becomes a primary health care site when the customer's food consumption point is recognized as a facility. The customer, of course, is the ultimate decision maker. The food service operator provides a high quality food product at low cost. The food service operator could be a valuable contributor to health services through a voluntary efforts by implementing safety-behavioral and intervention factors which are simple, practical and timely solutions to an existing problem. This paper examines the role of the food service operator in implementing the Self Care Action Program (SCAP) to insure the consumer's choice of effective food intake at the food consumption point to maintain and improve their state of health.

Primary Health Care and Food-Health Service

The modern health care delivery system is divided into three levels: primary (local), secondary (intermediate) and tertiary (regional or national). The basis of this classification is to provide health care services according to an individual's state of health and well-being. The primary health care services are concentrated on limited and common health problems. When the individual's health situation becomes serious and critical secondary and tertiary health services are provided (see fig. 1). The primary health care services are baselevel activities performed at "the point of initial contact between the members of the community and health services".(2) Primary health care is envisaged to undertake the appropriate measures for the first line of defense as health

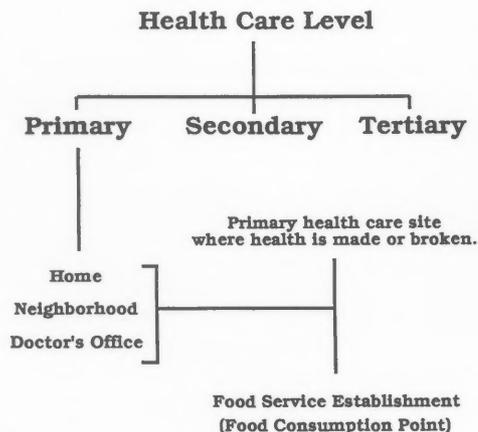


Fig. 1.

strategy where people live and work that "health is made or broken".(3) The individual and community involvement are vital elements of the primary health care system. They strengthen the local level infrastructure where the roles of food consumers, food suppliers and primary care providers can contribute to the achievement of the desired goals in the areas of disease prevention (food safety), health promotion (food selection), clinical medicine (food therapy) and rehabilitation services.

Food-health related activities, services and practices in primary health care at home, neighborhood or in the community, doctor's office or health facility would provide an opportunity for all persons involved in a food service establishment to participate in a comprehensive program for all food related health services.

The distinctive criteria at this level would be a liaison or partnership between the providers and consumers through voluntary efforts and participation rather than through implementation of stringent regulatory measures. The implementation of a self care action program (SCAP) requires the cooperation of food service operators and the consumer to prevent food contamination, promote health and well-being by the foods that are chosen at the food consumption point. The application of procedures and techniques vary from establishment to establishment due to the consumer's health status, the food supply (menu) and other relevant environmental conditions. (Continued on pg. 252)

VISIT US
AT THE
IFT EXPO,
BOOTH
#177

Our medium is our message.

Call 800-567-TEST for your FREE trial sample of any of these reliable OXOID Listeria diagnostic products. We'll let them do the talking for us.

Oxford Medium

Introduced to the U.S. by Oxoid, this selective and diagnostic medium is recommended by the IDF for the isolation of *L. monocytogenes* in milk and milk products.

NEW PRODUCT

PALCAM Medium

Utilizing a *double* indicator system that also identifies enterococci and staphylococci, this highly selective medium permits differential diagnosis of *L. monocytogenes*.

Listeria Enrichment Broth

This FDA-approved selective enrichment broth is formulated for the recovery of *Listeria* from dairy products.

MODIFIED Enrichment Broth

A modified formulation recommended by the IDF which reduces concentrations of Acriflavine from 15 mg/l to 10 mg/l. FDA-approved.

Selective Enrichment Media (UVM)

For the two-step selective enrichment method approved by the USDA for the isolation and cultivation of *Listeria monocytogenes* from meat products.



Unipath Co., (Oxoid Division)
P.O. Box 691, Ogdensburg, NY 13669 (800) 567-8378
217 Colonnade Road, Nepean, Ontario, K2E 7K3 (613) 226-1318

Marketplace to the world.

Chicago, October 26-30, 1991. The world's largest international showcase for food, dairy, beverage and pharmaceutical processors brings you everything that's new in equipment, packaging, supplies, ingredients, transportation and services. New this year... "Food Megatrends Conference." **FREE** to all processors.


**FOOD
& DAIRY
EXPO
91**

Admission to EXPO and all seminars is free to all processors. Use this coupon to pre-register for EXPO.

Please send me additional information on Food & Dairy EXPO '91

Exhibiting Attending

Name: _____ Title: _____

Company: _____

Address: _____

City: _____ State or Province: _____

ZIP Code: _____ Tel: _____

Please copy above or clip and return business card to register.
Mail to: Dairy & Food Industries Supply Association, Inc., 6245 Executive Blvd.,
Rockville, MD 20852-3938 USA

Food Consumption Point

The food consumption point can be defined as the site where the food material is received and consumed by the individual (see fig. 2). It is the end point of the environmental food system. The food consumption point is the link between the flow of energy from the external to the internal body environment. It constitutes the vital functioning of factors and elements which make up the preventive, promotive, curative and rehabilitative food-health care activities, services and practices.

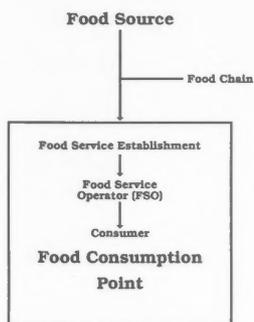


Fig. 2

The functional role of a food service establishment as a primary health care provider is quite contrary to the conventional system where the local health department could "padlock a restaurant" (4) by regulatory action. All activities of the primary health care provider should be performed through the voluntary efforts (self care) of the individual (food consumer) and through the provider (food service operator) to resolve the limited and common problems to insure that the health condition of the consumer or customer will not reach a serious and critical state.(5)

A food service establishment from the perspective of the food consumption point can be divided into two categories: where the food is prepared, served and consumed and where the food is prepared, served but not consumed, such as a take-out food establishment. The food consumption for take-out is not well defined because the consumer's food intake site is not visible and known to the food service operator. Therefore, unknown confounding variables, related to the health factors, would become difficult to establish in the cause and effect relationship of the food intake and an illness. At the food consumption point a favorable or unfavorable reaction of the ingested food substances could take place. Therefore, the role of the food service operator to supply safe and nutritious food and to establish a relationship of proper understanding for cooperation in order to achieve goals for health effectiveness and satisfaction of paramount importance.

The Customer

The primary objective of the customer's food choice at the food consumption point is to select the appropriate food substances according to the body's needs and its time clock requirements in order to maximize the highest level of physiological functional mechanism. Reaching this opti-

imum level of productive human activity will increase the life span and reduce the risk factors of illness. Of course, an infinite number of factors are involved in the consumer's choice of food. At the primary health care level the selection of food should be oriented towards the individual's health status.

At the food consumption point the customer must fully cooperate with the food service operator to achieve positive health effects from the food intake. The customer's decision process is based on accurate information in determining the acceptance or rejection of the food components as a voluntary defense against the risk factors which are related to illness. Balancing the excess-deficit of food intake ingredients for improving the quality of health and well-being is necessary. Therefore, the selection of a menu, an eating time, and the quantity of food intake are important. The choice of appropriate food substances by the customer at the food consumption point is adopting a self care action program which are important considerations which can make or break the body at the primary health care level.

The Food Service Operator

The food service operator obviously accepts certain charges at the food consumption point to supply adequate, nutritive and proper food for the consumer's health and well-being. The food service operator attempts to control risk factors associated with food substances prior to the customer's food intake. In essence, a food service operator plays a significant role in reducing the morbidity and mortality of the consumer by interrupting the casual factors of diarrheal diseases and the malnutritional cycle. Therefore, he/she becomes the prominent member of the primary health care team.

The food service operation in a facility depends upon the type of the food system in use, the adequacy of a food supply and also the consumer's need and demand of certain ingredients which vary "due to the different life style facilities"(6), socio-economic-environmental conditions and value judgements. As the health conscious Americans are demanding low salt, low fat, the calorie count, the menus of the food service establishments are designed to meet the customer's demand at the food intake point. The information included on the menu's by the food service operator to meet the customer's demand for health requirements may become an accepted health care practice in the near future.

The Food Service Operator and Primary Health Care Activities

The food service operator at any establishment is a primary health care provider. He assumes the responsibility of providing a safe food environment and also assists in selecting appropriate food substances for the customer so that the food substance consumed in his premises would contribute to building up the body. Each customer's need for specific health requirements, personal preferences and demands are different. At the food consumption point the food service operator has a real opportunity to increase the number of new and repeat customers by judiciously planning

the menu, providing a safe food environment and also by applying simple procedures, practical techniques and inexpensive solutions to food intake ingredients relating to the health situation of each customer or client. The operational strategies, guidelines and the evaluation of activities in a food service establishment should be well planned and executed by the food service operator, with the help of high quality performing employees, insure the health and well-being of all customers.

Conceptual Strategies

Historically and traditionally a safe food supply has become a major factor in public health activities by reducing the risk factors of foodborne illnesses which can lead to morbidity and sometimes mortality. The cleaning and sanitation practices in a food service establishment are considered to be preventive and precautionary measures to provide safe food to the consumer. The three techniques (the Inspection Report Form, a Hazard Analysis Critical Control Point and a Sanitary Assessment of Food Environment) are applied to evaluate the state of the sanitary conditions by field observations. The conceptual aims of the three techniques are to make food safe from microbiological contamination and hazards though the evaluation perspectives of the three approaches all of which are different. The Inspection Report Form reveals conditions of food environment by field identification of contamination sources. The Hazard Analysis Critical Control Point concept evaluates the risk factors associated with the food, along with its flow process steps, e.g. cooking, food handling after cooking, cooling, reheating, storage, etc. in the food service operation. The objective of the Sanitary Assessment of Food Environment is quality assurance through self inspection and self regulation. However, it is difficult to determine how safe a food substance is in terms of health and well-being.

Customers often select food depending on availability, price, convenience and socio-cultural factors rather than on biological and health maintenance needs. Therefore, the health status information of the client population is pertinent to the food service operator. It is also helpful for preparing menus.

The client population can be divided into two categories based on food intake:

1. Selective food intake for the general population to remain in a symptomless state which could be linked with fitness programs (weight control, exercise, nutrition, stress management, etc.) to improve the quality of life as well as a state of well-being.
2. Prescriptive food for a specific population, e.g. infants, elderly, pregnant population, substance abusers, eating disorders and those who are suffering from a state of malnutrition.

The proper assessment of the food supply and to prepare healthy eating menus appropriate for each client requires health status information of the customer population. Behavioral techniques should be applied in the promotive approach of food selection where food habits, food environment, food systems, and food infrastructure all play an important role in the customer's selection of an eating place and as well as the menu items chosen for food intake.

Food therapy is of prescriptive and clinical in nature. It is an intervention method widely practiced by clinical, behavioral and holistic (traditional) practitioners. In prescriptive treatment, the physician, after diagnosis or evaluation, either attempts to treat by changing patient's diet or refers the patient to a nutritionist or behaviorist to improve the food intake behavior.

Self Care Action Program (SCAP)

The Self Care Action Program or SCAP is based on the principles of a self care health practice where the individual assumes responsibility to perform certain tasks to prevent illness, promote health and well-being. The therapeutic-clinical intervention is under the guidance of physicians and health professionals. The SCAP at a food service establishment will place the emphasis on the activity of the food service employees concerning the customer involved at the site for the proper food intake, eliminating the potentialities of breaking the equilibrium of the health state. The interaction between the food ingredients obtained from the environment and the consumer's health condition at the food consumption point where the biological and environmental time clocks play a significant role in the voluntary decision making processes based on objective findings and subjective reasonings.

The SCAP is an action oriented program for attempting a continuous improvement of the conditions of the food safety plus the health status of the consumer. The food service operator in an establishment should develop operational guidelines based on a strong commitment in a team approach. The procedure of SCAP are similar to the Japanese "Just in Time" (JIT) management philosophy which means providing health care of the customer at the food consumption point whenever and wherever the food substances are implicated either to disease risks or improving the health status of the customer. This JIT principle is incorporated in SCAP with a view to improving the performance level of multiskilled food service operators, assessing environmental conditions to determine health risks, profitability of the establishment along with the customer's satisfaction and an effective health care delivery service to improve the customer's health status after the food intake. The goal of the food service operation from the viewpoint of primary health care is to reach "no error" situation similar to making the effort for attaining "zerolevel risks" from microbiological and toxicological contaminants in the food substances. The voluntary efforts, cooperation and sharing amongst all participants or persons involved at this level is the key to the success of the SCAP.

The SCAP activities in the food service operation are based on the human factor not the food product. They address the interaction of two distinct variables: food substance as an environmental agent and the response of the human body to the food intake. The determination of either acceptance or rejection of the food substances are the criteria of the program. The SCAP activity in the food service operation has two distinct areas: the environmental safety of the food substances (food quality and sanitation practices) and the consumer's health status (see fig. 3).

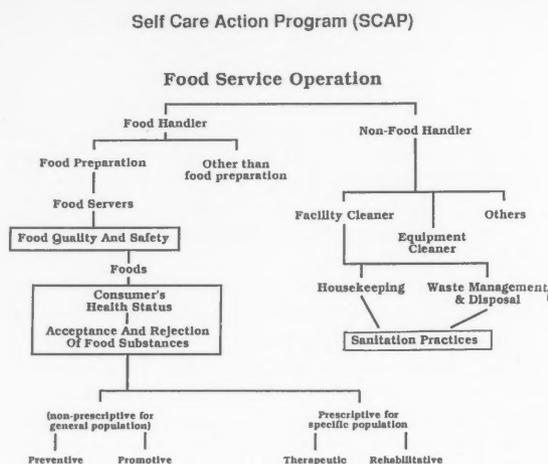


Fig. 3

The food service operator implements SCAP by setting up the operational activities at the establishment in the following areas:

I. Customer Survey

Detailed information about the customers such as lifestyle, types of occupation, budget limitation, etc. based on a survey from the standpoint of food consumption and an individual's health requirements are useful to formulate SCAP. The consumer population can be classified into two categories, general and specific so that preventive (food safety issue), promotive (behavioral and educational activities), therapeutic (clinical) and rehabilitative needs are met via metabolic absorption processes of the ingested substances. The various other related information for planning and designing SCAP should be incorporated so as to increase the statistical number of new and repeated customers.

II. Menu Determination and Planning

Numerous factors and elements such as customs, food preferences, food system, food availability, socio-economic setting, etc. should be taken into consideration for the menu planning. The goal is customer's acceptance of the food items as listed in the menu. Most often the dilemma that is confronting the issue is, attractive versus healthful food. One should remember that menu flexibility and its cost-effectiveness have considerable impact on improving customer's health standards.

III. Human Factor Management

This is the basic ingredient of SCAP. The management practices should aim for attaining optimum service input with efficiency from personnel for serving safe and appropriate food to the customer. The main objective is to reduce morbidity caused by mistakes and faulty practices of food service personnel. Food service operators and employees prime responsibility is to eliminate all causes of foodborne illness resulting from errors of human

factors and contamination of food environment which "interrupts the vicious circle of diarrheal-malnutrition"(7) plus economic losses.

IV. Information Dissemination

The effective communication amongst food service personnel and between food service operators and customers are the keys to the success of food related health services in the establishment. The food service personnel should be well informed on all aspects of the food health related services to the customer. The food service operator should provide appropriate information to the general consumer and should also assist the specific therapeutic population to minimize the interference of metabolism via ingested food substances.

V. Evaluation

The evaluation strategies and procedures of SCAP should be simple, feasible, cost effective and health oriented. Its methodology should include both objective and subjective methods depending upon the circumstances (see fig. 4). The format or guidelines cannot be homogenized. The evaluation basics are dependent upon variables such as the available food substances, the human body and time clock and their interaction phenomenon.

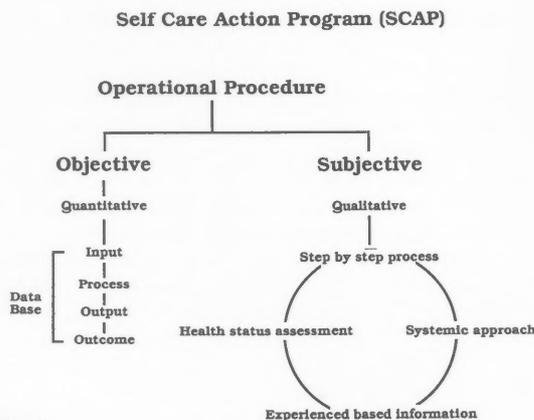


Fig. 4.

The objective-quantitative evaluation includes the classical database (input-process-output-outcome) approach. The spot checking (Inspection Report Form), sequential investigative activity (Hazard Analysis Critical Control Point) and effective coordination through self inspection procedures (Sanitary Assessment of Food Environment) are useful preventive measures which could be incorporated in SCAP activities. In SCAP the caution is to be made that all approaches should be simplified and feasible for effective results. The subjective process is geared towards qualitative (non-quantitative indices) assessments by the sequential and step by step approach associated with the health status of the customer. The evaluation of SCAP is meaningful to the food service operator when its contents have the ability to resolve problems and improve the health condition of the customer.

The Role of the Food Service Operator

The unnoticed variable, time, make changes. The results of these changes will not be the same. Yesterday's food consumer was environmentally conscious, prevention oriented and demanded safety of the food from contamination. Preventive activities through regulatory measures based on the environmental standards were significant health service contribution to the community. In the last decade of this century, health care levels have been recognized to identify the processes occurring in the chain of events where the human responsibilities for health factors should be well defined and meaningful "to protect and promote the health of all people of the world".(8)

The role of the food service operator in an establishment at the primary health care level is significant because due to involvement of his/her activities and decision making processes, he/she is responsible for making or breaking the health of the consumer. The food service operator is concerned with three variables which are: the quality of food substances, the customer's health status and the food-environmental factors for preventing contamination.

SCAP should be implemented to provide the simple measures, procedures and solutions to the customer's health problem. SCAP is cost-effective, feasible and a strong primary health care weapon at the food consumption point. The effective communication and understanding between the food service operator and the customer are essential to apply the basic principles of SCAP. Human factors are responsible for the health care environment in which a solution can be offered to resolve problems so that the food items cannot be held responsible for causing the health deterioration of the consumer. Finally, the food service operator must determine what he/she can do and what he/she cannot do to improve and maintain the customer's health status at the food consumption point.

References

1. World Health Organization. Formulating Strategies for Health for All by the Year 2000. Guiding Principles and Essential Issues. Geneva, 1979 (Health For All Series, No. 2).
2. Klaczkowski, Bogdan M., Elling, Ray H. and Smith, Duane; Health System Support for Primary Health Care. Public Health Papers, No. 80, Geneva, World Health Organization, 1984.
3. World Health Organization. Global Strategy for Health for All by the Year 2000. Geneva, 1981 (Health for All Series, No. 3).
4. Meridith, J. C.; Environmental Health Services in Primary Health Care Centers; Journal of Environmental Health, Vol. 44, No. 2, 1981.
5. Fry, J.; "Information for patient care in the office based practice", Med Care, 11 (2) Supplement, 1973.
6. Mason, Jaqueline L., "Meeting the individual needs of a changing population", Provider, January, 1990.
7. World Health Organization: The Role of Food Safety in Health and Development. Geneva, 1984, (Technical Report Series, No. 705).
8. Alma-Ata Declaration for "an acceptable level of health for all the people of the world" in the International Conference on Primary Health Care held at Alma-Ata, USSR, September 12, 1978.

FREE SAMPLE



**SAVES TIME
AND MONEY**

**THE DILUTION BOTTLE THAT IS
CHANGING THE WAY
MICRO LABS OPERATE.**

**• PRE-FILLED • PRE-MEASURED
• PRE-STERILIZED**

Eliminate the aggravation, expense and wasted time of glass dilution bottles. Imagine no more washing, preparation and autoclaving.

Our new disposable bottles are sterile, inexpensive and come pre-filled to test dairy and food (Butterfield's Buffer), water/wastewater (Phosphate Buffered), or cosmetics and pharmaceuticals (Peptone Water).

To order, call your Laboratory Supply Distributor. For a free sample, call, write or use the Reader Service Card.



9 Blackburn Drive Gloucester, MA 01930
1-508-283-1800

Workings of An Environmental Health Court

Judge Larry E. Potter
Municipal Court, 201 Poplar Avenue, LL-06
Memphis, TN 38103

Historically, the courts had shown little interest in cases presented by the Health Department, Fire Department, Housing Authority or Codes Enforcement in general. Of course, in some highly publicized instances where food poisonings occurred, or deaths occurred in fires, the courts could react with righteous indignation. But the media tends to only cover the sensational and never concerns itself with the routine cases that you and I face on a day to day basis. Yet, these cases certainly have an affect upon the health and welfare of a community.

Nothing is more demoralizing for a food inspector or any codes inspector, to work hard preparing a strong case for court only to have the judge dismiss the case without a proper hearing.

In Memphis, prior to 1982, some cases did work their way into the municipal court system and the problems encountered were probably similar to those in your communities. The courts were overburdened with criminal cases and inspectors were required to wait long periods of time in court before their cases could be called. Citizens could not find where their cases were set. These cases would be systematically transferred from court to court on a monthly basis. Even those people who were familiar with the system had difficulty tracking their cases. This led to inconsistent decisions by the judges. Cases were continued or outright dismissed by the different judges. Due to judicial inattention, the various codes inspectors finally reached the point that they would rather do anything than take a case to court. As a result, they suffered from low morale. Why take anything to court, the judges just didn't seem to care? As a result, little was done to enforce environmental laws. To plagiarize a quote from Albert Einstein, "Nothing is more destructive of respect for the government and the law of the land than passing laws which will not be enforced".

Our citizens and many of our inspectors to some degree had lost respect for our court system. People would often blame the judges for the problems they encountered. After all, it was easy to hold the judiciary responsible for these difficulties. Yet, the real culprit was the system. The court system was not being responsive to these environmental problems.

With this background, we decided there had to be a better way of doing business, and in 1982, we established an Environmental Court. The first such court in the State of Tennessee and according to KAB sources, one of only a few in the United States.

The advantages of such a court were many. One judge was permitted to specialize in this area of the law. A special

docket was set aside so only environmental cases were to be heard. The inspectors cases were not mixed in with criminal matters. There was continuity in court decisions which established a precedent. As a result, inspectors had an idea of what to expect from the judge and vice-versa. Citizens who had an interest in environmental matters were now able to find the court, and believe me, they do come to court. In Memphis we have strong neighborhood groups, and they have an active interest in seeing the problems within their communities corrected. The judge also has the benefit of seeing repeat offenders. It is important that you remember that an individual is innocent until proven otherwise and it is incumbent upon the prosecutor to prove his or her case each time a person is charged with a violation of the law. If the judge finds a person guilty, he may then take into consideration that the defendant has been to the court on prior occasions. As a matter fact, I have seen some of these individuals to the point that we are almost on a first name basis.

Those are only a few of the tangible advantages of an Environmental Court. There are intangible considerations also. These intangible benefits include increased awareness of Environmental problems within the political power structure, the media and the community in general. The morale of the inspectors also improved remarkably.

We established the Environmental Court (docket) without incurring any additional cost to taxpayers. Let me repeat that, we were able to establish the Environmental Court without incurring any additional cost to the taxpayers. We transferred to one existing division of our municipal court, all cases involving Health, Housing, Fire, Building and Zoning Code violations.

When I explain how we were able to establish the court, the reaction I often receive is one of astonishment. It seems so simple and it can be. Yet we seem to make some things more difficult than they are. As E.W. Howe stated, "Some men storm imaginary Alps all their lives and die in the foothills cursing difficulties which do not exist". We didn't agonize over what the problems were that confronted us. We just did something to remedy these problems and it has worked.

Types of Cases Handled by the Court

The bulk of the cases heard in the court involve alleged Health Code violations. There are approximately twelve thousand (12,000) environmental complaints each year involving this area of the Code. The majority of these complaints are investigated by the Environmental Sanitation

Section, which is the oldest administrative unit within the Memphis and Shelby County Health Department. The Environmental Sanitation Section has seventy eight (78) employees and seven (7) administrative sub-sections including rural sanitation, litter and weed control, training/food borne outbreak investigation, urban sanitation and food service sanitation.

Environmental inspectors initiate court proceedings by one of two methods. A defendant may be served a court summons by either the warrant squad or a deputized member of the Health Department. This of course, requires the inspector to prepare the summons in a proper manner and the defendant is placed on notice of the charges he or she is to answer in court.

An Environmental ticket may also be issued by the inspector when they find a potential violation. The ticket is not as involved as the summons, but it does again place the defendant on notice as to the charges. When the defendant signs the ticket, or summons, he or she is not admitting guilt. They are only accepting service of process. If the defendant refuses to sign the ticket, or summons, the police are summoned and they may effect an arrest. If the defendant fails to appear in court as a result of either a summons or an environmental ticket, the judge may issue a warrant for the arrest of the person.

These inspectors investigate various Health Code violations which include but are not limited to rat infestation or rat harborage. In 1982, the Health Department received over seven hundred (700) complaints relating to rat infestation and forty-four (44) reported rat bite cases. These forty-four (44) individuals actually sought medical treatment. It is estimated that three times this amount may have suffered rat bites but did not seek medical treatment. The victims of rat bites are often small children or elderly individuals. Many of these cases involve accumulation of items which provide a breeding habitat for rats. As one can see these matters present a serious concern to the health and safety of our citizens.

Some of these cases also involve property owners who fail to cut the weeds and grass on their property. They also permit items to accumulate on the property which constitute not only a blight to the neighborhood but also a public nuisance. One would be surprised as to how high some grass and weeds will really grow if left alone. The surrounding property owners usually will come to court to testify as to the conditions of the alleged violation. This is because their neighbor's lack of concern affects their property value.

We also see cases involving defective plumbing which permits accumulation of water that provides a breeding habitat for mosquitoes and other unpleasant pests. In one particular case a single mother with small children, stood before the court crying. She explained how she had attempted to get her landlord to repair the defective plumbing but he refused to do so. She testified that one afternoon she found her small children outside playing in the raw sewage which was being outcropped onto the property. It did not take long for me to render a decision finding the defendant guilty. I explained that for each day the condition existed, the defendant would be fined fifty dollars (\$50.00) per day. He repaired the plumbing almost overnight.

In addition, we also see cases involving prohibited littering or illegal dumping. Several years ago, an estimated five thousand (5,000) illegal dump sites were located in Memphis and Shelby County. Illegal dump sites are like a cancer. If the area is not immediately cleaned up, it will only grow larger to the point that it becomes a major health hazard. The cleanup of these areas by the City is very costly to the taxpayers. That money could be used for other needs. It is amazing when you consider what happens to those materials which are illegally dumped. The dumped items will continue to collect until they decompose. It is astounding the period of time it takes for Mother Nature to decompose some items we use on an everyday basis. For instance, the styrofoam coffee cup everyone uses only takes ten (10) to twenty (20) years to decompose. A wooden stake will take approximately thirteen (13) years to decay. It will take a tin can eighty (80) to one hundred (100) years to disintegrate. Compare that to the normal life expectancy of people today. Oh yes, the plastic cover that we find on the six pack of beer or soft drinks that we purchase will decompose in only four hundred and fifty (450) years. A disposable diaper will take five hundred (500) years to break down and scientists do not know how long it will take for a glass bottle to decompose. Yet they theorize that the Statue of Liberty will decompose before a glass bottle does. Obviously these matters are serious and we need to educate the public as to the damage done to our environment when items are illegally disposed of.

The Health Department also has a very active Food Service Inspection Division. These inspectors respond to approximately fifteen hundred (1,500) complaints annually regarding some phase of food service. This includes some one hundred twenty (120) complaints of alleged food borne illnesses. Collectively they conduct more than fifty thousand (50,000) inspections and twenty thousand (20,000) of these inspections are food related involving restaurants, grocery stores, day care centers, personal care homes, bakeries, candy counters and concessions stands. The list goes on ad infinitum. When the Health Department administrative hearings and office conferences do not achieve the necessary results, as a last resort a case is prepared for court. These cases present some of the more unusual and interesting factual circumstances that we see in court. Some seem to be stranger than fiction.

One case involved an individual who was charged by the Health Department with allegedly selling adulterated food and selling meat without a permit. The Health Department inspector produced bloated cans of food at the trial and also explained that rat droppings were found in and around open bins of dry food. The witnesses produced by the City made an impressive presentation in the courtroom. Yet, the defendant tearfully explained that he was providing a service to the inner-city citizens who could not afford to purchase food at the larger supermarkets. He further explained that this was an example of the government trying to shut down a small businessman. I decided that I should visit the property and see firsthand if indeed the conditions were as the Health Department had indicated. I required all parties to meet me on the scene the following morning at 8:30 a.m.. The conditions of the business were deplorable and yes,

bloated cans of food were stocked on the shelves. Rat droppings were scattered across the floor. I was shocked at what I saw and quickly left, instructing the parties to meet me back in court within one hour. I found the defendant guilty of a continuing violation which the law permitted me to fine the defendant fifty dollars (\$50.00) for each day that the condition existed. The fines were in excess of nine thousand dollars (\$9,000.00) and shortly thereafter the defendant closed his business.

Some individuals will tell you that these Health Code matters are not significant. They are wrong - dead wrong, and it is this attitude that has given us the problems we have today environmentally.

Housing Code Violations

We also see a substantial number of cases involving Housing Code violations. These cases usually involve substandard housing. This is an area of the law that I expect to see a significant increase in activity. There are approximately eight thousand (8,000) complaints managed each year by Housing and Community Development. These cases often involve individual apartment owners sometimes referred to as "slum lords". Initially, I heard a good number of these cases because property owners actually refused to comply with the code. One case involved a family that did not have toilet facilities because the land owner refused to effect a repair of the property. The defendant was charged with a continuing violation and after a trial he was found guilty. When I explained that the fines would be several thousand dollars, he immediately repaired the plumbing.

Some of these Housing Code violations involve individuals who refuse to clean their property. These cases often involve abandoned or junked automobiles. One man had sixty (60) abandoned automobiles in a residential area. He explained that these cars were not junkers but were classic cars which he hoped to restore. He was found guilty and fined some nine thousand (\$9,000.00) dollars. After the shock of the fine passed, I asked if he wanted to save himself several thousand dollars. He said he would do anything, and I explained he could remove the cars. Within two weeks, the defendant returned with the inspector. The inspector to my surprise, said the defendant was now in compliance with the law. The defendant had removed all of the vehicles, and I remitted the fine substantially. The defendant, the inspector and the neighborhood were all pleased with the results. Six months later, the same defendant walked into court again with similar charges. This time the city alleged that he only had thirty (30) junked cars on his property. This again is one of the advantages of the court. The judge gets to see repeat offenders.

Building and Zoning Variations

The court also concerns itself with Building and Zoning Code violations. This is a complex area of the law. Most people including some lawyers are uninformed as to this complex body of law. These cases may involve individuals who use property in a manner which is not permitted by the Zoning ordinance regulations. These cases also involve various Building Code violations, Sign Code violations, Electrical, Plumbing and Mechanical Safety Code viola-

tions. Since the Environmental Court was established, the number of cases in this area has increased three hundred percent (300%).

Fire Code Violations

The last area of law that the court has responsibility for involves Fire Code violations. These matters obviously affect the health and welfare of our citizens, and unfortunately some of these cases involve fatalities. Fire Code violations may include charges relating to locked or blocked exit doors. Initially I tried several of these cases. It got to the point that when I would go into a restaurant I would not look at a menu first. I would instead look for the exit door and wonder if it were locked or blocked. In one case, the Fire Marshalls' made an inspection during a Friday night basketball game. There were several hundred people inside the gym. Seven of the eight exit doors were locked and chained. If a fire had occurred, the loss of life would have been staggering.

Other Fire Code violations include failure to remove hazardous materials, dangerous accumulations of waste materials, failure to install smoke detectors, failure to install proper fire protection systems and failure to secure vacant buildings. Many of the smoke detector cases involve fatalities of children. To see a child die as a result of someone's negligence is certainly a tragedy that cannot be adequately remedied.

The Court is Working

These are the types of cases heard by the court and the reason for the necessity of such a court. The docket on Friday afternoon averages between three hundred (300) to one thousand (1,000) charges, that is in our off season. During the summer months we may average from one thousand (1,000) to two thousand (2,000) charges per docket. This does not mean that we have that many individual defendants in court. Some defendants may have multiple counts on the docket. The inspector may allege that a continuing violation has occurred. For instance, the inspector may determine that the condition has existed for a period of time. If the proof verifies that fact, each day will be considered a separate violation. The judge may assess fines of fifty (\$50.00) dollars per day in these cases. Otherwise we are jurisdictionally limited to a fine of fifty dollars (\$50.00) plus court cost and litigation taxes.

I have tried to approach these problems in an innovative manner. As I explained heretofore, in some cases I have instituted on site inspections. In essence, I take the courtroom into the community, but only in selected cases. I will usually continue the case for several weeks before I visit the scene. The defendant will often bring his or her property into compliance by the date of the on site inspection. As the judge of the court, that is what I hope will be achieved. Compliance will benefit the neighborhood and the City in general. In some cases, I will issue warrants for people who refuse to come to court. When the warrant squad knocks on the defendant's door it usually serves to get their attention.

Has it had an impact in Memphis? Within two (2) years, we had reduced the number of reported rat bite cases by fifty percent (50%) and only ten (10) rat bite investigations were

made from July, 1986 to July, 1987. The Health Department deserves much of the credit for the reduction due to its rat abatement program. Yet, I would like to think that the courts efforts have aided their hard work. The real testimony as to the court has to come from those inspectors who can remember how it was in the past and how it is now. All of the municipal agencies who utilize the court indicate that the inspectors who come to the court are strong proponents of the concept. They feel that people are more likely to comply with their request. In addition, the community has become more aware of environmental problems.

No longer is it considered vogue or liberal to work in protecting the environment. It is now the common sense thing to do. No longer are just garden club members concerned about the beautification of our surroundings, entire communities have now become aware. Political leaders are making environmental protection part of their agenda. I have worked with the Environmentalists in Memphis and I have traveled across the country as an Evangelist preaching the benefit of the Environmental Court concept. I know you have worked hard over the years trying to get the attention of the public. We have tried to get the public to understand that you may disregard and ignore your environment, but you cannot escape it. These problems will not disappear. They will only become more significant and courage is needed to act now or it may be to late. As George Eliot wrote, "Necessity does the work of courage".

I view the Environmental Court as a unique partnership between Government and the community. This partnership is working to make our City and State cleaner for all of our citizens, particularly our children. That is what we are all about. We want to leave our children a cleaner and safer world. I want to close with the following from an unknown author.

An old man going along the highway came,
at the evening cold and gray to a chasm which was
vast, deep and wide; through which was flowing a
sullen tide.

The old man crossed at the twilight dim,
that sullen stream had no fears for him;
but he turned when safe on the other side;
and built a bridge to span the tide.

Old man, said a fellow pilgrim standing near,
you are wasting your strength with building here.
You have crossed this chasm deep and wide,
why build a bridge at the evening tide?

The builder lifted his old gray head and said,
good friend, in the path that I have come today,
there followeth me a youth whose feet too must
pass this way.

This chasm that has been naught to me, to
that fairhead youth may a pitfall be.
He too must cross in the twilight dim.

Good friend, I am building this bridge for him.

That folks is what we are doing. We are building a bridge for those who will come after us. We are building that bridge for our children. You and your efforts are our bridge over troubled waters.

This speech was presented by Judge Larry E. Potter on November 1, 1990, at the Southeast Region Annual Retail Food Protection Seminar in New Orleans, Louisiana. Judge Potter serves as the Administrative Judge of the Municipal Court in Memphis, Tennessee. He also presides over the Memphis Environmental Court. The first court of its type in the state of Tennessee and one of only a few such courts in the United States. Judge Potter has traveled extensively explaining the benefits of this innovative approach to Environmental concerns.

For further information you may contact Judge Potter at the following address:

Judge Larry E. Potter
Municipal Court
201 Poplar Avenue LL-06
Memphis, TN 38103

O₂/CO₂ Respirometer for Measuring Bacteria and Fungus Growth



The micro-Oxymax O₂/CO₂ Respirometer is equipped with O₂ and CO₂ sensors which monitor "head space" gas exchange produced by bacterial or fungal contamination in solids or liquids. Operates with 1 to 20 measuring chambers (supplied or user's own chambers) with volumes ranging from 50mL to 50L. Max. sensitivity is 0.2µL/hr. Fully automatic 24 hr. operation with periodic printouts under IBM-PC computer control. Applications are in monitoring aflatoxin contamination in grains, bacterial contamination in food, biodegradation of pollutants in water and soil, fermentation, etc.



Columbus Instruments

Post Office Box 44049
Columbus, Ohio 43204 USA

PH: (614) 488-6176 Toll Free: 1-800-669-5011
Fax: (614) 276-0529 TLX: 246514

Please circle No. 200 on your Reader Service Card

Milking Hygiene, Milking and Mastitis

Jörn Hamann

Institute for Hygiene, Federal Dairy Research Centre,
Hermann Weigmann-Straße 1, 2300 Kiel, Fed. Rep. Germany

Abstract

Mastitis is determined by the number and type of pathogens which gain access to the udder and the susceptibility of the cow. The efficiency of local (teat) defense mechanisms is influenced by the general health status of the cow and especially by the integrity of the teat tissue. Improved mastitis control measures should concentrate mainly on: i.) reducing the degree and duration of teat end contamination and the teat canal colonization and ii.) avoiding machine-induced circulatory impairment.

Udder preparation measures commonly used, such as foremilk, washing, drying, premilking, teat sanitation and procedures to minimize the transfer of pathogens between cows are discussed with special regard to control of mastitis caused by environmental pathogens. Machine milking predisposes mastitis mainly by movement of pathogens between quarters and changing the teat tissue integrity.

Studies of the biological responses of the teat tissue to conventional milking units show that mechanical milking always induces a significantly greater change in teat thickness in comparison with calf suckling. Preliminary results show a significant correlation between the increase in teat thickness after milking and the new infection risk. Dairy farmers and veterinary practitioners can measure the degree of machine-induced thickness changes by using a spring loaded caliper device ("cutimeter"). Based on such data, the function of the machine can be monitored and the mastitis risk can be reduced.

Introduction

Surplus production in many dairying countries has led to the introduction of special milk quality payment schemes and of quotas. Both factors have increased the economic pressure on dairy farmers very markedly. Today the improvement of bacteriological quality of milk is mainly a technical question related to the cleaning and disinfection equipment and the cooling installation capacity. Therefore the difficulties in principle to get a good bacteriological quality are relatively limited and usually easy to overcome. In contrast, it seems difficult under the conditions of modern dairy farming with increased herd sizes, despite the application of new information systems for objectifying decisions for selection, nutrition and disease, to ensure a good udder health and thereby a stable, low bulk milk cell count and a physiological composition of milk.

Two key factors determine the new infection risk of the mammary gland: i.) The level of exposure to pathogens ii.) The efficiency of the bovine defence mechanisms. Mastitis control methods based on integrated management techniques coupled with specific therapeutic and preventive measures are able to reduce the new infection rates markedly. Nevertheless there are many questions still open. For example the great variation in the pattern of infection between herds and the varying extent of success after application of identical control methods depending on the types of pathogens and environmental conditions. This paper covers some of the most important aspects of milking hygiene and milking in relation to mastitis. It also indicates some potential ways to improve the control of this multifactorial disease.

Milking Hygiene

General aspects

Hygiene means preventive medicine. Therefore milking hygiene in its broader sense may be defined as the sum of all methods to prevent diseases of the cow and related influences on the milk composition. In addition to the question of exposure to pathogens, the success of mastitis control measures will be determined by the efficiency of both the systemic defense mechanisms of the cow and the corresponding local systems in the teat end acting as the first barrier against invading microbes. In principle the new infection risk increases with increased milk yield (Fig. 1). A physiological threshold of milk yield per cow and lactation with regard to a sufficient function of the defense mechanisms is difficult to define and not available at present.

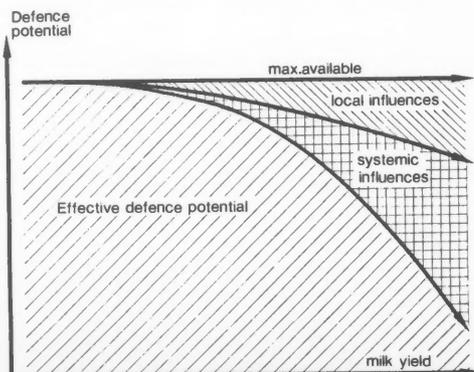


Fig. 1: Relationships between milk yield and effective defence potential against mastitis (Hypothetical model)

The so called optimizing of dairying has been done predominantly by increasing the yield per cow with different measures (genetic influences, feeding techniques, etc.) and not in relation to the udder health status after certain numbers of lactations. In addition cows have been selected especially based on milkability characteristics. With increased milk flow rates a greater teat canal diameter can be assumed. The next figure shows a relationship between milk flow rates and new infection risk (2).

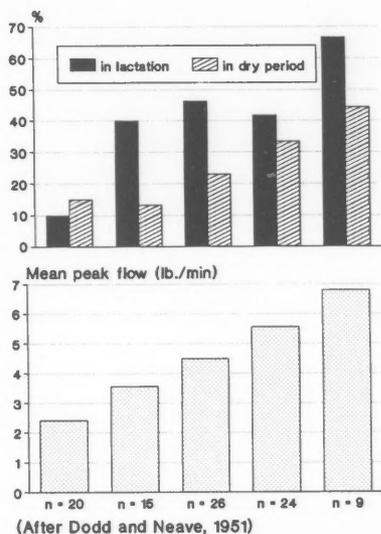


Fig. 2: Proportion of cows becoming infected in lactation and dry period related to mean peak flow of group (lb. min)

These results indicate that the new infection rate was increased not only during lactation but also during the dry period for cows with higher milk flow rates. Selection for high yielding cows may have resulted in two main problems related to the new infection risk: i.) especially during the early lactation metabolic disorders can reduce the efficiency of systemic defense mechanisms. ii.) increased teat canal diameter may offer a higher invasion risk. As conclusion for practical mastitis control it may be recommended: i.) to ensure especially during the early lactation period a feeding regime which maintains the cows in a metabolic balance and ii.) to avoid further selection of cows mainly based on extremely high peak flow rates.

Special aspects

Premilking udder preparation

It must be the goal of a good premilking udder preparation to reach a sufficient decontamination of the teat to ensure a good milk quality and to reduce the milking related infection risk.

Different opinions exist on the necessity and the ways for premilking udder preparation under the conditions of modern dairying including high yielding cows. The question "Is there really a need for premilking udder preparation?" has to be answered with a clear "yes, it is". The main reasons are the following: i.) examination of milk for signs of clinical

mastitis. ii.) decontamination of the teat skin. iii.) optimizing udder evacuation. i.v.) avoiding teat tissue damaging. All four aspects are involved in mastitis control and milk quality.

Foremilking covers three aspects: opening of the teat canal, examination of the secret quality and improvement of bacteriological quality of milk. If the foremilk indicates milk changes, the cow can be milked separately to reduce the risk of spreading the pathogens and contamination of the bulk milk. An effective premilking sanitation presupposes a suitable technique, a minimum requirement of around 0.2 min for teat washing, a sufficient concentration of the sanitizer (e.g. 100 - 200 ppm iodine), a period of around 30s that the sanitizer is in contact with the microbes and the final drying of the teats with paper towels.

A very useful alternative premilking sanitation procedure consists in predipping with germicides at 0.1% to 0.5% active ingredient which is done after foremilking. By adopting predipping as a sanitation method it is obvious that drying the teats thoroughly prior to machine attachment is a fundamental step to prevent residues in the milk. Several studies have shown that by predipping the new infection rates for environmental pathogens could be reduced by approximately 50% compared to udder washing as sanitation step (11).

Around 20 years ago, Neave (10) concluded that "Omitting all udder washing would result in a marked reduction in the spread of the major mastitis pathogens". Some months ago Grindal and Bramley (3) confirmed this statement by experimental results which show the important effect of udder preparation on transmission of *Staph. aureus*. Foremilking and teat preparation by washing the teats using rubber gloved hands and running warm water containing 500 ppm Cl_2 and drying with a separate paper towel for each cow led to transfer of staphylococci between quarters within cows (3). This risk of spreading pathogens by manual udder preparation was the reason that it was generally recommended that teats should not be washed unless they are very dirty (8). On large dairies, especially ones with environmental mastitis problems this recommendation may not be acceptable. Therefore the combination of foremilking and predipping, including drying the teats, seems to be the means of choice. It may be assumed that by using predipping solutions at concentration levels of 0.1% to 0.5% transferring of pathogens by foremilking will be also reduced to a much greater extent than by teat sanitizers at levels of 0.02% used for teat washing.

Foremilking and teat sanitation have additional positive effects because they are stimulating to the cow. This will increase the degree of udder evacuation and shorten the milking duration. The shorter the milking duration the lower the risk that marked teat tissue damaging may occur initiated by the milking machine action especially during the low flow period. Concerning the practical conclusion the following scheme can be proposed.

Table 1: Proposal for premilking teat preparation

1. Dry cleaning with paper towel
2. Foremilking
3. Predipping/contact time: 30 sec
4. Drying with paper towel

Cleanliness of the milking equipment

Provided that a properly installed cleaning system is operating correctly and the amount, temperature and concentration of added detergent sterilizer of the cleaning solution corresponds to the special recommendations, it can be assumed that the equipment is clean and free of pathogens at the start of milking. The efficiency of cleaning is markedly reduced if defective or old and cracked rubber material is in use. Under such conditions mastitis pathogens may have their source on the contaminated surface of such defective material with the consequence that the potential contamination risk of teats and milk will be increased.

To reduce cow to cow transfer of pathogens via contaminated liners, different systems of cluster flushing have been developed. The effect of backflushing on new infection rate is not as clear as its effect on reducing number of pathogens. Nevertheless practical experience shows that on most dairies, if backflushing has been added to the common sanitizing routine, new infections could be reduced. It should be used in mastitis problem herds.

Postmilking hygienic measures

Postmilking hygienic measures should cover the whole intermilking period up to the next milking, resulting in a 24 hour per day hygiene program. Teat disinfection immediately after milking, prevention of lying down of cows within the first 1 to 2 hours after milking and acceptable environmental hygienic conditions for the rest of the intermilking period should be regarded as very effective and economic ways to prevent mastitis. Teat disinfection can reduce new infection rates by contagious pathogens by 50% or more. Teat skin contamination is reduced, colonization of the teat orifice is prevented and healing of teat lesions is supported, particularly if emollients such as glycerol or lanoline are included in the disinfectant. There are still many open questions concerning the mechanisms by which the differences in reducing the new infection rates depending on the type of pathogen by pre- and post-dipping can be explained. Table 2 tries to give some explanations.

Table 2: Possible explanation for efficiency of pre- and postmilking dipping in relation to different types of pathogens

Type of pathogen	Time period		Successful Mastitis control by
	Milking	Intermilking Interval	
Cow dependent (e.g. <i>S. aureus</i>)	Contamination	Invasion	Post-dipping
Environmental (e.g. <i>E. coli</i>)	Invasion	Contamination	Pre-dipping

If contagious pathogens are mainly transferred during milking post dipping will reduce the risk for invasion during the intermilking interval. The contamination with environmental pathogens will take place predominantly during the intermilking interval. If so, predipping will be able to prevent invasion of these pathogens during milking. This rough scheme gives some possible explanation but some open questions may be only answered by further detailed studies. The conclusion also from this table is that, because

it is not possible to avoid contamination, we should try to prevent invasion as soon as possible after contamination has taken place. The second aspect to prevent invasion and new infection is to use as much as possible the natural physiological defense potential by avoiding mechanical impairment of the teat tissue during milking. This aspect will be covered in the next section.

Milking

In addition to the above mentioned aspects of movement of pathogens by mechanical contamination during milking the function of the machine plays a role in mastitis by different direct and indirect mechanisms (Table 3).

Table 3: Machine milking and mastitis

- Direct influences
- Indirect influences
- Moving pathogens into the teat cistern
- Increasing the external teat contamination
- Decreasing the teat tissue defence potential

Transfer of pathogens

Two types of transfer can be distinguished during machine milking. i.) transfer of contagious pathogens between quarters resulting mainly in contamination of the teat skin and ii.) transfer of environmental pathogens placed at the teat orifice into the teat cistern and therefore resulting in invasion.

Different approaches have been introduced into milking equipment (i.e. interceptor shields, valves, larger volume claw pieces etc.) to prevent impacts or reduce pressure fluctuations. However, it is clear that such modifications of the conventional milking systems cannot control pressure changes within the teat cup because the air/milk mixture is of variable density and the pressure relationships are influenced by the teat conformation and milk flow rate. But it may be stated that a combination of good hygienic practices, modern milking machine characteristics and appropriate handling of the cluster will be able to keep the transfer rate of pathogens at a very low level.

Teat tissue condition and treatment

For both the contagious and the environmental mastitis-causing organisms, the level of exposure at one hand and the efficiency of the teat tissue, especially of the teat end, in preventing penetration at the other hand will determine the new infection risk. A sufficient blood supply is the basis which is needed to enable a very good function of all mechanisms involved in the defense of pathogens.

Environmental influences including machine milking may be able to evoke circulatory and mechanical impairment of the teat tissue and cause metabolic disorder. Presumably all these influences together will increase the invasion risk.

Before milking

The status of the teat tissue before milking will depend on the milking system used during the foregoing milking, the length of the intermilking interval and cow individual

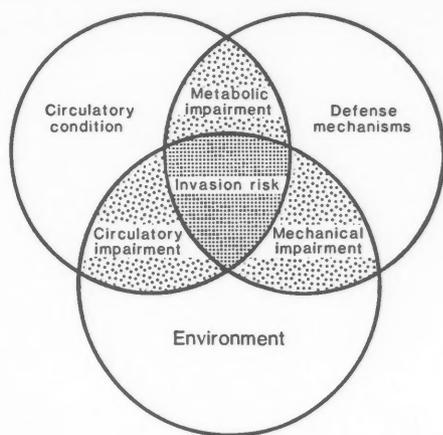


Fig. 3: Invasion risk depending on machine milking and teat tissue reactions

factors such as teat conformation, lactation stage and number, and the smooth muscle tone. The teat penetration risk is mainly determined by the closure of the teat canal (barrier function). The efficiency of local and systemic defense mechanisms to eliminate invaded pathogens is predominantly determined by the status of blood supply. The main factors involved in the closure of the teat canal are summarized in Table 4.

Table 4: Cow individual and milking related influences on the closure of the teat canal

- Teat canal diameter
- Degree of Keratinization
- Smooth muscle tone
- Degree of oedema

Especially during the early lactation period physiological factors such as oedema, reduced muscle tone and low degree of keratinization may counteract an effective closure of the teat canal.

During milking

The sympathetic nervous system is involved in the regulatory mechanisms of the blood supply of the teat tissue. Arteries, arterioles and smooth muscles of the teat tissue are sympathetically innervated (1). The amount of milk present in the udder is the main factor determining the sympathetic tone. Milk withdrawal decreases the sympathetic tone, whereas the tone is increased with increasing accumulation of milk in the gland. Teat stimulation in connection with premilking udder preparation, decreases the sympathetic tone, too (9). Therefore the blood supply of the mammary gland is increased but the rate and the amplitude of the teat contractions, which are partly responsible for the blood movement of the teat tissue, are decreased (9). Overall it can be assumed that the reactivity of the teat tissue to mechanical forces applied during milking will be influenced by the sympathetic tone. After application of the teatcups, different types of tissue changes will involve the circulatory system of the teat. i.) teat moving into the liner and stretching 33%

to 50%. ii.) partial occlusion of blood vessels by the liner mouthpiece. iii.) vacuum application and mechanical forces are greater near the teat end. All influences together result in an increase of teat tissue thickness due to interstitial fluid accumulation and tissue hypoxia. During the last years we measured machine-induced teat tissue reactions by using a spring loaded caliper device known as a cutimeter. The measurements provided information on changes in thickness of the teat end as an expression of the extra-vascular accumulation of fluid, i.e. oedema (4).

After milking

To answer the question to what extent teat thickness changes may occur after milking due to the effect of the reduced intramammary pressure by emptying the udder or due to the action of the machine the effects of cannula milking versus no milking were compared. The measured thickness values and the calculated compressibility results are summarized in Fig. 4 (6).

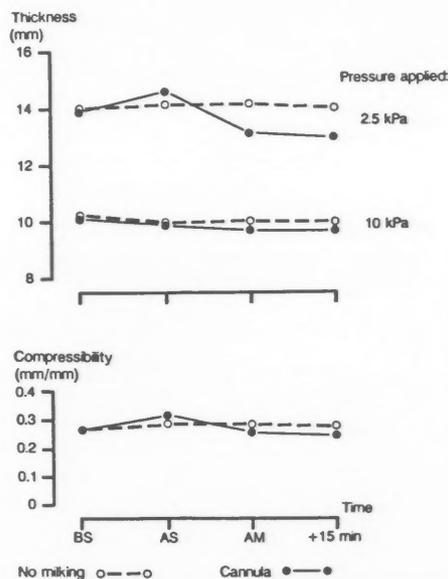


Fig. 4: Changes in mean thickness and compressibility of the teat apex in 16 quarters (4 cows) that were either not milked (0-0) or drained by cannula (0-0) BS = Before stimulation, AS = After stimulation, AM = After milking (cannula)

The implication of these results is that increased thickness values after machine milking can be interpreted as response of teat tissue to the milking machine action. As shown in Fig. 5, different milking methods result in different percentage changes in teat thickness (relative to the premilking values) (7).

Preliminary results of infection trials, in which the teats were dipped immediately after cluster removal in a suspension containing 10^7 colony forming units/ml of mastitis pathogens showed a significant relationship between increased thickness after milking and increased new infection rate (4,5).

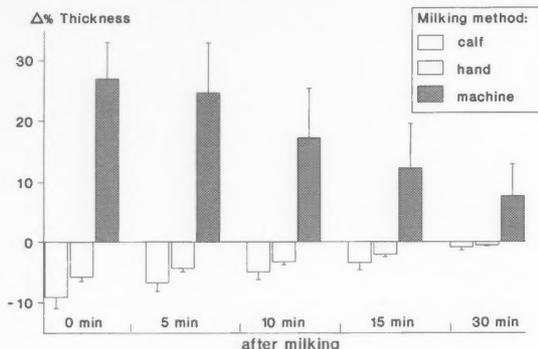


Fig. 5: Development of the percentage changes in teat end thickness (relative to the premilking value) throughout the first 30 min after milking

Conclusion

With increasing milking rates and milk yields per cow, the susceptibility to mastitis seems to be increased because the total defense potential is decreased. This is partly due to systemic factors, such as metabolic disorders, and partly due to local teat factors such as increased teat canal diameter and decreased sympathetic tone. Therefore we need excellent hygienic practices including pre- and postmilking teat dipping, especially for high yielding cows. In addition, the

handling and the function of the milking equipment needs to be improved to prevent teat tissue reactions which may act as mastitis predisposing factors.

References

- Bernabe, J. and G. Peeters. 1980. Studies on the motility of smooth muscles of the teats in lactating cows. *J. Dairy Res.* 47: 259-275.
- Dodd, F.H. and F.K. Neave. 1951. Machine milking rate and mastitis. *J. Dairy Res.* 18: 240-245.
- Grindal, R.J. and A.J. Bramley. 1989. Effect of udder preparation on transmission of *Staphylococcus aureus* while milking with a multi-valved cluster. *J. Dairy Res.* 56: 683-690.
- Hamann, J. (ed.). 1989a. *Maschinelles Milchentzug und Mastitis*. Ferdinand Enke Verlag, Stuttgart. ISBN 3-432-98091-4.
- Hamann, J. 1989b. Machine milking and new infection risk. *Proc. Int. Conf. Mastitis, St.Georgen, Austria*, p.113-122.
- Hamann, J. and G.A. Mein. 1990. Measurement of machine-induced changes in thickness of the bovine teat. *J. Dairy Res.* (in press).
- Hamann, J. and U. Stanitzke. 1990. Studies on pathogenesis of bovine mastitis by comparison of milking conditions as calf suckling, hand milking and machine milking: reaction of the teat tissue. *Milchwissenschaft* 45(10):632-637.
- IDF-Subgroup A2D. 1987. Conclusions on the relationship between machine milking and mastitis. *IDF-Bull.* No 215:3.
- Lefcourt, A.M. 1982. Effect of teat stimulation on sympathetic tone in bovine mammary gland. *J. Dairy Sci.* 65:2317-2322.
- Neave, F.K. 1971. The control of mastitis by hygiene, p. 55-71. In: F.H. Dodd and E.R. Jackson (eds.), *Control of Bovine Mastitis*. British Cattle Veterinary Association.
- Pankey, W. and D.M. Galton. 1989. Premilking teat sanitation: Mastitis control and iodine residues in milk. *Proc. Int. Conf. Mastitis, St.Georgen, Austria*, p.214-221.



NELSON
JAMESON
INC

DISINFECTANT MAT™

A Step in the Right Direction For Footwear Sanitation

- Scientific design has proven effective in years of food & dairy plant use.
- Flexible rubber fingers brush bacteria-carrying matter from shoe.
- Finger design holds shoes out of accumulated sediment.
- Unlike ordinary footbaths, shoe sole is lowered to a proper depth into *clean* disinfectant solution only.
- High walls hold up to 5 qts. of solution.



Cross section of Disinfectant Mat™

1-800-472-8339 Wisconsin

Nelson-Jameson 1-800-826-8302 Other States

The Yogurt Story - Past, Present and Future Part II

Ebenezer R. Vedamuthu, Ph.D.
Microlife Technics, 1833 57th Street, P.O. Box 3917, Sarasota, FL 34230

Yogurt Starter Bacteria

Yogurt starter bacteria consist of one or more strains of *Streptococcus thermophilus* (coccus) in conjunction with single or multiple strains of *Lactobacillus bulgaricus* (rod). The pairing of *coccus* and *rod* is important because there is an associative beneficial relationship between the two types. In biology, such an associative beneficial relationship is called symbiosis. There are, however, differences in the degree of symbiosis between different strains of *rod* and *coccus* cultures. To obtain maximum symbiotic effect in functionality, the pairings should be examined for specific functions in yogurt fermentations. Characteristics usually sought after are rapidity of acid production, the fine blend of acid (tartness) and flavor (greenness) in the finished product and the firmness and smoothness of the coagulum.

Characteristics of *Streptococcus thermophilus*

Streptococcus thermophilus microorganisms were first described by Orla-Jensen, a Danish microbiologist in 1916. These bacteria are commonly found in dairy products, especially yogurt, Italian and Swiss cheese varieties and dairy environs where these products are made. As their common, industrial name, *coccus*, suggests, they are spherical in shape, and when spherical bacteria are found in chains, they are called streptococci. Hence, the genus name, *Streptococcus*. As opposed to other milk streptococci that grow at lower temperatures and which are used in culturing buttermilk, sour cream, cultured cream butter, etc., (known in the industry as *lactics*, belonging to the genus *Lactococcus*), *S. thermophilus* strains actively grow and metabolize at higher temperatures (up to 120°F or 49°C), and hence, the species name *thermophilus*.

Although *S. thermophilus* in young broth or milk cultures are spherical in shape and occur as pairs or long chains, older or overincubated cultures, and those that have experienced nutritional or other environmental stress and colonies from solid media often appear as elongated convex lens shaped cells in straight chains or may even be mistaken for rod-shaped bacteria.

Good growth media for laboratory propagation of *S. thermophilus* include Elliker's lactic broth and plain or

litmus milk. For enumeration, Elliker's lactic agar is excellent (2). *Coccus* cultures produce enough acid in milk to coagulate it, but the acidity is relatively less than other dairy lactic acid bacteria. For bulk starter propagation in dairy plants, steam-sterilized skim milk or reconstituted skim milk solids and sweet whey are excellent.

Three characteristics of *coccus* strains make them vulnerable in dairy fermentations. They are as follows:

1. These bacteria are extremely sensitive to penicillin and a little less sensitive to other antibiotic residues in milk. Often the inhibitory levels of penicillin for *S. thermophilus* cannot be detected by some of the antibiotic testing procedures. Sometimes when antibiotic tainted milk is diverted to condensed milk production, the antibiotic level is concentrated during its manufacture. When such tainted condensed milk is used for solids fortification, yogurt fermentation is affected to varying degrees. When condensed milk is used in making up yogurt mixes, every lot should be tested for antibiotics using a sensitive procedure.
2. *Streptococcus thermophilus* is quite sensitive to levels of table salt above 2.5 to 3.0%. This may be important in certain cheeses where *coccus* cultures are used.
3. These bacteria are also somewhat retarded by high sucrose concentrations. Some researchers report a slow down of acid production in mixes containing greater than 4.0% table sugar.

Streptococcus thermophilus is quite heat-resistant and can survive heating at 140°F (60°C) for 30 min. (5). These bacteria also produce some carbon dioxide and ammonia in milk cultures by breaking down naturally present urea in milk (5). In other words, these bacteria produce *urease*, the enzyme that breaks down urea. *Streptococcus thermophilus* breaks down milk sugar, lactose by the enzyme *lactase* or β -galactosidase. Production of *lactase* by *coccus* cultures is a stable property and is genetically encoded on the chromosome. *Lactase* from *S. thermophilus* is quite heat-stable and researchers have suggested the use of these bacteria for the production of heat-stable β -galactosidase. The enzyme, β -galactosidase cleaves lactose into its component parts, glucose and galactose. Glucose from lactose is readily used by *coccus* cultures, but very little, if any, of the galactose is immediately used up. So galactose accumulates. Many *S. ther-*

thermophilus strains cannot readily use galactose in the presence of lactose. Further, some strains can use galactose (Gal+) while others cannot (Gal-). Some strains that are Gal- when propagated a few times in the presence of galactose become Gal+. This characteristic has some implications in pizza cheese manufacturing and the browning of cheese toppings on pizza.

Strains of *S. thermophilus* that produce capsules and extracellular slime (exopolysaccharide) are known. These strains are useful in producing yogurt with smooth, viscous body that helps to suspend fruit pieces more or less evenly in fruit yogurt. Also the heavy body imparted by exopolysaccharide helps to retain the integrity of the coagulum and its texture during post-fermentation handling.

Phages for *S. thermophilus* have been described. These bacterial viruses possess very long tails which are often seen entangled in electron micrographs. Some researchers ascribe the elongated tails of these phages to be the reason for their high retention on microfilters used for sterilizing whey before examining for bacterial viruses (4). These phages are also quite sensitive to low pH and need special handling and plating techniques to demonstrate plaques. Reddy (4) made an extensive study on the techniques needed to transport, isolate and demonstrate *coccus* and *rod* phages.

As compared with *lactics*, *S. thermophilus* strains are relatively sensitive to phosphates. So most strains of *coccus* do not readily grow well in phosphate-containing phage inhibitory media. These are, however, specially selected *S. thermophilus* strains that do well in phosphate-containing media. Also, commercial phage inhibitory media containing alternate divalent cation chelating compounds or mixtures thereof, and specific growth stimulants are available for propagating *coccus* starters.

Genetics of *S. thermophilus* have not been as widely studied as that of *Lactococcus* species. Extrachromosomal genetic elements, namely, plasmids have been found in *S. thermophilus* and they have been analyzed using restriction enzymes. Procedures to introduce plasmid DNA using electric impulses (electrotransformation) have been developed for *coccus* strains. Chromosomal β -galactosidase genes of *S. thermophilus* have been cloned. Foreign genes have also been cloned in *S. thermophilus*. More research is needed on the genetics of *coccus* bacteria.

Characteristics of *Lactobacillus bulgaricus*

The genus name *Lactobacillus* is derived from two words, *lacto* meaning "pertaining to milk" and *bacillus* meaning "rod-shaped." In other words, *Lactobacillus* refers to rod-shaped bacteria found in or associated with milk. The exact derivation of the name *bulgaricus* is obscure, but it is possible that the association of these bacteria with Bulgarian milk, a fermented milk product is the root of this appellation. Although lactobacilli are commonly found in milk, they are not part of normal udder flora and, hence, not found in milk as drawn from the udder. They enter milk from dairy utensils and dairy environs.

Lactobacillus bulgaricus was first described by Orla-Jensen in 1919. The organisms can be isolated from yogurt, Swiss and Italian cheese varieties. In the industry, these

bacteria are referred to as *rods*. *Lactobacillus bulgaricus* occur as medium to long, slender rods, sometimes bent or curved, in pairs and in chains. Stained cells often reveal dark, phosphate-rich granules called metachromatic granules. Older or over-incubated cultures or environmentally or nutritionally stressed cells exhibit filamentous and sometimes bizarre morphology. Such cultures do not perform well in dairy fermentations.

For laboratory propagation of *L. bulgaricus*, Elliker's lactic broth, MRS broth, plain or litmus milk are excellent (2). For enumeration, Elliker's or MRS agar are recommended (2). Because of their preference for oxygen-reduced environment, growth on agar plates is enhanced by incubating in an atmosphere containing carbon dioxide. This may be achieved by using the BBL Gas-Pak system (BBL Microbiology Systems, Becton Dickinson & Co., Cockeysville, MD 21030). Incubation for 48-72 hrs at 35°C - 37°C (95° - 99°F) is necessary for good colony formation. In the dairy plant, bulk starters of *rods* may be prepared in sufficiently heat-treated skim milk or reconstituted skim milk powder or in sweet whey.

Lactobacillus bulgaricus is fairly heat-tolerant and its optimum temperature for growth is around 45°C (113°F) and acid production in milk occurs optimally around 43° - 46°C (110° - 115°F). *Rods* have a more complex enzyme system to break down lactose than *coccus* cultures. Lactose degrading enzyme system in *L. bulgaricus* consist of β -galactosidase as well as β -D-phosphogalactoside galactohydrolase. These bacteria also do not use galactose and hence galactose accumulates in milk fermentations. They preferentially use glucose when both glucose and lactose are present (5). Residual galactose in cheeses made with thermophilic starters containing *L. bulgaricus* as the *rod* component could present problems as discussed under *S. thermophilus*.

Because of their stringent microaerophilic nature (tolerate only trace amounts of oxygen), *L. bulgaricus* strains do not grow rapidly until oxygen is largely depleted in the fermentation system. This property has a bearing on yogurt fermentation, which will be discussed in a later section.

Exopolysaccharide-producing *rods* are available and they are useful in manufacturing yogurt with a heavy, smooth body. Scanning electron micrographs of milk cultures of such strains show fine strands of exopolysaccharide attached to the bacterial cell-walls extending over to the protein matrix of the milk curd (3). Selected strains of such *rod* cultures are widely used in yogurt manufacture.

Phages for *L. bulgaricus* have been described. Demonstration of plaques of *L. bulgaricus* phages is very difficult. A low inoculum of the host and a very thin semisolid agar overlayer seeded with phage-host mixture are necessary for demonstration of plaques. For more details on phages of *rods* and procedures for their isolation and enumeration the work of Reddy (4) should be consulted.

Lactobacillus bulgaricus strains need Ca⁺⁺ and Mn⁺⁺ to maintain cellular integrity (5). Because of this, when *rods* are grown in divalent cation chelating phosphate-containing phage-inhibitory media, they undergo changes in normal cellular morphology and impairment of acid producing activity (5). Commercial manufacturers of phage inhibitory

media have made suitable adjustments and fortification with growth stimulants to overcome these problems, but still some fine-tuning appears to be necessary.

Very little genetic work has been done on lactobacilli. Not much attention has been paid to *L. bulgaricus* genetic system. Chassy (1) has discussed some of the avenues that could be pursued in genetically improving commercially important lactobacilli.

References

1. Chassey, B.M. 1985. Prospects for improving economically significant *Lactobacillus* strains by genetic technology. Trends Biotechnol. 3(11):273-275.
2. Gilliland, S.E., W.E. Sandine and E.R. Vedamuthu. 1984. Acid producing microorganisms. In: Compendium of Methods for the Microbiological Examination of Foods. 2nd ed. (M.L. Speck, ed.), American Public Health Association, Washington, DC.
3. Kalab, M. P. Allan-Wojtas and B.E. Phipps-Todd. 1983. Development of microstructure in set-style non-fat yoghurt -A review. Food Microstructure 2:51-66.
4. Reddy, M.S. 1974. Development of cultural techniques for the study of *Streptococcus thermophilus* and *Lactobacillus* bacteriophages. Ph.D. thesis. Iowa State University, Ames, IA
5. Reinbold, G.W. 1989. Spare the rod (or coccus) and spoil the cheese? Parts I and II. Dairy Dialogue 4(1,2). Spring-Summer 1989. Chr. Hansen's Laboratory Inc., Milwaukee, WI.

Please circle No. 114 on your Reader Service Card
Stop by our Exhibit at the 1991 IAMFES Annual Meeting

MOJONNIER SAMPLE BAGS

BAGS FOR ALL YOUR SAMPLING NEEDS

Mojonnier bags are high quality durable, sterile sampling bags which can be used for almost any sampling application. Bags are 3 and 4-1/2 mil polyethylene - strongest sterilized sampling bags on the market.

Some Applications are:

- Milk and dairy products
- Water
- Medical/biological material
- Stomacher® blending
- Foods of all kinds
- Feed and grain
- Environmental items
- Soil
- Gonorrhoeae cultures

There are 12 standard sizes in stock for prompt delivery. Many special sizes are now available or one can be made to your specifications - plain or imprinted with your information.

****CALL TODAY****

**FOR INFORMATION AND PRICES
CHUCK COOK - 1-800-333-3086**

Manufactured in Eaton, Indiana

**Plastic Packaging Concepts, Inc.
Albert Mojonnier, Inc.**

Road 1100 North & N. Hartford St. Phone 317-396-3351
P.O. Box 570, Eaton, IN 47338 FAX 317-396-9930
Wisconsin Office -- Phone 608-825-6633
Sun Prairie, WI FAX 608-825-6833
Toll Free - Both Offices - 1-800-333-3086

Put MVTL to the test

Put Minnesota Valley Testing Laboratories to the test. You'll find a conscientious group of professionals whose first concern is helping you achieve quality control for all your food products.

MVTL offers competitive prices on simple and complex procedures — microbiological, organic and inorganic chemical testing.

Put us to the test. We guarantee fast turn-around and accurate testing. You'll see why hundreds of food and dairy processors rely on MVTL. They've put us to the test time and time again. And we passed with flying colors.

For more information about how MVTL can handle all your testing requirements, call Kate O'Connor at 800-782-3557.



MINNESOTA VALLEY
TESTING LABORATORIES, INC.
1126 N. FRONT ST.
NEW ULM, MINNESOTA 56073

Please circle No. 191 on your Reader Service Card

News

Terra Tek and Texas A&M University Enter Into Agreement

Terra Tek, Inc. (Salt Lake City, Utah) and The Texas A&M University System (College Station, Texas) have entered into an exclusive, world wide license agreement to commercialize an environmental detection technology developed by Texas A&M University scientists and supported by The Texas Agricultural Experiment Station. Terra Tek will manufacture and market a series of easy-to-use devices for detecting environmental contaminants in food, soil or water. The first assays will test for mycotoxins, which can contaminate stored grains and processed foods. The Texas A&M University System will receive a royalty on all sales of products derived from their patent-pending technology.

The technology on which the detection systems relies is called selective absorption and the research was pioneered by Drs. Timothy Phillips, Beverly Clement, and Norman Heidelbaugh in the Department of Veterinary Anatomy and Public Health at Texas A&M University. Highly selective materials designed to adsorb individual chemical or toxic compounds are made possible by the discoveries of the researchers at Texas A&M. The initial products, designed to detect aflatoxins, which are naturally occurring carcinogenic molecules produced by fungi, are now commercially available from Terra Tek. Aflatoxins have been identified in stored corn and peanuts as well as processed foods such as milk. Major advantages of the new detection methods include their ease of use and ability to provide a rapid screening analysis of the suspected contaminant. Future tests for soil and water contaminants are in the development stages.

Terra Tek is an advanced technology engineering and products company headquartered in the University of Utah Research Park in Salt Lake City, Utah with offices in Houston, Dallas and Midland, Texas. The detection devices produced under the license agreement will be marketed by the Terra Tek Environmental Products Division. For further information contact: Terra Tek Environmental Products Division; (801)584-2400.

Du Pont Announces Food Packaging and Environmental Awards Winners

Three food packaging developments and two environmentally responsible recycling programs, have received 1990 Du Pont Awards for innovation.

Winners were announced at the National Food Processors Association (NFPA) annual conference by Archie W. Dunham, senior vice president, Du Pont Polymers.

"Over the past five years, the Du Pont Awards have recognized many outstanding industry innovations," said Dunham. "Our 1990 winners capitalize on the many benefits of plastic packaging, while effectively demonstrating the compatibility between environmental considerations and new packaging developments," he said.

Dunham was referring specifically to the Jose' Cheese Sauce application, which won a Du Pont Award in the packaging competition, and an honorable mention in the environmental category.

He said future awards program winners will continue to demonstrate that environmental interests are closely aligned with industry trends.

Winners of the 1990 Packaging Awards were:

- Jose' Cheddar Cheese Sauce to Amboy Specialty Foods, American National Can and the Robert Bosch Company;
- ACI Coex Bowl to ACI Coex, Edgell-Birds Eye and Hitek Limited;
- Heinz Ketchup to Heinz U.S.A. and Continental PET Technologies, Inc.

Honorable mention in the Packaging competition:

- Duncan Cups to Procter & Gamble.

Winners of the 1990 Environmental category were:

- "Resackle" Sacks to Vanguard Plastics;
- Key Packaging Industries for its grocery bag recycling program.

Honorable mention in the Environmental category:

- Jose' Cheddar Cheese Sauce to Amboy Specialty Foods, American National Can, and the Robert Bosch Company.

The Du Pont Awards competition, now in its fifth year, recognizes industry innovations from anywhere throughout the food industry chain.

The Awards are sponsored by Du Pont Packaging in cooperation with the National Food Processors Association. Each winner was presented with a specially commissioned acrylic sculpture created by Delaware artist Margaret Scott Kincannon.

For more information contact Carolmarie Citra, Du Pont, 302-774-0821.

Cancer tests on rodents are 'useless'

Animal cancer tests in which rodents are fed massive doses of chemicals might be useless for calculating the cancer risks in humans because the dosages themselves might be causing the disease, researchers said. *The Los Angeles Times Service* reported the news Aug. 31, 1990.

Researchers are reporting that the massive doses of chemicals induced into the test animals' bodies may themselves be causing most of the cancers simply by increasing the rate of cell proliferation. The studies were

done by two research teams, Bruce Ames, molecular biologist, University of California at Berkeley and Lois Swirsky Gold, molecular biologist, Lawrence Berkeley Laboratory; and the team of pathologists Samuel Cohen and Leon Ellwein of the University of Nebraska Medical Center.

"Government dependence on animal testing for carcinogens is pretty much useless for protecting us against low levels of chemicals," Ames said. "When you test chemicals on rats at very high doses, half of them will come out positive (develop cancer) but the reason is that it is killing cells."

The article further reported that in the low doses at which humans would normally be exposed to such chemicals—which range from pesticide residues on fruits and vegetables to food additives such as the artificial sweetener saccharin—most of the rodent carcinogens would be harmless, the researchers said.

"Clearly we can no longer just accept that information from animal bioassays is sacrosanct as proof that the chemicals will cause cancer in humans," Cohen stated.

For more information contact Joel Paul, National Pest Control Association, 703-573-8330 or FAX 703-573-4116.

"Safe Food: You Make the Difference" Video Available

Tacoma-Pierce County Health Department offers this new and different sanitation education film. It features two experienced sanitarians, Dave DeLong and Rick Porso, of the Tacoma-Pierce County Health Department. General Mills' restaurants provided the set. Graphics were received from Cornell University and an original musical score was written by Dave DeLong.

They give a lively explanation of sanitation practices for new food workers in crisp, clear language with realistic examples. They cover all the basics plus some little known aspects of food service sanitation. A fascinating magic trick is employed to illustrate how hepatitis A and other enteric diseases are spread.

The twenty minute story seems to end too soon because of its ability to hold one's attention and challenge his sanitary sensibilities.

Widespread use of this type of persuasion and education will probably prove more effective than any enforcement program in advancing the protection of public health.

Cassette copies of this copyrighted film are priced at \$50.00 and can be ordered from:

TPCHD Productions
Food & Community Safety Section
3629 So. D Street, Mail Stop EHD 012
Tacoma, WA 98408

Inquiries can be phoned to Don Vandervelde at 206-591-6464. Purchase orders can be faxed to 206-591-6589.

Leaders agree — tight regulatory budget will challenge food safety efforts

Government purse strings are tight, and with the threat of recession looming, they aren't likely to loosen anytime soon. Food safety leaders agree that tight budgets will challenge regulatory agencies as they attempt to perform the mission of protecting consumers. However, there is lack of general agreement as how best to invest the limited dollars that are available.

Dr. Lester Crawford is Administrator of the Food Safety and Inspection Service for USDA. Speaking of Congressional allocations, Crawford said, "We had a budget crisis which was finally resolved and we actually did get the amount of money for this year that we requested. At least for this year, that is fiscal 1991, we are at full funding so it will not affect any of our programs."

With regard to planning future budgets, Crawford continues, "We're in the middle of '92 and I have no way of knowing whether we will get what we ask for. I think there will be lean times for the next several years as they (Congress) try to balance the general budget consonant with the dictates of Gramm-Rudman."

The fact that federal budgets will be tight has direct effects on state programs as well. Shirley Bohm, Food Program Manager for the Illinois Department of Public Health, Division of Food, Drugs, and Dairy said, "Most state agencies have some type of federal funding, or some type of program where they directly or indirectly have benefit from federal programs. For example, we have a contract with FDA to do food processing plant inspections in Illinois plants."

There is concern among state regulators that federal programs may be reduced and that state agencies will be compelled to increase their vigilance. Tom Masso, Director of Food Inspection, Minnesota Department of Agriculture, is the current President, Association of Food & Drug Officials. Masso has ideas he thinks could help limited resources go farther.

"One thing, I think, would be a really good idea. Let's have FDA contract with the states to actually do more work. It doesn't make a lot of sense if we've got a good program out here (at the state level) and we've got the FDA out making spot inspections of our warehouses and food manufacturing plants. We should really be doing them; let them pay us and let them oversee the program."

Dr. Fred Shank, Director, Center for Food Safety and Applied Nutrition for FDA agrees with Masso in principle. He said, "We at FDA are looking for ways we can strengthen these programs, the role of state and federal government, in order to make them more efficient and to eliminate duplication where that might exist, and to target all of our resources to those areas of higher priority both from the safety perspective as well as other considerations."

Differences of opinion occur when it comes to the setting of priorities. Although Masso and Shank seem to

voice harmonious points of view, discord is injected from sources outside the regulatory community. Priority conflicts occur when consumers, consumer groups, politicians, and food safety professionals fail to have complete agreement on what issues should receive priority.

Dr. Damien A. Gabis is CEO of Silliker Laboratories and President-Elect of the International Association of Milk, Food and Environmental Sanitarians. He said, "Many food companies are finding themselves pressured into doing tests that they may not have done if the political and consumer environment weren't so pressuring. I think a lot of the testing that's done is done in response to that type of pressure. Not necessarily regulatory pressure directly, but it's all enmeshed so you can't really tease out what the real reasons are. When consumers start to get active, then the regulatory people get active, because the legislators get active... and so it gets tied up in a multi-effect picture."

For this reason, many feel that limited resources are being expended inappropriately. Masso said, "The problem of chemophobia continues to go on. The real problem is in microbiological quality of food. I think everybody in the business is aware of that...that's where the dollars have to be spent. I think we've over-emphasized the chemical area."

Splitting the pie

A major concern, caused by lack of resources, was voiced by Gabis. Speaking of two of the most significant foodborne illness outbreaks ever to occur, he said, "After the Hillfarm Salmonella outbreak and the Listeria outbreak, I know that their (FDA's) resources were not increased to cover that. They had to reallocate their resources on a short term basis to take care of those issues, so that other programs that required funding and personnel had to be reduced."

Gabis continued, "It's the same way with the CDC now. The necessary attention they're giving to the AIDS epidemic is detracting, in some respects, from their work in food surveillance epidemiology. That's just the way life is. There are only so many resources."

Improperly allocating resources?

An example of how conflicts arise over the investment of resources has lately been provided by the controversy about drug residues in milk. A recent GAO report was critical of FDA's conclusions about the safety of milk with regard for drug residue levels. Part of the criticism centered around the small number of samples FDA chose to test, and there were questions about the laboratory methods used. Although the issues involved are complex and convoluted, regulatory resource limitations are unquestionably intertwined in the controversy. There are those who feel insufficient resources were applied.

According to Dr. H. Michael Wehr, Administrator, Laboratory Services Div., Oregon Department of Agriculture and current President of the Association of Official Analytical Chemists, there are limitations to the

officially accepted test methods used for drug residues in milk. Wehr said, "There is a single procedure that is recognized and official for the testing of antibiotic residues in fluid milk, and that is the *Bacillus stearothermophilis* disk assay test that is a part of Pasteurized Milk Ordinance." He continued, "That methodology is very sensitive for beta lactams, which includes the penicillin group. It is very insensitive for essentially everything else including the sulfas and the tetracyclenes."

One of the sulfa drugs, sulfamethazine, is not approved for use in lactating dairy cattle and has generated further concern since it is suspected of being a potential carcinogen. A newly developed testing method was applied to milk and a high incidence of detected drug residues, not detectable by the standard method, was reported. These results were highly publicized and FDA was obliged to investigate and respond.

FDA performed limited studies using their own methodology. Based on these studies, they responded that milk was safe. This conclusion was criticized by GAO, in part due to questions about the FDA test methods as well as the design of their studies.

FDA defended

Gabis was supportive of FDA. He said, "I'm just not convinced that the FDA did not do the job they were mandated to do; no matter what GAO says...I think the FDA, as a rule, does the best job that they could with the resources they have."

FDA's detection methods, although criticized, remain their basis for determining regulatory compliance of milk for certain drug residues. States wishing to take enforcement action for other than beta lactam drugs would need to use the FDA methods. Unfortunately, these methods are very sophisticated and expensive to perform. Due to resource constraints, application of FDA methods is simply out of reach for many state agencies that have to enforce drug residue regulations.

William W. Coleman, II is Director of the Dairy & Livestock Division for the Minnesota Department of Agriculture. Regarding FDA methods for sulfa residues Coleman stated, "We have those here, we've looked at them, but they're pretty expensive and not the easiest to run...I would guess that there aren't a dozen state laboratories in the country that would be able to duplicate them."

Even though equipped to use FDA methods, Minnesota has opted to use other methods. Coleman said, "We're doing all 'screening' tests and we're not enforcing any of those tests. We're just going to industry and telling them what we find and asking them to look into it."

From an industry perspective, Minnesota-based Land O'Lakes, Inc. doesn't view lack of regulatory resources, for application to drug residue or other food safety concerns, as a serious problem for them. According to Douglas R. Engebretson, Vice President of Quality Assurance and Regulatory Affairs, Land O'Lakes internal programs make regulatory effort almost superfluous.

"The amount of internal surveillance and testing far exceeds regulatory scrutiny," Engebretson said.

Self-policing not accepted

Unfortunately for industry, not everyone is convinced that their efforts to self-police food safety are sufficient. Roger Blobaum is with the Center for Science in the Public Interest (CSPI). CSPI was a driving force behind the initial testing and subsequent publicity given to drug residues in milk.

When asked if industry could do an effective job of self-policing, Blobaum said, "From discussions that I've had with people who buy fruits and vegetables for canning and freezing, I know they're probably tougher than what the regulations require because they're very concerned about consumer anxiety about residues. I think there is a lot of work within the industry to see that they don't have a problem."

However, Blobaum remains unconvinced that dairy industry efforts are as stringent. He continued, "We certainly aren't saying that about the milk industry...we have a system in place for milk, and it's quite obvious that the milk industry is not exceeding the federal standards on their own."

Based on this type of perception, CSPI and other consumer organizations continue to apply pressure for increased regulatory protection. Regulators face the challenge of funding such programs while trying not to diminish their traditional duties.

For state agencies, that doesn't leave many options. According to Illinois' Bohm, "If a state agency doesn't receive funding through a federal agency, like FDA, then we either cut the program ourselves, or we have to generate some kind of additional revenue in Illinois—meaning user fees or licenses."

According to Coleman, increased utilization of user fees are a reality. He said, "Everybody's in a budget crunch; we are in this state, just like every other state. My budget's in the red; I'm catching flak for it. We've got to go out and ask for more industry fees, because we're not going to get it from the state. We have to do all this extra work but the state's not going to pick up the tab."

Falling behind scientifically

According to Gabis, and others, it is difficult for regulators to keep up with current scientific advancements. Gabis said, "They all are really under tight pressure and they have not had proportionate increases in their budgets over the years to do the things that they need to do to keep modern. They may be losing their technical edge."

Bohm concurs, "It's very difficult for regulatory agencies to keep abreast of new research and new technologies and to maintain that level of oversight and understanding with very limited resources. That goes for every level of regulatory government that you have, local city/municipal, right to the federal level...I feel there is a need for a regulatory agency's work and right now it's very difficult to get adequate resources to do what I feel

is a minimum level of regulatory oversight. I'm not sure how to go about doing that; every year it's stretched a little thinner."

FDA's Shank said, "Because of the current structure of the government salaries, and some of the frustrations that we are continuing to face (such as an ever increasing work-load, with constrained budgets) we are losing some of our better personnel to industry and to other opportunities outside the federal government."

Facing the future

There are no indications that regulatory resources will be any easier to come by in the foreseeable future. New demands will continue to be placed on agencies. According to Dr. Allen Matthys, Director of Technical Regulatory Affairs of NFPA, "Congress had left, not just FDA, but all of the regulatory agencies with a terrific legacy of rule-making over the next two year period."

One such series of rule-making will be the result of the new nutrition labeling law. Shank said, "We anticipate that there may be in excess of 20 regulations that are required by that act. We've got very short time frames to accomplish it and it's going to be a very high priority. We have asked for substantial additional resources to accomplish the implementation as well as the development of the ongoing program once it's been implemented."

USDA's Crawford could be faced with similar hurdles, depending on the ultimate form of seafood inspection programs. Crawford feels that the type of seafood inspection desired by some proponents would require \$100 million annually.

Reprinted from Food Processing, February 1991, pages 74-79.

New VPs at ABC Research Corporation

ABC Research Corporation is pleased to announce that Dr. David Eaker has joined the staff as Vice President Chemistry. Dr. Eaker joined ABC Research in January 1991 from RJR Nabisco, Inc., Winston-Salem, NC where he was a Senior Research Chemist/R&D Group Leader.

Jarrett L. Kenyon has been appointed Executive Vice President of ABC Research. Mr. Kenyon joined the staff in August 1989 after retiring as a Colonel from the Army. He served almost 28 years in various assignments, the most notable as Army Liaison Officer, DOD Food Program, Natick Laboratories and as Commander European Commissary Region. Previously he was Senior Vice President.

For more information contact ABC Research at (904)3722-0436.

Food and Environmental Hazards to Health

Childhood Lead Poisoning, New York City, 1988

Summary

In 1988, a total of 796 cases of childhood lead poisoning were identified through surveillance by the New York City Bureau of Lead Poisoning Control (BLPC), an estimated 0.3 cases identified per 100 children screened. Sixty-two percent of the case-group children had blood-lead levels between 25 and 34 µg/dl. One- and two-year-old children accounted for 61% of cases. Of the children in the case group, 59% were black and 27% were Hispanic. From 1986 through 1989, the annual number of children screened increased by 27%, while the annual number of new cases fell by 30%. Because of incomplete screening, false negative results, and lack of information on children with lower but potentially harmful levels of blood lead (10-24 µg/dl), the magnitude of excessive lead absorption in New York City children is underestimated. These surveillance data indicate that lead poisoning among children is a persistent public health problem in New York City.

Introduction

Lead poisoning among children is a widespread and persistent public health problem in the United States. Although lead is also toxic to adults and affects virtually all organ systems, adverse effects on cognitive development and behavior in children are of special concern. In 1984, an estimated 200,700 U.S. children living in standard metropolitan statistical areas (SMSAs) had blood-lead levels of ≥ 25 µg/dl, CDC's current definition of an elevated blood-lead level for use in screening programs for children. Growing evidence indicates that levels of blood lead in the range of 10-15 µg/dl and above have adverse neurobehavioral effects in children; in 1984, an estimated 3 million children in SMSAs had blood-lead levels of ≥ 15 µg/dl.

The main source of lead exposure among lead-poisoned children in urban areas is lead-based paint. Children may ingest lead directly from paint chips, but an important route of exposure is the normal mouthing of hands or objects such as toys, resulting in the ingestion of small amounts of lead paint-contaminated housedust and soil. Children living in deteriorating housing built before 1950 are at high risk for excessive lead exposure via this route, and poor, black children in urban areas are disproportionately affected by lead poisoning.

Organized programs to screen children for lead poisoning were started in Chicago and other large cities in the late 1960s and expanded during the 1970s with federal support. Since that time, state and local childhood lead-poisoning prevention programs (CLPPPs) have remained the principal means by which lead-poisoned children are detected and lead-paint hazards are identified and abated. The New York

City Bureau of Lead Poisoning Control (BLPC), created in 1970, is the largest CLPPP in the country. In this report, the characteristics of lead-poisoning cases identified through surveillance by BLPC for 1988 are described, and time-trends in overall case counts from 1986 through 1989 are reported.

Methods

BLPC has the responsibility for screening children for lead poisoning, facilitating and monitoring screening conducted by health-care providers, inspecting dwellings of lead-poisoned children for lead-based paint, and ensuring that lead-paint hazards are abated when identified. This report is based on BLPC's computerized registry of childhood lead-poisoning cases, which are identified in three ways. First, BLPC monitors screening and diagnostic tests for lead poisoning performed by city-operated and affiliated clinics and hospitals and by some private providers. Second, BLPC staff conduct "door-to-door" household screening, usually in targeted, high-risk neighborhoods. Finally, cases are identified through mandatory reporting of blood-lead levels of ≥ 25 µg/dl by private laboratories to BLPC.

Two screening methods are used by providers reporting to BLPC. In approximately 60% of screening tests, portable hematofluorometers are used to measure zinc protoporphyrin (ZPP) on site from capillary blood samples. Children who screen positive, defined as ZPP of ≥ 35 µg/dl, are evaluated with a venous blood-lead measurement. In the second screening method, capillary blood samples are collected on lead-free filter paper. These are submitted to the New York City Bureau of Laboratories and analyzed for free erythrocyte protoporphyrin (FEP) and for blood lead if the FEP is ≥ 35 µg/dl. Children with blood-lead measurements of ≥ 25 µg/dl, as indicated by the filter-paper method, are recalled for a venous blood-lead measurement. Case-group children are defined as children with venous blood-lead levels of ≥ 25 µg/dl and ZPP or FEP levels of ≥ 35 µg/dl. In addition, children's capillary blood-lead levels of ≥ 70 µg/dl and FEP of ≥ 110 µg/dl or with capillary blood-lead levels of ≥ 50 µg/dl and FEP of ≥ 250 µg/dl are tentatively registered as cases, pending the venous blood-lead level.

Because laboratory tests for lead toxicity reported to BLPC include follow-up tests, estimates of the number of persons screened are obtained by multiplying the number of tests by 0.92, the estimated proportion of tests that are screening tests (BLPC, unpublished data). These estimates were used in this report to compute "case-detection rates"-cases per 100 persons screened. Age- and race-specific estimates of persons screened were not available. Age- and race-specific enrollment data were available for city clinics and hospitals where a previous study showed that approximately 75% of active patients 9 months through 6 years of age were screened at least annually (BLPC, unpublished data). These data were used to compute case/enrollment

ratios for children 9 months through 5 years of age seen at such facilities.

Results

In 1988, an estimated 229,365 New York City children had screening tests for lead poisoning that were reported to BLPC. Among these children, 694 new cases of lead poisoning were detected. Private laboratories reported an additional 102 new cases to BLPC. Screening conducted at city clinics and hospitals accounted for 375 cases (47% of all cases identified). BLPC door-to-door screening identified <10% of cases but yielded the highest case-detection rate (1.17 cases per 100 children screened).

In most new cases (61%), the children had blood-lead levels between 25 and 34 $\mu\text{g}/\text{dl}$. Thirteen percent had blood-lead levels of $\geq 50 \mu\text{g}/\text{dl}$, levels that may be associated with overt symptoms. In addition to these new cases, in 545 cases identified before 1988, the children had at least one blood-lead level of $>25 \mu\text{g}/\text{dl}$ measured in 1988. These "previous/active" cases included children still undergoing treatment, children whose homes had not yet undergone abatement for lead-based paint, and children whose blood-lead levels remained elevated after household abatement.

In 1988, 1- and 2-year-old children accounted for 61% of all lead-poisoning cases. The age distribution for all cases was closely paralleled by that for cases identified at city clinics and hospitals. The case/enrollment ratio in the latter group peaked among 2-year-olds at 0.3 cases per 100 children enrolled.

More than three-fourths of all cases identified occurred among black (59%) or Hispanic (28%) children. A similar racial distribution was noted among cases identified at city clinics and hospitals, where the case/enrollment ratio among black children (0.23 cases per 100 enrolled) was nearly four times that among white children (0.06 cases per 100 enrolled). The highest case/enrollment ratio (0.30) was observed in the "other" racial/ethnic category. Asians and Pacific Islanders accounted for 41% of "other" children enrolled at city clinics and hospitals; the BLPC case registry does not include a separate category for Asians or Pacific Islanders.

BLPC data indicated that the number of children screened annually was 27% greater in 1989 than in 1986, the first full year in which current lead-poisoning criteria were used. During this same period, the annual number of new cases decreased by 30%, from 1,284 to 897; however, a 15% increase in the number of children screened from 1988 through 1989 was associated with a 13% increase in new cases. The number of previously identified cases in which the child had measured blood-lead levels of $\geq 25 \mu\text{g}/\text{dl}$ decreased each year during the period.

Discussion

BLPC data indicate that childhood lead poisoning is a persistent public health problem in New York City, as it is in many other cities. Because of certain limitations of BLPC data, the magnitude of excessive lead absorption among children in New York City is underestimated. First, not all children in the high-risk age group (9 months through 5 years of age) are screened. The screening coverage for children receiving care from non-city-affiliated providers is un-

known, but it probably is lower than the estimated 75% coverage at city-affiliated facilities. In most new cases (87%) identified by BLPC, the children had blood-lead levels that were toxic but too low to cause overt symptoms. Such cases would not be detected without screening. Second, the principal screening methods that were used miss a substantial proportion of children with elevated blood-lead levels. Estimated false-negative rates for FEP and ZPP screening range from 30% (CDC, unpublished date) to >50%. Third, the current CDC case definition of lead poisoning excludes children with blood-lead levels between 10 and 24 $\mu\text{g}/\text{dl}$. Recent research has linked such levels with adverse effects in children, and the CDC case definition will soon be revised to reflect these findings.

An advantage of the fixed-site screening methods used in New York City is that large numbers of children can be screened efficiently by primary-care providers during routine pediatric care. However, high-risk children with limited access to primary care may be missed by such screening. The BLPC experience suggests that door-to-door screening in selected neighborhoods may be a useful, though time-consuming, way of detecting cases missed by fixed-site screening.

BLPC surveillance data are consistent with national data showing that children ages 6 months through 2 years are at highest risk of lead poisoning. Toddlers are especially liable to ingest lead in contaminated environments because of normal mouthing behavior and increased hand contact with dirt and dust. Children in this age group are also more susceptible than older children to lead-related neurobehavioral toxicity.

The predominance of black and Hispanic children in the case group in New York City is partly attributable to the racial and ethnic composition of children served by city-affiliated clinics and hospitals. The distribution of cases by racial/ethnic group probably also reflects and increased risk of lead poisoning among black and Hispanic children, suggested by higher ratios of cases to enrolled children in those groups compared with whites. Data from the Second National Health and Nutrition Examination Survey indicate that black children have a higher prevalence of elevated blood-lead levels than white children, regardless of age, household income, or degree of urbanization. In 1984, black children accounted for an estimated 60% of children in SMSAs with blood-lead levels $>25 \mu\text{g}/\text{dl}$.

The decrease in annual case counts over time is consistent with the experience of CLPPPs nationally. Previous screening and abatement activities have addressed lead paint hazards in only a small proportion of homes with leaded paint and therefore cannot account entirely for this trend. For example, in 1984, approximately 422,800 New York City children 6 months through 5 years of age lived in housing constructed before 1950, most of which still contains leaded paint. Intensive education efforts and decreased contributions to blood-lead levels from other sources, especially leaded gasoline, probably account for some of the decrease in lead poisoning cases.

Although surveillance data indicate that blood-lead levels and the incidence of lead poisoning are decreasing, recent research has identified adverse health effects at blood-lead

levels previously thought to be safe. As a result, the recognized public health burden of lead poisoning among children remains large. More intensive screening and abatement efforts are needed to eliminate blood-lead levels ≥ 25 $\mu\text{g}/\text{dl}$ in New York City children. Addressing the larger numbers of children with toxic blood-lead levels < 25 $\mu\text{g}/\text{dl}$ will require a still greater commitment of resources.

MMWR, Vol. 39, No. SS-4

Are The Alternatives To Municipal Waters Truly Safer?

A 1989 Gallup poll is quoted as indicating that 95% of Canadians are concerned about the quality of drinking water in Canada and that millions either drink "only bottled water or use filtering devices at home." Canadians are not unique in their concern. In 1985, "Americans consumed nearly \$1 billion worth of bottled water." In France and Belgium, the consumption of bottled water is reported to be 50 litres per person per year. Current concern relates mainly to chemical pollutants in municipal water supplies, although infectious agents are still an important cause of waterborne acute illness, especially protozoa and viruses. The public is seeking alternatives to municipal tap water, but these alternatives should be safe. Tobin et al have warned of the dangers of using "point-of-use carbon filters," and Warburton et al have recommended a surveillance of bottled water. In the summer of 1989 a pilot study was conducted in Winnipeg to determine the quality of bottled water processed and sold in Manitoba. The results of this study and a discussion on the microbiologic quality of bottled water are presented.

Materials and Methods

A total of 60 bottles of water were collected by health inspectors in the City of Winnipeg; 3 bottles were submitted from each of 19 establishments between 5 June and 10 August, 1989. Of the 19 stores selected, 8 were health food stores, 2 were retail stores, and 9 were involved in processing, bottling or refilling. The source of water was spring water in one, Artesian well in 4 and City of Winnipeg water in the rest.

The bottles were submitted to the Cadham Provincial Laboratory (CPL) for immediate bacteriologic analyses. Water was processed by membrane filtration (MF) for total coliforms and pour plate for standard plate counts (SPCs) of aerobic bacteria, using recommended laboratory procedures. Whenever the SPC exceeded the level of 100 colony forming units (CFU)/mL, recommended in the federal guidelines organisms were speciated using standard laboratory procedures.

Results

The SPC exceeded the acceptable level of 100 CFU/mL in 72% of the bottles submitted, i.e., 43 of the 60 bottles tested; in 30 samples the SPC was 3000 CFU/mL.

Speciation documented the presence of 17 types of microorganisms. Of concern is the presence of coagulase-positive *Staphylococcus aureus* in 2 of the 43 samples

selected for speciation. One sample had been purified using deionization, ultraviolet light treatment and carbon filtration, and the other had been distilled and treated with ultraviolet light.

Very low counts (i.e., 1/100 mL) of total coliforms were found in 4 samples of water; all had SPCs 3000 CFU/mL; one of the waters was distilled and treated with ultraviolet light and 3 were distilled and carbon filtered.

Enterococcus was found in one sample of distilled and carbon-filtered water which had an SPC of 3000 CFU/mL.

Discussion

Information on the microbiologic quality of bottled water is scarce, yet the sources of contamination are multiple. Autochthonous bacteria are found in all waters, even pristine ones. Usually, they grow better at 22 °C, are Gram negative (mainly *Achromobacter*, *Flavobacterium*, *Alcaligenes*, *Acinetobacter*, *Moraxella*, *Pseudomonas*, other than *P. aeruginosa*), and are believed to be non-pathogenic.

Prior to bottling, most manufacturers attempt purification of natural waters using a variety of treatments including distillation, carbon filtration, ultraviolet sterilization, deionization or reverse osmosis. Any malfunction in the processing plant, improper sterilization of bottles, or poor housekeeping practices will result in the introduction of more microorganisms, some of them known human pathogens. Usually these grow better at 37°C. Representatives of contamination at this stage include fungi, *Bacillus* and Gram-positive cocci such as *Micrococcus*, *Staphylococcus* and *Streptococcus* spp.

Storage of bottled water provides an opportunity for the regrowth of some of the autochthonous bacteria. This regrowth occurs during a period of 1-3 weeks regardless of the process used for purification or the temperature at which the water is stored. Recently, Payment reported regrowth in water purified in homes by reverse osmosis; he noticed a single species growth often and was able to recover large numbers of bacteria; however, he stated that these bacteria posed no risk to health.

Bottled water has not been linked directly with either sporadic cases or outbreaks of infectious diseases. This observation is comforting though misleading. Tracing the source of an infection to water is difficult and only outbreaks involving sudden illness in a large number of individuals manage to trigger an investigation. Health officials tend to rely on surveillance programs and enforcement of water quality guidelines. All countries have a monitoring program for municipal potable water but few, if any, have a surveillance program and water quality guidelines for bottled water. Guidelines have been developed for assessing water quality in the bottling plant, but not at the "point of sale." A maximum of 100 SPC/mL at 22°C has been recommended by the European Community and Canada. Pathogens, coliforms and *P. aeruginosa* should be absent from bottled waters.

Comment

Bottled water is a regular part of the diet of many Canadians. It is used as a substitute for soft drinks and alcohol, and is seen by some consumers as a purer or better

tasting alternative to tap water. However, while the bottled water available in Canada is generally of good quality, consumers should know that it is not necessarily safer than water from the tap.

Most Canadians are not aware that bottled water is a food and thus is not a sterile product. Like foods, bottled water can contain naturally occurring bacteria, which under improper and/or prolonged storage conditions can increase in numbers to levels that may be harmful to health. Refrigeration of bottled water is an effective means to minimize microbial growth. Moreover, because bottled water is not a sterile product, it should not be used as a substitute for sterile solutions such as for contact lenses.

The sale of bottled water is not licensed, but is subject to government inspection. The Health Protection Branch conducts periodic spot checks of both domestic and foreign bottled water to assess bacteria quality. Spot checks for heavy metals and some industrial chemical contaminants are also undertaken on a limited basis. Problem areas are, of course, subject to additional monitoring.

Canadian Diseases Weekly Report, 11/3/90

Arboviral Surveillance

Update: St. Louis Encephalitis in Florida and Texas, United States, 1990

In July 1990, active surveillance of national arboviral transmission patterns indicated that outbreaks of St. Louis encephalitis (SLE) might occur in Florida and in Houston and Harris County, Texas. Subsequently, a cluster of cases was reported from central Florida, and sporadic cases were recognized in Harris County.

Florida

As of 24 October 1990, 74 laboratory-confirmed cases and 26 suspect cases of SLE had been reported. Two patients had died and 1 fatal case was under investigation. The affected counties have maintained programs of larviciding and aerial and ground-based adulticiding for control of *Culex nigripalpus*, the principal mosquito vector of SLE in Florida. Residents and visitors to affected counties have been cautioned to continue using personal protective measures against mosquitos. In some affected counties, evening recreational activities have been rescheduled to daylight hours.

Texas

In 1990, mosquitos infected with SLE virus were detected in Houston and surrounding Harris County on 19 June, almost 1 month earlier than in previous epidemic years and at higher levels than usual. As of 7 September, 2 cases of SLE had been reported: since then, 10 additional cases have been confirmed serologically. All 12 patients were residents of Harris County. Two infected patients have died, but the causes of death have not been established.

Mosquito surveillance and control activities have been intensified throughout Harris County, especially in areas reporting human cases and in areas where infected mosquitos

were found. No infected mosquitos have been detected since 26 September.

MMWR Editorial Note: SLE is transmitted in Florida principally by *Cx. nigripalpus*, a predominantly exophilic (outdoor biting) mosquito found throughout central and south Florida. Feeding activity is most intense at night, especially at dusk and at dawn. Although vector control is an important means of decreasing transmission of SLE to humans, personal protective measures are also important. These practices include avoiding night-time outdoor activity in affected counties, especially at dusk and dawn; for persons who cannot avoid outdoor activity during these periods, wearing long-sleeved shirts and long trousers of tightly woven material and applying mosquito repellents are recommended.

In Harris County, Texas, and throughout the southeastern United States, *Cx. quinquefasciatus*, the southern house mosquito, is the principal vector of SLE. In contrast to *Cx. nigripalpus* which feeds in various outdoor locations, *Cx. quinquefasciatus* is a highly domesticated species and may feed indoors or outdoors. Risk for acquiring the disease has been epidemiologically associated with inadequately screened residences; conversely, air-conditioned residences, especially residences with central air-conditioning units, have been found to be protective.

In both central Florida and in Harris County, Texas the risk for further epidemic transmission should decline as the activity of vector mosquitos diminishes with cooling temperatures.

Canadian Diseases Weekly Report, 11/24/90

When the
safety and
integrity
of your
product is
at stake ...



Count on ...

Acculab

for fast accurate
microbe identification
using fatty acid analysis

(302) 292-8888

Please circle No. 115 on your Reader Service Card
Stop by our Exhibit at the 1991 IAMFES Annual Meeting
DAIRY, FOOD AND ENVIRONMENTAL SANITATION/MAY 1991 275



N.M.C.

NATIONAL MASTITIS COUNCIL

Teat Dip Testing Methods: An NMC Update

Postmilking teat dipping is one of the most effective management practices to prevent mastitis. Numerous products are marketed as teat dips, however no government agency requires data to establish whether a particular teat dip effectively reduces the incidence of new intramammary infections (efficacy data). Several years ago, the National Mastitis Council (NMC) developed protocols to provide teat dip manufacturers with standardized test methods for determining teat dip efficacy. The protocols detail experimental design; selection of herds, cows and quarters; preparation of bacterial cultures; teat dipping; sampling schedule and procedures; criteria for diagnosing infections; size and duration of trial; and presentation of data.

Teat dip efficacy studies are conducted under either 1) experimental challenge conditions, or 2) natural exposure conditions. "Experimental challenge studies" evaluate the ability of a teat dip to prevent new intramammary infections when teats are experimentally challenged with mastitis pathogens. Teats are experimentally challenged by immersion in a bacterial suspension containing specific pathogens immediately after milking units are removed. This protocol determines efficacy under experimental conditions only. "Natural exposure studies" evaluate the ability of a teat dip to prevent naturally occurring infections in cows under normal field conditions. Natural exposure with a *negative control* compares a new teat dip product to no teat dipping. Natural exposure with a *positive control* compares a new teat dip product to a teat dip of known efficacy.

The original NMC protocols, developed in the 1970s, were designated A, B and C. Protocol A, intended as a screening test only, measured bactericidal activity of a teat dip formulation on teat skin. Protocol B outlined procedures to determine ability of a teat dip to prevent infections under experimental challenge conditions. Protocol C outlined procedures to determine ability of a teat dip to prevent natural infections under normal field conditions.

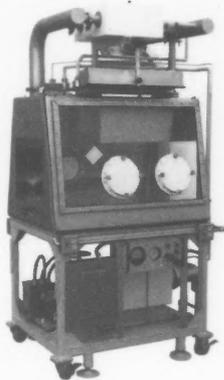
NMC recently revised the protocols to enhance scientific merit, reflect new technologies and further ensure standardization of test procedures. The previous alphabetical name designations (A, B and C) were dropped and changed to identify the investigative method used. The revisions do not invalidate or change the meaning of previous efficacy studies or require that they be redone.

NMC currently recommends the following protocols: 1) Efficacy of a Postmilking Teat Dip After Experimental Exposure of Teats to Mastitis Pathogens (compares to former protocol B), 2) Efficacy of a Postmilking Teat Dip Based on Reduction of Naturally Occurring New Intramammary Infections (compares to former protocol C, using a negative control) and 3) Comparing an Experimental Postmilking Teat Dip with a Product of Known Efficacy Based on Incidence of Naturally Occurring New Intramammary Infections (compares to former protocol C, using a positive control). Note that former Protocol A is no longer recommended.

NMC does not test or approve teat dips - NMC only recommends protocols for manufacturers to use in testing teat dips. Be aware that federal regulations do not require efficacy data on teat dip products. Therefore, teat dips can be manufactured and marketed without demonstrating effectiveness. In this "buyer beware" market, the consumer is responsible for determining whether a particular product has been tested and proven effective. Before using or recommending a particular product, request written information from the manufacturer or dealer on compliance with federal regulations and results of controlled research studies showing effectiveness.

For additional information, contact the NMC, 1840 Wilson Blvd., Arlington, VA 22201; 703-243-8268.

Industry Products



Walker Introduces a Portable Glovebox

The Portable Glovebox is a good member of the family of Stainless Steel Gloveboxes made by WALKER STAINLESS EQUIPMENT COMPANY, INC.

WALKER STAINLESS EQUIPMENT CO., INC. has experience with the fabrication of these types of containments with volumes from 2 to 200 cu. ft.

"Safety first" is the slogan for our designs. Direct contact of humans with the protected or toxic environment is avoided. Yet, hands-on control and visual control is available.

The Gloveboxes are designed to accommodate your wet or dry process while providing efficient room for manipulation. The concept of "volume for process and manipulation only" gives better opportunities for creating a required environment.

The limited volume also makes maintaining such an environment more economical. Typical helium media leaktest integrity is measured at 10⁻⁸ torr of vacuum or sniffing methods.

The corrosion resistant Stainless Steel Boxes are designed for exceptional visibility and control. Process Control and manipulation can be manual as well as remote or both.

Gloveports and gloves for hand-on control are arranged into LEXAN® or Safety Glass windows for a complete view of the operators tasks.

Cylindrical or square airlocks with 100% retractable slidetrays (both ways) are available with hinged, swinging or sliding doors.

Special attention is given to the maintenance of the environment through filtering, humidity control and gas ratio control.

Walker Stainless Equipment Co. -
Cudahy, WI

**Please circle No. 256
on your Reader Service Card**



Automatic SENSAMATIC FAUCET

WORLD DRYER CORPORATION, the leader in warm air hand and hair dryers, is pleased to announce the addition of the new SENSAMATIC FAUCET. This product line expansion exemplifies the company's 40-year commitment to the world concerning sanitation, energy, and natural resource conservation issues.

The SENSAMATIC FAUCET dispenses water automatically when the hands enter the invisible infrared field located under the spout. The pre-mixed, tempered water then turns off when hands are pulled away. The faucet prevents water from running needlessly and conserves energy. Water is conserved and costs reduced.

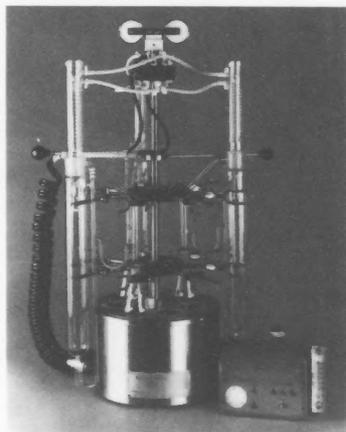
Since the faucet turns on and off automatically, there are no knobs to touch after hands have been cleaned. What could be more clean and sanitary. The automatic feature also reduces vandalism, since there are no knobs or handles to turn and break, and the water cannot be left running.

World Dryer's SENSAMATIC FAUCETS are easy to install in all types of wash basins. The user-friendly design allows for installation in your new or existing facilities. Simply hook up the valves to the water line and plug it in.

The SENSAMATIC FAUCET makes it possible to improve hygiene, reduce your operating expenses, and conserve resources. Used in conjunction with World's Automatic hand dryers, it is possible to have a totally-automated wash-room with WORLD DRYER.

World Dryer Corp. - Berkeley, IL

**Please circle No. 257
on your Reader Service Card**



Liquid-Liquid Analytical Extractor Offered in 7 or 10 Glassware Configurations

An analytical extractor that accommodates a variety of different extraction apparatus such as those designed by Hershberg-Wolfe, David Slizys, the Logsdon design and David Dalton is available from Organomation Associates, Inc. of Berlin, Massachusetts.

The ROT-X-TRACT-L Liquid-Liquid Analytical Extractor is offered in 7 or 10 glassware configurations and is supplied with hole covers for unused openings in the bath. Accommodating a variety of different extraction apparatus, all glassware is accessible from the front and is easily removed along with a removable frit in the Hershberg-Wolfe extractors which aids cleaning.

Designed for continuous, unattended extraction and subsequent evaporation in the same flask, the ROT-X-TRACT-L Liquid-Liquid Analytical Extractor accepts standard 250 ml Kuderna-Danish boiling flasks. A temperature cut-off switch will detect low bath water levels and a flow detector monitors water from the condenser manifold. An optional water chiller is offered.

Venmark International - Wellesley, MA

**Please circle No. 258
on your Reader Service Card**



Plastic Relief Valve Protects Piping System Components

Hayward's all Plastic PVC Relief Valves have been designed to protect piping system components from damage due to over pressurization. Reverse osmosis units, filters and tanks are examples of components that can be protected by Hayward Plastic Relief Valves.

The valve can be set, without the use of tools, to relieve at any desired pressure between 5 and 100 psi. When the system pressure exceeds the set pressure, the valve opens, diverts the process media flow and relieves the excessive pressure. The valve then remains open until the system pressure drops, at which time the valve resets itself automatically. Unlike metal relief valves, they cannot stick or jam due to internal corrosion.

Hayward Plastic PVC Relief Valves are ideal for applications that require a corrosion resistant, non-contaminating valve. PVC is resistant to most corrosive materials and will not contaminate sensitive fluids that come in contact with it. Examples of industries that will benefit from this valve are chemical processing, ultrapure water, electroplating and water treatment.

A unique feature of this plastic relief valve is a threaded gauge port that is integrally molded into the valve body. This makes it easy to install a pressure gauge to monitor system pressures. The valve is available in five sizes from 1/2 in. to 2 in. with threaded end connections and either Viton or EPDM seals.

Hayward Industrial Products -
Elizabeth, NJ

Please circle No. 259
on your Reader Service Card

Glengarry Biotech Introduces CAL-EZE Dry Powder Calibrant for IR Milk Analyzers

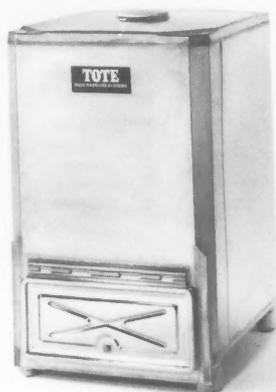
Glengarry Biotech announces the introduction of CAL-EZE, the dry powder calibrant for infrared milk analyzers. CAL-EZE has a shelf-life of at least one year, and is reconstituted by adding 50 C tap water to a prescribed weight of the powder.

CAL-EZE is presented in kits of 12 samples which range from low to high fat. These reconstituted calibrants may be kept in refrigerated storage for up to 21 days. A kit will enable the reconstitution of 5 sets of calibrants.

A re-print of the AOAC paper "Dry Calibration Milks for infrared Milk Analyzers" is available on request.

Glengarry Biotech - Cornwall, Ontario

Please circle No. 260
on your Reader Service Card



Tote Announces U.S.D.A.- Approved Container

TOTE Bulk Handling Systems of Fort Worth, Texas, has announced U.S.D.A. approval of their newly designed container. Engineered for the bulk powder industries, this particular container is suited for use in the dairy, food, pharmaceutical, chemical, plastic and solid fuel industries.

The container can be used for blending, storing, or shipping bulk powder requiring sanitary conditions specified by the U.S.D.A. Some of the features include:

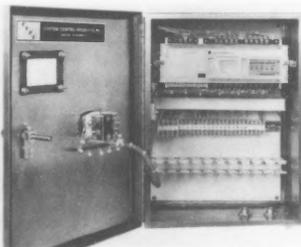
- 45° no-trap corner engineering
- Stainless steel side door
- E.P.D.M. white gasket door seals
- Proprietary blade door hinge design which will -
 - open and slide-aside; staying at variable, horizontally fixed positions
 - remain propped open
 - allow complete door removal
 - seal the door tight
- Nylon cam-closure on door
- White EPDM cap-seal on top hatch opening

"This container was an engineering challenge that we're really proud to have met," said Larry Guenther, manager of marketing and sales. "Now customers who need to comply with U.S.D.A. standards can have the convenience and efficiency of TOTE bulk handling containers."

Tote containers are engineered to reduce contamination, facilitate handling ease, maximize efficiency, integrate and automate, and reduce environmental waste.

TOTE Systems - Ft. Worth, TX

Please circle No. 262
on your Reader Service Card



Custom Control Products Inc. - Leading the Industry

Custom Control Products Inc. announces its new Flow Diversion Valve Control (FDVC). This solid state Flow Diversion Valve Control is in compliance with PMO and FDA regulations for use in a Grade "A" milk plant.

Unlike electromechanical flow diversion valve controls, the innovative FDVC from Custom Control Products contains no moving parts. Downtime previously associated with valve problems is now minimized or eliminated. A window in the sealed box reveals on-line indicator lights for quick diagnostic identification of system status.

Engineered and tested for over three years, the Flow Diversion Valve Control is specifically designed to be totally compatible with all flow diversion valves conforming with 3A/FDA regulations and guidelines.

Custom Control Products Inc. provides the highest quality control systems and auxiliary products backed by personal and professional service to the dairy, food and industrial markets.

Custom Control Products, Inc. -
Racine, WI

Please circle No. 261
on your Reader Service Card



New Analyzer from Trebor Determines Constituents of Whole Foods

A new Food Analyzer, TREBOR-70L, able to handle whole foods up to 6"x6-3/4"x9" (approx. 15x16x23 cm) is now available from Trebor Industries, Inc., Hagerstown, MD. Its ability to measure by infrared transmission without the need for cutting, grinding or crushing makes Model 70L ideal for rapid analysis of the internal quality of bulky whole products. Model 70L allows simultaneous measurement of a vast number of constituents for virtually every farm product. Typical applications include food such as tomato, corn, potato, apple, peach, plum, pear, melons and virtually any food smaller than 9" (major axis). For research or QC projects, TREBOR-70L can provide chlorophyll and sugar percent in fruit; total solids, presence of disease, maturity and after-processing constituent parameters for potato chips and other fluffy and flakey products. In addition, processed foods -- snacks, candies, etc., are also analyzed quickly.

TREBOR-70L Whole Food Analyzer displays up to 12 constituents directly in percent on a large screen video. Constituents can include most organic compounds such as protein, moisture, fat and fiber, as well as empirical parameters, i.e., taste acceptability. In operation, infrared spectral data is obtained by transmission at every nanometer from 600 to 1100 nm and analyzed by a series of mathematical data manipulations.

After loading the whole or processed fruit or vegetable into the large chamber, TREBOR-70L operates from its keypad, giving results in seconds. Data are unaffected by high moisture or fat content. Although the unit is factory-calibrated, the user can field-calibrate for special projects or products.

Trebor Industries, Inc. - Hagerstown, MD

Please circle No. 263
on your Reader Service Card

Voice Response Now Available for API 20S™ System

The API 20S™ v.2.1 data base is now available on Voice Response, a computer synthesized speech system which provides the Microbiology Laboratory with immediate answers to API profile identifications. This toll-free service allows 24 hour access to the API 20S computer data base. API 20E® (24-hour and 48-hour.) API 20C®, An-IDENT®, STAPH-IDENT®, Rapid* NFT, Rapid*E, Rapid* Strep and STAPH* Trac Identification Systems are also available on Voice Response. Consultation with certified microbiologists is also possible during business hours. Voice Response will now provide the API 20S customer with an instant profile identification at the touch of a button.

Analytab Products - Plainview, NY

Please circle No. 264
on your Reader Service Card



Accurate Digital LCD Thermometer -40 to 150°C in 0.1°

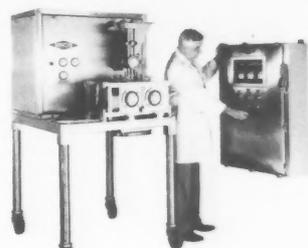
Brooklyn Thermometer's line of F.A.C.T.S. (Fahrenheit and Celsius Temperature System) thermometers is spearheaded by this new precision digital thermometer. Using the latest in micro-technology and a 10K thermistor sensor Catalog #6660 boasts an accuracy of $\pm 0.2^\circ$ and measurement range of -40 to 300°F & °C. Having a large LCD display in 0.1° resolution it also features a display light for readability in low light environments. Operator On/Off and function buttons are sealed against accidental liquid and corrosive chemical spills.

F.A.C.T.S. precision thermometer features interchangeable stainless steel probes allowing it to measure all surfaces, calibration baths, foods, ambient (air) for H.V.A.C., semi-solids, and for quality control and sample testing.

Brooklyn's line of F.A.C.T.S. thermometers -- consisting of "Basic," "Precision" and "Remote-Reading" units -- are economically priced and fully described in their new 44 page Catalog.

Brooklyn Thermometers Co., Inc. - Farmingdale, NY

Please circle No. 265
on your Reader Service Card



Fitzpatrick Features Easily-Cleaned Roll Compactor, Shows New USDA/3A Approved Components at IEFP '91

A portable Chilsonator® dry-powder compaction unit, designed for rapid disassembly and easy cleaning for applications in laboratory testing, process development and short production runs, was highlighted by The Fitzpatrick Company at the IEFP '91 Exhibition. In addition the company displayed a new design of rotor/blade assembly for its FitzMill® comminution mill featuring USDA/3A approval for dairy processing applications.

The L-89 Chilsonator compactor offers greater capacity than previous portable compaction units. To increase cleaning efficiency, the model can be completely disassembled without tools, and features a separate control panel that can be remotely mounted to keep electric controls away from the machine during cleaning. To further enhance cleanability, the L-89 is mounted on a stainless steel base designed to present minimal horizontal surfaces, thus eliminating places for product to accumulate during operation.

Fitzpatrick's USDA/3A rotor, principal operating component of the company's newly developed DAAS06 FitzMill comminutor, features an assembly of 16 blades precisely grooved to position silicone O-ring seals between blades, closing those interfaces against product accumulation. Special lock nuts, which hold the blade and rotor assembly together, are sealed in like fashion. This provides the advantage of individually replaceable blades, while eliminating the need to dismantle the rotor/blade assembly for routine cleaning/sanitizing procedures.

The new rotor design also features solid Teflon split O-ring packing glands to seal the rotor/chamber interfaces per USDA/3A requirements.

All product-contact components of the new rotor assembly are stainless steel, polished to a smoothness exceeding the USDA-required #4 finish. The new rotor/blade assembly is offered as a retrofit to earlier USDA FitzMill comminutors, allowing upgrade to current dairy specifications without the expense of replacing the entire mill.

The Fitzpatrick Company - Elmhurst, IL

Please circle No. 266
on your Reader Service Card

Haynes Sanitary Lubricating Spray in Aerosol Cans

A sanitary lubricant in aerosol cans, designed for easy application to foodservice equipment, door hinges and other sanitary parts will be introduced by Haynes Manufacturing Company at the National Restaurant Association show.

The convenient aerosol can is available with an optional, easily attached tube that enables the user to accurately pinpoint the area where the lubricant should be applied. Just pushing the release button, and spraying, quickly lubricates sanitary and foodservice equipment.

This lubricant is rated USDA H-1 and is made with 100% USDA and FDA accepted ingredients. Containing no animal or vegetable fats, odorless and tasteless, this neutral lubricant will not contaminate, taint, or harm food products. The lubricant is packaged in convenient 9 ounce aerosol cans.

Haynes® Manufacturing Co. -
Cleveland, OH

Please circle No. 267
on your Reader Service Card



Sulfamethazine Detection

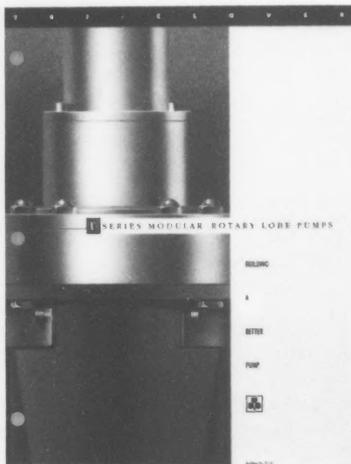
The Signal® ForSite™ Sulfamethazine Detection Test from SmithKline Beecham Animal Health gives you results that can be clearly seen in only four minutes.

Signal ForSite is an immunoassay based on solid phase antibody-antigen technology. And can be used to test milk, tissue (muscle), serum, urine and feed for sulfamethazine residue at a 10 ppb.

This economical, user-friendly test contains 20 reaction sites per kit.

SmithKline Animal Health - Exton, PA

Please circle No. 268
on your Reader Service Card



Tri-Clover Offers New Catalog Featuring T-Series Pumps

A new catalog, featuring the T-Series Modular Rotary Lobe Pumps, currently available from Tri-Clover, Inc.

The four color, eight page catalog offers detailed descriptions of all three basic models - the TSR, TSK and TSC -- that comprise the series. The catalog offers an overview of the series' modular concept and its adaptability to a variety of uses.

In addition, the catalog features a cut-away diagram detailing key elements of each pump group, and the various options each offers. Performance ranges, actual pump dimensions and a chart depicting product numbering system are also included in the catalog.

Tri-Clover, Inc. is a leading manufacturer of sanitary stainless steel valves, pumps and fittings, as well as flow control, batch/weight and Clean-in-Place (CIP) systems.

Tri-Clover, Inc. - Kenosha, WI

Please circle No. 269
on your Reader Service Card

Spotlight Kit for Dairy Products

The Spotlight™ Kit for Dairy Products is a rapid microbial screen for determining total count and coliform levels in uncultured dairy products. The test utilizes a pre-dispensed reagent cartridge and a portable detector to produce permanent, hard copy results. Total count results are available in 10 minutes, with next-day confirmation of coliform levels. The company also offers research kits for rapid measurement of bacteria and yeasts in other types of samples.

Analytical Luminescence Laboratory -
San Diego, CA

Please circle No. 270
on your Reader Service Card



Micro-Gen Introduces Pro-Control Total Release Fogger

David Campbell, president of Micro-Gen Equipment Corporation has announced the introduction of its new Pro-Control Total Release Fogger, with natural pyrethrin, for the commercial pest control industry.

In response to market research and customer demands for a safe, high quality product at competitive prices, Micro-Gen developed the Pro-Control Total Release Fogger. The Pro-Control Fogger contains natural pyrethrin, which is preferred over synthetics by pest control operators, but manufacturing efficiencies allow Micro-Gen to produce and sell the natural pyrethrin fogger at a much more competitive price.

The Pro-Control Fogger has food clearance and is approved for kitchens and food handling areas.

Micro-Gen Equipment Corp. -
San Antonio, TX

Please circle No. 271
on your Reader Service Card

Federal Register

Foreign Agricultural Service

List of Technical Working Group Contact Persons for the United States-Canada Free-Trade Agreement

Agency: Foreign Agricultural Service, USDA

Action: Notice

Summary: Notice is given of the U.S. contact persons of the technical working groups created by the United States-Canada Free Trade Agreement. The technical working groups are comprised of government officials from the United States and Canada. The purpose of these groups is to determine whether any technical changes to the administration of U.S. or Canadian law could be made to enhance bilateral agricultural trade. Each of these groups has been assigned specific trade areas. If any person wishes to submit information for consideration by a technical working group or obtain information about a technical working group, please contact the person representing that working group listed below.

Dairy, Fruit, Vegetable and Egg Inspection

Kenneth C. Clayton, Deputy Administrator, Marketing Programs, Agricultural Marketing Service, U.S. Department of Agriculture, room 3069-S, 14th & Independence Ave., SW., Washington, DC 20250, (202)447-4276 telephone, (202)447-8477 fax.

Food, Beverage and Color Additives and Unavoidable Contaminants

Ray Gill, Food and Drug Administration, Division of Nutrition (HFF-260), room 1844, 200 C St., SW., Washington, DC 20204, (202)485-0160 telephone, (202)472-1542 fax.

Packaging and Labeling

John Vanderveen, Food and Drug Administration, Division of Nutrition (HFF-260), rm 1844, 200 C St., SW., Washington, DC 20204, (202)245-1064 telephone, (202)426-7494 fax.

Seafood

Thomas Billy, National Marine Fisheries Service, U.S. Department of Commerce, 1335 East-West Highway, Silver Spring, MD 20910, (301)427-2351 telephone, (301)588-4853 fax.

Seeds

James Triplett, Agricultural Marketing Service, Seed Regulatory and Testing Branch, Bld 506, BARC-E, Beltsville, MD 20705, (301)344-4430 telephone, (301)344-4454 fax.

Animal Health

Dr. Robert Whiting, Animal and Plant Health Inspection Service, U.S. Department of Agriculture, Room 765 Federal Building, 6505 Belcrest Road, Hyattsville, MD 20782, (301)436-8590 telephone, (301)436-8226 fax.

Plant Health

Scot Campbell, Animal and Plant Health Inspection Service,

U.S. Department of Agriculture, Room 657 Federal Building, 6505 Belcrest Road, Hyattsville, MD 20782, (301)436-8892 telephone, (301)436-8318 fax.

Meat and Poultry Inspection

Pat Stolfa, Deputy Administrator, International Programs, Food Safety and Inspection Service, U.S. Department of Agriculture, room 341-E, 14th & Independence Ave., SW., Washington, DC 20250, (202)447-3473 telephone, (202)426-3856 fax.

Veterinary Drugs and Feeds

Dr. Gerald Guest, Dr. John Augburg, Food and Drug Administration, Center for Veterinary Medicine, 5600 Fisher Lane, room 757, Rockville, MD 20857, (301)443-3450 telephone, (301)443-3449 fax.

Pesticides and Fertilizers

Stanford Fertig, Agricultural Research Service, U.S. Department of Agriculture, BARC-East, Building 1070, Beltsville, MD 20705, (301)344-2845 telephone, (301)344-55063 fax.

Dates: March 13, 1991.

For further information contact: Lawrence D. Fuell, FAS, International Trade Policy, room 5506-S, U.S. Department of Agriculture, Washington, DC 20250, (202)382-1335 telephone, (202)382-8069 fax.

Supplementary information: On January 2, 1988, President Reagan signed the United States-Canada Free-Trade Agreement (hereafter "FTA"). Pursuant to Article 2105, the "Agreement shall enter into force on January 1, 1989, upon exchange of diplomatic notes certifying the completion of necessary legal procedures by each Party." To implement the United States obligations of the Agreement, the Congress passed and President Reagan signed into law the United States-Canada Free-Trade Agreement Implementation Act of 1988, Public Law 100-449.

Article 708 of the FTA required the creation of technical working groups which would attempt to resolve barriers to bilateral agricultural trade caused by differences in U.S. and Canadian technical regulations and standards concerning agricultural, food, beverage, and other related goods. These working groups are comprised of government officials from the United States and Canada. The purpose of these groups is to raise issues concerning technical barriers to bilateral agricultural trade, develop proposals to resolve such trade barriers, and forward those proposals to their respective governments. These groups do not have the authority to make binding agreements between the two governments and they have no independent authority to change law in either the United States or Canada. The working groups merely provide a forum for the governments to raise and discuss possible solutions to technical agricultural trade issues.

Federal Register/Vol. 56, No. 49/Wednesday, March 13, 1991/Notices

Updates . . .

The following are additional symposia for the 78th IAMFES Annual Meeting, July 21-24, 1991 at the Galt House in Louisville, Kentucky. Both these symposia will be held on Wednesday, July 24th.

A SAMPLING OF ASEPTIC PROCESSING ISSUE SYMPOSIUM

Convener: D. Barnard

- 8:30 Overview of FDA Regulations: Differences Between Low-Acid Aseptic and UHT-Long-Life
- 9:00 Critical Design Concepts for Aseptic Processing Equipment
- 9:30 Packaging and Package Machine Design Requirements for Aseptic Products
- 10:00 Break
- 10:20 Establishment of Processes for Homogenous and Nonhomogenous Products to be Processed Aseptically
- 10:50 Validation of Aseptic Operations

THE FOOD PROCESSING ENVIRONMENT: A CRITICAL CONTROL POINT FOR MICROBIOLOGICAL HAZARDS SYMPOSIUM

Convener: D. GABIS

- 8:30 Management of Microbiological Risks in the Food Processing Environment: Identifying and Evaluating Hazards
- 9:00 The Role of Facilities Design and Construction
- 9:30 Process Equipment Design, Fabrication, and Installation: A Systems Approach
- 10:00 Break
- 10:20 The Role of the Maintenance and Repair Function in Microbiological Risk Management
- 10:50 Microbiological Risk Control Through Cleaning and Disinfection Practices
- 11:20 The Human Factor - Management of Microbiological Risks Through the Work Force: The Role of Education, Training, and Hiring Practices

Long-Time IAMFES Member Ivan Parkin Passes Away

Ivan E. Parkin, formerly of Westbrook, Connecticut, passed away April 20, 1991 at the age of 87. Mr. Parkin succumbed at the Highview Healthcare Center, Middletown, CT, following a long illness.

Mr. Parkin was born December 28, 1903 in Meriden, CT and lived in Westbrook for 25 years. He is survived by a son, Stanton of Milford, CT; a daughter, Sandra Ramsdale of Westbrook, CT; and nine grandchildren.

A private service and burial for Mr. Parkin was held at the Swan Funeral Home, Old Saybrook, CT. Memorial contributions may be made to the Westbrook Congregational Church, Main Street, Westbrook, CT 06498 or the American Cancer Society, 8 Lunar Drive, Woodbridge, CT 06525.

Mr. Parkin, a long-time member of the International Association of Milk, Food and Environmental Sanitarians, was an alumnus of the University of Connecticut and, for many years, served on the faculty at Pennsylvania State University as a Dairy Extension Specialist, retiring in 1963. He was elected to the IAMFES Executive Board in 1951, and served as President in 1954-55. An Honorary Life Member of IAMFES, Mr. Parkin received the Citation Award in 1970 for his many years of devoted service to the ideals and objectives of the Association. Following his retirement from Penn State, Mr. Parkin continued his contributions to the Association, serving as Parliamentarian at the Annual Business Meeting.

In 1986, the Association began a Guest Lectureship program for its Annual Meeting. In seeking a name for this Lectureship, the goal was to honor an Association member who had contributed substantially to IAMFES. The overwhelming choice was Ivan Parkin. The first Ivan Parkin Lectureship was presented at the 73rd Annual Meeting in Minneapolis, MN. An excerpt from the introduction of this first Ivan Parkin Lectureship indicates the high esteem in which Mr. Parkin was held.

"You can always rely on Ivan to lend a helping hand and to provide you with candid guidance. Ivan is truly Mr. IAMFES, serving as an example to others as a professional, a contributor, a loyal member and a kind and warm person who is most deserving of this special recognition."

Greatly respected and admired by his fellow Association members, Mr. Parkin's candor, commitment and genuine affection for his fellow man will be sorely missed by all.

Synopsis of Papers for the 78th Annual Meeting

Abstracts of papers to be presented at the 78th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc. to be held in Louisville, Kentucky, July 21-24, 1991.

Monitoring The Hygienic Status Of Surfaces, J.T. Holah, Campden Food and Drink Research Association, Chipping Campden, Glos. U.K.

The requirement in the food industry for an assessment of the hygienic status of surfaces in a time relative to process control has led to the development of rapid methodology. Such techniques include direct epifluorescent microscopy (DEM), the direct epifluorescent filter technique (DEFT) and the measurement of ATP, from both microbial and total sources. The accuracy of these rapid methods was compared to traditional techniques including swabbing and contact plates (both laboratory prepared and commercial kits) by assessing each method's ability to enumerate population ranges of bacteria grown as biofilms on stainless steel surfaces. Results showed that DEM was easily the most accurate and all other techniques were therefore compared to this method.

Traditional techniques were shown to be accurate at surface population levels likely to be found after cleaning was generally ± 2 log orders. The swabbing based rapid methods DEFT and ATP, were shown to be no less accurate than traditional techniques, but have the advantage of providing a result in minutes. The practical attributes of the various techniques assessed is also discussed.

The Dispersal of Microorganisms By Cleaning Systems, J.T. Holah* and J.S. Holder, Campden Food and Drink Research Association, Chipping Campden, Glos., U.K.

The dispersal of microorganisms, including *Listeria*, via soil particles, water droplets and aerosols ($<40\mu\text{m}$) was assessed for a range of cleaning techniques. The techniques could be divided into two categories: those that dispersed microorganisms to a height that could contaminate product or product contact surfaces (assumed as $> 1\text{m}$) and those that did not spread a significant number of droplets to this height. A high pressure/low volume spray lance and a low pressure/high volume hose were both shown to spread water to a height well in excess of 1m and their use in areas where microbial contamination of product is undesirable, during production periods, should be restricted. In addition, because of the dispersal range, when these techniques are used out of production periods all product contact surfaces should be disinfected as the final stage of the total environmental sanitation programme. A number of techniques including a rotary floor scrubber, a rotary wall/floor scrubber, a scrubber drier, a high pressure/low volume floorhood attachment and manual techniques were shown to be unlikely to contaminate product/product contact surfaces and are hence more suitable for use in 'clean as you go' operations. All cleaning techniques were shown to disperse viable microorganisms from biofilms developed on flooring materials via both water droplets and aerosols.

A Practical View Of The Sous Vide Issue From A Food Service Perspective, Cindy Holden, Shoney's, Inc., 1727 Elm Hill Pike, Nashville, TN 37210

Sous vide and in general controlled/modified atmosphere packaging (CAP/MAP) has received national attention. There has been a tremendous amount of data and information gathered and reported.

The National Advisory Committee on Microbiological Criterion has established specific guidelines for sous vide manufacturers.

Mixed feelings are held by many in the food service industry. With the advent of sous vide, we (food service) may now serve a higher quality product, with half the labor force and lower equipment costs than conventional foods. However, we are also aware of the need for greater food science knowledge and training and distribution systems with adequate and affordable time/temperature indicators.

The advantage of the sous vide system coupled with advances in technology will eventually exceed our present concerns.

Nutrition conscious baby boomers will influence food trends in the 1990s. As always, education of the consumer will play a key role in the success of CAP/MAP.

A Low-Cost Technique For Water Activity Without Specialized Instrumentation, Bernard E. Kane, Jr., East Carolina University, Greenville, NC 27858

A simple technique for measuring water activity of foods by the dew point method is described. The technique requires the use of a common thermistor temperature probe and a dissecting microscope but no specialized water activity instrumentation. Water from an ice bath is siphoned through a brass tube which pierces a styrofoam coffee cup sample chamber. Use of a water ballast provides a temperature gradient that enables precise measurements ($\pm 0.02 a_w$ at 0.90).

The technique was used to determine whether samples of barbecued pork met the F.D.A. definition of a "Potentially Hazardous Food." It is a useful technique for screening foods in foodborne outbreak investigations by health departments and for teaching food sanitation classes.

Influence Of Modified Atmosphere Storage On The Competitive Growth Of *Listeria* And *Pseudomonas* On Chicken, D. L. Marshall*, L.S. Andrews, J.H. Wells and A.J. Farr, Dept. of Food Science, Louisiana St. University Agri. Center, Baton Rouge, LA 70803

The purpose of this study was to determine the effects of modified atmosphere packaging (MAP) on the competitive growth of *Listeria monocytogenes* and *Pseudomonas fluorescens* on pre-cooked chicken nuggets during refrigerated storage. The two organisms were inoculated on nuggets which were then stored under air or two high-CO₂ modified atmospheres (MA₁ or MA₂) at 3, 7, and 11°C. The growth of *P. fluorescens* was inhibited by MAP to a greater extent than was *L. monocytogenes*. The effectiveness of MAP decreased with increasing temperature. Little difference was observed between MA₁ and MA₂ on the inhibition of growth of the two organisms when grown alone. However, when the two organisms were grown in mixed culture at 3°C, the growth of *L. monocytogenes* was stimulated by the presence of *P. fluorescens* in air and MA₁ but not MA₂. This growth stimulation was not observed at the higher temperatures. *P. fluorescens* was generally not affected by the presence of *L. monocytogenes*. We conclude that under MAP conditions, *L. monocytogenes* could grow to large numbers prior to evidence of spoilage.

Affiliate News

Georgia Association of Food and Environmental Sanitarians Meeting

On February 19 & 20, 1991 the first joint meeting between the Dairy Technology Society of Georgia and the Georgia Association of Food and Environmental Sanitarians was held at the Airport-North Holiday Inn in Atlanta. This meeting was held in conjunction with the 5th Annual Meeting of GAFES. The program offered the 60 attendees a diverse and informative array of topics.

Dr. George Muck of Dean Foods spoke on both days of the meeting. He discussed regulatory concerns associated with the development of new dairy products on the first day and the effects mergers and acquisitions within the food industry have on quality assurance and research and development activities on the next.

Joe Hall, Jr. from the South Carolina Board of Health also spoke on concerns of the dairy industry. He presented an update on 3-A sanitary standards program for processing systems and equipment.

Three other presentations concerned sanitation matters. First Dr. Maxey Nolan, Jr. discussed some of the illnesses that are born by arthropods and new methods and agents used to control pests in food processing plants. He also showed the group several of the products that he discussed.

Dr. Damien Gabis of Silliker Laboratories presentation was on microbial niches in food processing plants. During his talk, he showed the group a variety of slides showing places within plants which are difficult to clean and sanitize and provide good environments for microbial growth. He discussed the problems associated with these problem areas.

Diversey's Dr. Mark Banner provided an overview of available sanitizing agents for use in the food industry. He also provided an update on new chemical sanitizers that have applications in these environments.

Dr. Morris Potter of the Centers for Disease Control and David Smith from the Georgia Department of Human Resources spoke on foodborne illness investigation. Dr. Potter's presentation covered the most common bacterial causes of foodborne illnesses in the U.S. using current CDC data. Mr. Smith discussed how foodborne illnesses are investigated and provided several examples based on his own experiences.

The two-day meeting also featured a social hour and dinner at the end of the first day. The dinner speaker was Kay Flowers from WXIA-TV, Atlanta. Ms. Flowers is the Station's food safety reporter and spoke on the broadcast news media and food safety issues.

Upcoming IAMFES Affiliate Meetings

1991

JUNE

•5, Tennessee Association of Milk, Water and Food Protection Annual Meeting will be held at the Ramada Airport, Nashville, TN. For more information contact Dennis Lampley at (615)360-0157.

•11-12, Texas Association of Milk, Food and Environmental Sanitarians Annual Meeting will be held at the Howard Johnson, South, Austin, TX. For further information contact Janie Park at (512)458-7281.

SEPTEMBER

•16-20, Wyoming Public Health Sanitarians Association will hold their Annual Meeting at the Holiday Inn, Cheyenne, WY. For further information contact Terry Carlile, Box 1182, Laramie, WY 82070; (307)742-3611.

•24-26, New York State Association of Milk and Food Sanitarians Annual Conference will be held at the Sheraton Inn, Liverpool, NY. For more information contact Paul Dersam at (716)937-3432.

•25-26, Wisconsin Association of Milk and Food Sanitarians, Wisconsin Environmental Health Association and Wisconsin Dairy Plant Fieldmen's Association Joint Education Conference will be held at the Maritime Inn, Manitowoc, WI. For further information contact Neil M. Vassau, Publicity Chairman, P.O. Box 7883, Madison, WI 53707; (608)267-3504.

NOVEMBER

•13-14, Alabama Association of Dairy & Milk Sanitarians Annual Meeting will be held in Birmingham, AL. For more information call or write Tom McCaskey, Department of Dairy Science, Auburn University, Auburn, AL 36849; (205)844-1518.

The GAFES group also had a business meeting and heard about the activities that will be occurring in preparation of hosting the 1993 IAMFES Meeting in Atlanta. The 1991-92 officers were elected and are:

President Al Fain, Jr.
Vice President Frank Pool
Secretary Mark Harrison
Treasurer Jim Camp

Virginia Association of Sanitarians and Dairy Fieldmen Meet

The Virginia Association of Sanitarians and Dairy Fieldmen, was a Co-Sponsor of a Dairy Industry Workshop at the Donaldson Brown Center of Virginia Tech in Blacksburg, Virginia on March 5-6, 1991.

Welcome and announcements were given by President Barbara Pennington and the meeting chairman was First Vice President, Rodney Phillips. Presentations included a View of Dairy Slatted Floors, Rapid Exits, and Parallel Parlors, FDA Requirements for Antibiotics: Storage, Labels, Etc. Mrs. Tina Grove, graduate assistant, Food Science and Technology, Virginia Tech, reported on independent tests the department is conducting on antibiotic residue tests. The trade show and industry reception followed this presentation giving everyone an opportunity to talk to representatives of industry leaders and see the varying tests.

Day two, chaired by Barbara Pennington, was headed by presentations by Dr. Richard Wilkes, Farm Veterinary Services and Dr. W.D. Whittier, Associate Professor of Veterinary Medicine at Virginia Tech concerned a Veterinarian's Perspective of Drug Use and Regulations. This presentation was followed by Dr. Jerry Jones and Dr. Charlie Stallings, both of the Dairy Science Dept. of Virginia Tech. Their topics were updates on somatic cell counts, prostaph, teat dipping, newspaper bedding and BST.

After the milk and coffee break Dr. Anya McGuirk, assistant professor, Agricultural Economics, reviewed results of a survey to determine consumer perception of BST and Food Safety.

The meeting came to a close at the noon luncheon. Dr. Bennet Cassell, associate professor, Dairy Science, gave an informative and entertaining talk and slide show entitled "Dairying Down Under."

I want to thank the Virginia Association for their hospitality and also welcome Donna Izac as Secretary-Treasurer and IAMFES contact. She is replacing Haney Hodges who has retired from this position. Thanks also to Haney for years of past support.

Dee Buske, Affiliate Liaison

Plan Now to Attend

Procedures to Investigate Foodborne Illness Workshop

Conducted by

Frank L. Bryan, Ph.D., M.P.H.

**July 19-20, 1991—The Galt House Hotel
Louisville, Kentucky**

Food Protection Professionals— Learn the Most Effective Way to:

- Prepare for the Investigation
- Take Steps to Verify Diagnosis
- Obtain Case Histories
- Develop a Case Definition
- Obtain Clinical Specimens
- Make Epidemiologic Associations
- Expand an Investigation
- Analyze Data (Symptoms, Epidemic Curves, etc.)
- Interpret Laboratory Results
- Conduct Meetings with Foodservice Management
- Interview Foodservice Workers
- Conduct Hazard Analyses
- Draw Flow Diagrams of Operations
- Collect Samples of Suspect Foods
- Trace Sources of Contamination
- Develop Foodborne Disease Surveillance Programs
- Use Investigative Data for Prevention

and much more

Fee Structure

(Includes Course Workbook and All Study Materials)

Member Fees: \$100.00 On-site: \$150.00
Non-member Fees: \$150.00 On-site: \$200.00

Early Registration Deadline: June 1, 1991

Continuing Education Credits will be Available

**Register Early!!! Space Limited
to the First 50 Registrants.**

**For Further Information,
Contact IAMFES:**

**800-369-6337 (US), 800-284-6336 (CAN)
FAX 515-232-4736**

Affiliate Officers

ALABAMA ASSOCIATION OF DAIRY & MILK SANITARIANS

Pres., Tom McCaskey Auburn
Past Pres. Elect, Chris Medley Montgomery
Vice Pres., Gregory B. Utley Tuscaloosa
Sec'y. Treas., Benjy Mikel Auburn
Past Pres. G.M. Gallaspy Childersburg
Delegate, Ronnie Williams Birmingham
Mail all correspondence to:
 Dr. Tom McCaskey
 Dept. of Dairy Sci.
 Auburn University
 Auburn, AL 36849
 (205)844-1518

ALBERTA ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Tom Lampman Edmonton
Past Pres., Karen Emde Edmonton
Past Pres. Elect, Harry Jackson Edmonton
Sec'y., Debbie Mooney Edmonton
Treas., Mike Mavromaras Edmonton
Delegate, James Steele Edmonton
Mail all correspondence to:
 AAMFES
 Attn: Tom Lampman
 P.O. Box 8273
 Station F
 Edmonton, Alberta, Canada T6H 5H3

CALIFORNIA ASSOCIATION OF DAIRY & MILK SANITARIANS

Pres. Richard Bolman Cerritos
Past Pres., Joe Miranda Tulare
1st Vice Pres., Dennis Storms Santa Rosa
Exec. Sec'y. Treas., Jack Coppes Whittier
Delegate, Austin Olinger Industry
Mail all correspondence to:
 Jack Coppes
 P.O. Box 9234
 Whittier, CA 90608
 (213)699-4313

CONNECTICUT ASSOCIATION OF DAIRY & FOOD SANITARIANS, INC.

Pres., Pete Nuzzo Branford
Sec'y., Donald Shields Hartford
Treas., Bud Pancoast Hartford
Delegate, Satyakam Sen Bristol
Mail all correspondence to:
 Don Shields
 CT Dept. of Agriculture
 165 Capitol Avenue
 Hartford, CT 06106
 (203)566-3279

FLORIDA ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC.

Pres., Dick Jolley Branford
Past Pres., Ron Schmidt Bradenton
Sec'y., Charlotte Milsaps Gainesville
Treas., Dr. W. M. Thornhill Winter Haven
Delegate, Dick Jolley Branford
Mail all correspondence to:
 Bill Thornhill
 3023 Lake Alfred Road
 Winter Haven, FL 33881
 (813)299-6555

GEORGIA ASSOCIATION OF FOOD & ENVIRONMENTAL SANITARIANS

Pres., Joseph Frank Athens
Vice Pres., Al Fain Stone Mountain
Past Pres., Dr. Robert Brackett Experiment
Sec'y., Mark Harrison Athens
Treas., James C. Camp Douglasville
Delegate, David Fry Lilburn
Mail all correspondence to:
 Mark Harrison
 GAFES Secretary
 Dept. of Food Science & Tech.
 Athens, GA 30602
 (404)542-1088

IDAHO ENVIRONMENTAL HEALTH ASSOCIATION

Pres., Shireene Sementi Coeur D'Alene
Past Pres. Elect, Steve Bastian Preston
Sec'y. Treas., Tom Turco Boise
Mail all correspondence to:
 Tom Turco
 1455 North Orchard
 Boise, ID 83706
 (208)375-5230

ASSOCIATED ILLINOIS MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Joe Delaney Carlinville
Past Pres. Elect, Charlie Price Lombard
1st Vice Pres., Claudia Morrow Chicago
2nd Vice Pres., Marlena Bordson Champaign
Sec'y. Treas., Bob Crombie Joliet
Past Pres., Terry Mitchell Naperville
Sergeant At Arms, Cheryl A. Pieper Chicago
Delegate, Terry Mitchell Naperville
Mail all correspondence to:
 Bob Crombie
 Crombie Company
 521 Cowles Avenue
 Joliet, IL 60435
 (815)726-1683

INDIANA ENVIRONMENTAL HEALTH ASSOCIATION, INC.

Pres., Bill Emmingger Indianapolis
Past Pres. Elect, Tim Decker Indianapolis
Vice Pres., Dave McClure Indianapolis
Treas., Tom Ford Indianapolis
Sec'y., Margaret Voyles Indianapolis
Past Pres., David M. Bokodi Indianapolis
Delegate, Helen Uhlman Hobart
Mail all correspondence to:
 Indiana Environmental Health Assoc.
 Attn: Tammy Barrett
 Indiana State Board of Health
 1330 W. Michigan Street
 Indianapolis, IN 46206
 (317)633-0173

IOWA ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC.

Pres. Gary Schall Cedar Rapids
Past Pres. Elect, Scott Core Urbandale
1st Vice Pres., Vicky Treicher Edgewood
2nd Vice Pres., Randy Stephenson Stacyville
Sec'y. Treas., Dale R. Cooper Manchester
Delegate, David Peper Sioux City
Mail all correspondence to:
 Dale Cooper
 Box 69
 Manchester, IA 52057
 (319)927-3212

KANSAS ASSOCIATION OF SANITARIANS

Pres., Judy Willingham Manhattan
Past Pres., Nancy Short Eugene, OR
1st Vice Pres., Marla Webster Westmoreland
2nd Vice Pres., Ann Scheve Emporia
Sec'y. Treas., John Davis Wichita
Delegate, Don Bechtel Manhattan
Mail all correspondence to:
 John M. Davis
 Wichita - Sedgewick Co.
 Dept. of Comm. Health
 1900 E. 9th
 Wichita, KS 67214
 (316)268-8351

KENTUCKY ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC.

Pres., Holly Wade Lexington
Past Pres. Elect, Rick Molohon Elizabethtown
Vice Pres., Anita Travis Frankfort
Past Pres., David Klee Frankfort
Sec'y., Cary Nesselrode Frankfort
Treas., Judy True Frankfort
Delegate, David Klee Frankfort
Mail all correspondence to:
 Judy True
 KAMFES, Inc.
 P.O. Box 1464
 Frankfort, KY 40602
 (502)564-7181

LOUISIANA ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Douglas Marshall Baton Rouge
Vice Pres., Paul Bergeron Baton Rouge
Sec'y. Treas., Dorothy Thompson Baton Rouge
Delegate, Douglas Marshall Baton Rouge
Mail all correspondence to:
 Doug Marshall
 Dept. Food Science
 LSU
 Baton Rouge, LA 70803
 (504)388-5197

MASSACHUSETTS MILK, FOOD & ENVIRONMENTAL INSPECTORS ASSOCIATION

Pres., Harlan Fulton Hardwick
Past Pres., Barb Kulg West Springfield
Vice Pres., Max Bookless Pittsfield
Sec'y. Treas., Fred Kowal Chicopee
Delegate, Christine Tobey Agawan
Contact:
 Barb Kulg
 Municipal Office Building
 26 Central Street
 West Springfield, MA 01089
 (413)781-7550 ext. 3204

MICHIGAN ENVIRONMENTAL HEALTH ASSOCIATION

Pres., V. Harry Adrounie Hastings
Past Pres. Elect, Patrick Conklin Fremont
Treas., Bob Blake Ann Arbor
Past Pres., David Gregg Cadillac
Sec'y., John Kowalczyk Ann Arbor
Delegate, Roger Stroh Holland
Mail all correspondence to:
 John Kowalczyk
 401 Manor Drive
 Ann Arbor, MI 48105
 (313)994-2490

**MINNESOTA SANITARIANS
ASSOCIATION, INC**

Pres., Kirk Cox Princeton
Pres. Elect, Greg Pittman Montgomery
Vice Pres., Paul Nierman St. Paul
Sec'y. Treas., Roy E. Ginn St. Paul
Past Pres., Lee Groehler Mankato
Sr. Past Pres., Mike Krem St. Paul
Delegate, Bill Coleman St. Paul
Mail all correspondence to:
Roy Ginn
Dairy Quality Control Institute
5205 Quincy Street
St. Paul, MN 55112-1499
(612)785-0484

**MISSISSIPPI ASSOCIATION OF
SANITARIANS, INC.**

Pres., Greg Geno Booneville
Pres. Elect, Kenneth Bruce Akerman
1st Vice Pres., Robert Rogers Forrest
Sec'y, Susan Howell Pantotoc
Treas., Paul Rankin Jackson
Past Pres., Ralph Turnbo Jackson
Mail all correspondence to:
Susan Howell
Pantotoc County Health Dept.
P.O. Box 248
Pantotoc, MS 38863
(601)489-1241

**MISSOURI MILK, FOOD & ENVIRONMENTAL
HEALTH ASSOCIATION**

Pres., Charles Sanders Columbia
Pres. Elect, Jerry Brown Hillsboro
Vice Pres., Cal Badding Jefferson City
Sec'y, Janet Murray Moberly
Treas., Richard Janulewicz Liberty
Past Pres., Bruce Myers Springfield
Delegate, Bruce Myers Springfield
Mail all correspondence to:
Richard Janulewicz
Clay County Health Dept.
1940 W. 152 Highway
Liberty, MO 64068
(816)781-1600

**NEBRASKA ASSOCIATION OF
MILK & FOOD SANITARIANS**

Pres., Lois Clauson Omaha
Pres. Elect, Susan Sumner Lincoln
Sec'y. Treas., Fred Cook Omaha
Past Pres., Dirk Shoemaker Lincoln
Delegate, Dick Brazis Bellevue
Mail all correspondence to:
Dr. Susan Sumner
Dept. Food Science
University of Nebraska
356 Food Industry Complex
Lincoln, NE 68583
(402)472-7807

**NEW YORK STATE ASSOCIATION OF
MILK & FOOD SANITARIANS**

Pres., John B. Baker Macedon
Pres. Elect, Leonard H. Jones Oneida
Past Pres., Paul Dersam Alden
Cornell Coord., David Bandler Ithaca
Delegate, Terry Musson Keyport, NJ
Mail all correspondence to:
Paul Dersam
27 Sullivan Road
Alden, NY 14004
(716)937-3432

**NORTH DAKOTA ENVIRONMENTAL
HEALTH ASSOCIATION**

Pres., Mel Fischer Bismarck
1st Vice Pres., Peri Dura Bismarck
2nd Vice Pres., Dan Mattern Bismarck
Past Pres., Allen Saylor Bismarck
Sec'y. Treas., Kenan Bullinger Bismarck
Member at Large, Allan McKay Devils Lake
Delegate, Allen Saylor Bismarck
Mail all correspondence to:
Kenan Bullinger
PO Box 937
Bismarck, ND 58502
(701)221-6147

**OHIO ASSOCIATION OF MILK, FOOD &
ENVIRONMENTAL SANITARIANS**

Pres., Dan McElroy Cincinnati
1st Vice Pres., Gloria Swick Columbus
2nd Vice Pres., Michael Tedrick Columbus
Sec'y. Treas., Don Barrett Columbus
Past Pres., Ed Richter Columbus
Mail all correspondence to:
Donald L. Barrett
Health Dept.
181 S. Washington Blvd.
Columbus, OH 43215
(614)645-6195

**ONTARIO FOOD PROTECTION
ASSOCIATION**

Pres., Coleen Stevens Etobicoke
Vice Pres., Michael Brodsky Toronto
Sec'y., Garth Sundeen Islington
Treas., Peter Boleszczuk Mississauga
Past Pres., Robert Tiffin Kitchener
Editor, Sam Bryks Toronto
Delegate, Robert Tiffin Kitchener
Mail all correspondence to:
Sherry Hagino
Diversified Res. Labs
1047 Yonge Street
Toronto, Ontario M4W 2L2
(416)922-5100

**PENNSYLVANIA ASSN. OF DAIRY
SANITARIANS & DAIRY LAB. ANALYSTS**

Pres., James DeTolla Sharpsville
Pres. Elect, Donald Lerch Camp Hill
Vice Pres., Don Yanek Orwigsburg
Secretary, Audrey Throne Hershey
Treasurer, Pat McKenty Pittsburgh
Past Pres., Lewis Terrill Saegertown
Delegate, James DeTolla Sharpsville
Assoc. Advisors:
Sidney Barnard Anthony B. Bizzaro
Steve Spencer Carol Wallace
Mail all correspondence to:
Audrey Hostetter Throne
Hershey Chocolate Co.
19 E. Chocolate Avenue
Hershey, PA 17033
(717)534-4031

**SOUTH DAKOTA ENVIRONMENTAL
HEALTH ASSOCIATION**

Pres., Diane Worall Huron
Pres. Elect, John Robertson
Sec'y Treas., Dave Micklos Pierre
Past Pres., Elser Rye Aberdeen
Delegate, Darwin Kurtenbach Pierre
Mail all correspondence to:
Dave Micklos
SD State Dept. of Health
523 E. Capitol
Pierre, SD 57501
(605)773-3364

**TENNESSEE ASSOCIATION OF MILK,
WATER & FOOD PROTECTION**

Pres., Hugh Wilson Athens
Pres. Elect, Ed Miller Lewisburg
Vice Pres., Ann Draughton Knoxville
Sec'y. Treas., Dennis Lampley Bon Aqua
Archivist, Ruth Fuqua Mt. Juliet
Board Member at Large, Dave Simmler Memphis
Past Pres., Gil Murrey Murfreesboro
Delegate, Ruth Fuqua Mt. Juliet
Mail all correspondence to:
Dennis Lampley
Rt. #1, Box 468-B
Bon Aqua, TN 37025
(615)360-0157

**TEXAS ASSOCIATION OF MILK, FOOD
& ENVIRONMENTAL SANITARIANS**

Pres., Kenneth Seaman Fort Worth
Pres. Elect, Nick Fohn Uvalde
Sec'y., Janie Park Austin
Treas., Dr. Ron Richter College Station
Delegate, Kirmon Smith Austin
Mail all correspondence to:
TAMFES
Janie Park
P.O. Box 2363
Cedar Park, TX 78613-2363
(512)458-7281

**VIRGINIA ASSN. OF SANITARIANS
& DAIRY FIELDMEN**

Pres., Barbara Pennington Amissville
1st Vice Pres., Rodney Phillips
2nd Vice Pres., Tom Owen South Boston
Sec'y. Treas., Donna Izac Chesterfield
Past Pres., James Stump Bristol
Delegate, James Stump Bristol
Mail all correspondence to:
Donna Izac
9431 Dry Creek Drive
Chesterfield, VA 23832
(804)739-3071

**WASHINGTON MILK SANITARIANS
ASSOCIATION**

Pres., Walt Mackin Seattle
Pres. Elect, Berg Giberson Seattle
Sec'y. Treas., Lloyd Luedecke Pullman
Delegate, Lloyd Luedecke Pullman
Mail all correspondence to:
Lloyd Luedecke
NW 312 True Street
Pullman, WA 99163
(509)335-4016

**WISCONSIN ASSOCIATION OF MILK &
FOOD SANITARIANS**

Pres., Dr. P.C. Vasavada River Falls
Past Pres., Ken Kirby Edgerton
Pres. Elect, Joseph Disch DeForest
1st Vice Pres., Mark Nelson Oshkosh
2nd Vice Pres., Erin Nutter Altoona
Sec'y., Randall Daggis Madison
Treas., Neil Vassau Madison
Membership Chairman, Jim Dresser Madison
Delegate, Ken Kirby Edgerton
Mail all correspondence to:
Neil M. Vassau
P.O. Box 7883
Madison, WI 53707
(608)267-3504

**WYOMING PUBLIC HEALTH
SANITARIANS ASSOCIATION**

Pres., Linda Stratton Cheyenne
Pres. Elect, Dean Finkenbinder Casper
Secretary, Terry Carlile Laramie
Treas., Ed Starkey Shoshone
Past Pres., Sandi Palmer Cheyenne
Delegate, Howard Hutchings Cheyenne
Mail all correspondence to:
Terry Carlile
P.O. Box 1182
Laramie, WY 82070
(307)876-2483

Guest Room Commitment
GOOD UNTIL JUNE 19, 1991
Make Your Reservation Now

HOTEL RESERVATIONS IAMFES

78th Annual Meeting
July 21-24, 1991
The Galt House
Louisville, Kentucky

Please check accommodation requested:

- Single (1 person)
 Double (2 persons 2 beds)
 King (2 persons 1 bed)
 Triple Quad

Special Requests _____

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 _____ CITY _____

COUNTRY _____ ZIP _____

TELEPHONE _____

ARRIVAL DATE _____ DEPARTURE DATE _____
(Check-in Time is after 3 p.m.) (Check-out Time is 12 p.m.)

SPECIAL REQUESTS _____

After June 19, 1991 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 money order, certified check or a Major Credit Card.

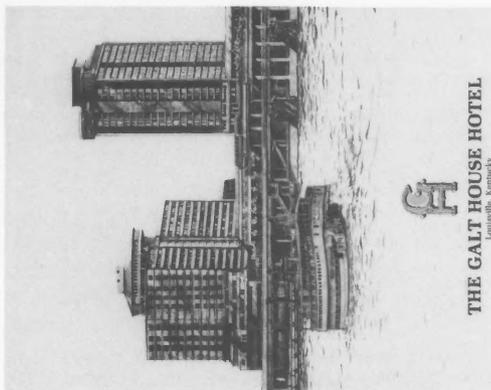
CREDIT CARD # _____ CREDIT CARD _____

EXPIRATION DATE _____

CARD HOLDERS SIGNATURE _____

SPECIAL ROOM RATES for this convention \$75 plus tax . . . single/double occupancy,
\$85 plus tax . . . triple/quadruple occupancy

For Toll-Free Reservations Call:
(800)962-0150 (within KY)
(800)626-1814 (outside KY)
or FAX (502)585-4266



MAIL DIRECTLY TO:

THE GALT HOUSE
140 N. 4TH AVENUE
LOUISVILLE,
KENTUCKY 40202-9210 USA

78th IAMFES Annual Meeting Registration Form

Galt House - Louisville, Kentucky - July 21-24, 1991

(Use photocopies for extra registrations)

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

FOR OFFICE USE
 Date Rec'd. _____ First Initial _____ Last Name _____
 ID# _____ Registration # _____

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 _____

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

Credit Card payments may be sent via Fax today!
515-232-4736

Registration

IAMFES Member (Banquet included) _____ Amount _____ Total Amount _____
 Non-Member (Banquet included) _____ \$ 95 (\$125 on-site)
 IAMFES Student Member _____ \$135 (\$165 on-site)
 IAMFES Member One Day (Circle: Mon/Tues/Wed) _____ \$ 20 (\$ 50 on-site)
 Non-Member One Day (Circle: Mon/Tues/Wed) _____ \$ 45 (\$ 55 on-site)
 Spouse/Companion (Name): _____ \$ 65 (\$ 75 on-site)
 Children (14 & Over), Name: _____ \$ 15 (\$ 20 on-site)
 One-Day Exhibits Only (Circle One: Mon/Tues) _____ \$ 15 (\$ 20 on-site)
 _____ \$ 10

***New Membership Fees:**

Membership *(Dairy, Food & Environmental Sanitation)* _____ \$ 40
 Membership *Plus (Dairy, Food & Env. Sanitation & Journal of Food Protection)* _____ \$ 70
 Student Membership *Dairy, Food & Env. San.* or *Journal of Food Protection* _____ \$ 20
 Student Membership *Plus (Dairy, Food & Environmental Sanitation & Journal of Food Protection)* _____ \$ 35
 POSTAGE CHARGES: OUTSIDE THE U.S. - SURFACE RATE _____ \$ 15 per journal
 AIRMAIL _____ \$ 95 per journal

Other Fees: (Per Person)

Cheese & Wine Reception (Sun., 7/21) _____ FREE
 Belle of Louisville Dinner Cruise (Mon., 7/22) _____ Adult \$30 (\$35 on-site)
 _____ Children Under 14 --
 _____ \$ 15 (\$ 18 on-site)
 _____ \$ 25 (\$ 30 on-site)

Spouse/Companion Events:

IAMFES Awards Banquet (Wed., 7/24) _____ \$ 25 (\$ 30 on-site)
 They're Off - Lunch at Derby Cafe (Mon., 7/22) _____ \$ 25 (\$ 30 on-site)
 Bardstown & Jim Beam Distillery, Lunch at Tabbot Tavern (Tues., 7/23) _____ \$ 25 (\$ 30 on-site)
 Shelbyville, Lunch at Old Stone Inn (Wed., 7/24) _____ \$ 25 (\$ 30 on-site)

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, 502 E. Lincoln Way, Ames, IA 50010-6666. Make checks payable to IAMFES. Pre-registration must be post-marked by July 10, 1991. The pre-registration deadline will be strictly observed. For additional information contact Julie Heim at 1-800-369-6337, 1-800-284-6336 (Canada).

Refund/Cancellation Policy

The IAMFES policy on meeting cancellation/refunds is as follows: "Registration fees, minus a \$15.00 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 with written notification to a colleague."

Exhibitor Information

An exhibition of products and consultant services will be at the Galt House. For more information on exhibiting at the conference, please contact Scott Wells at 1-800-369-6337, 1-800-284-6336 (Canada).

Book Review

Food Service Sanitation - A Certification Coursebook, Third Edition by John Wiley & Sons is available through the Educational Foundation of the National Restaurant Association, 250 South Wacker Drive, Chicago, IL 60606.

This coursebook consists of four parts. Part I covers Sanitation and Health under Chapters One, Two and Three.

Chapter One addresses several major concerns confronted by all food service managers such as providing safe food, premises sanitation, well maintained equipment, good employees, and knowing what the public expects.

Chapter Two looks at the principal forms of micro-biological life that concern the food service manager in the storage, preparation, holding, and serving of food. The five main classes of micro-organisms bacteria, parasites, viruses, and fungi are discussed, along with size and shape of bacteria and the way they multiply. This chapter examines what kind of environment bacteria thrive in and how nourishment, moisture, temperatures, and time affect bacteria survival and growth. The conditions for the growth of viruses, yeasts, and molds are considered. It reviews that micro-organisms are both harmful and helpful to humans.

Chapter Three covers the three basic hazards responsible for outbreaks of foodborne illness: 1) biological hazards dealing with harmful bacteria that contaminate food, 2) chemical hazards regarding pesticides and any other toxic material, 3) physical hazards relating to food contamination by glass breakage or metal particles or other foreign material.

The biological section differentiates foodborne infection and intoxication. This section gets into more detail on the principal bacterial contaminants and the diseases they cause. The major foodborne disease of bacterial origin is listed giving the bacteria by name and what infection and intoxication it produces. This section details incubation periods, duration of the illness, symptoms, reservoir, foods implicated, prevention and if it is a spore former.

The chemical hazard section is concerned with the contamination of food by pesticides, the use of excessive quantities of food additives, preservatives and contamination by toxic materials.

Part II is concerned with The Serving of Sanitary Food in Chapters Four, Five, Six and Seven.

Chapter Four takes into consideration those government programs to ensure a safe food supply, general rules for inspection of food as it arrives at the food service establishment, also specific signs of spoilage in food products.

Chapter Five reviews methods to prevent food contamination and spoilage during storage. This chapter discusses the fundamental principals of food storage in the food service facility, the elementary rules for the use of freezers, refrigerators, and dry-storage, proper storage procedures and recommended storage times for most common foods.

Chapter Six is concerned with protecting food during preparation and serving.

Chapter Seven discusses primary concerns of the food service manager when it comes to hiring, training, and setting standards to employ safe foodhandlers.

Part III The Sanitary and Safe Food Environment is covered by Chapters Eight, Nine, Ten, Eleven, and Twelve.

Chapter Eight treats the subject of sanitation in terms of materials, design, installation, construction, and layout of equipment; all with the view to facilitate cleaning, maintenance, and eliminating entryways and breeding places for insects and rodents.

Chapter Nine and Ten present all types and procedures for the scheduling of, cleaning of, and sanitizing of equipment, utensils, and food preparation areas.

Chapter Eleven gives some practical information of pest control.

Chapter Twelve discusses and defines accidents related to the food service industry, causes of accidents, and prevention of accidents.

Part IV Managing A Sanitary and Safe Food Service is covered by Chapters Thirteen, Fourteen, and Fifteen.

Chapter Thirteen covers in detail the elements of personal hygiene and sanitary food practices as well as employee training and motivation in regard to these practices.

Chapter Fourteen is a brief look at the two control and guidance systems that operate to protect the sanitary quality of food. This chapter discusses the regulatory and advisory controls conducted by the government agencies and the unofficial group of voluntary controls conducted by trade associations, industry, and professional groups.

Chapter Fifteen outlines the responsibilities of the food service manager for maintaining a sanitary and safe food service establishment.

At the end of each chapter there is a number of study questions along with "a case in point" and the answer to the situation at hand. The back of the book contains six assignment examinations and answers.

This is an excellent coursebook and should be a mandatory course required by all food service managers and assistant managers. Certification should be a requirement of all food service managers and assistant managers.

David H. Peper
Sanitarian - Siouxland District Health Department
Sioux City, IA 51101

IAMFES New Members

Arizona

Ipeng Chiou
The University of Arizona
Tucson

California

William Hauser
U.S. Army Veterinary Service
French Camp

John Paine
Klenzade
Fullerton

Douglas Schultz
Klenzade-EcoLab
Lodi

Delaware

Donald Fieldhouse
MIDI
Newark

Christie Paulanka
Du Pont
Wilmington

Florida

Keith Schneider
University of Florida
Gainesville

Illinois

Carol Harper
National Center of Food Safety &
Technology/FDA
Summit-Argo

G.P. Lenos
Enviro-Test/Perry Labs, Inc.
Downers Grove

Sandy Marubio
National Laboratory Training Network
Chicago

Steven Sklare
Superior Commercial Services Co.
Chicago

Kentucky

Nancy Cooper
Gateway District Health
Wellington

William Crist
University of Kentucky
Lexington

Maryland

Bonnie Rose
USDA, FSIS
Laurel

Minnesota

Mary Bulthaus
Superior Dairy Fresh Milk Co.
Minneapolis

New Jersey

Frank Sasso
Heboren Health Dept.
Hoboren

Ohio

Julia Naderer
The Ohio State University
Columbus

Stuart Oliver
Hillshire Farm & Kahn's
Cincinnati

Paula Wright
Shelby City Health Dept.
Shelby

Sandy Marubio
National Laboratory Training Network
Chicago

Texas

Robert Corbett
Dairy Health Equipment, Service
and Supply Co., Inc.
El Paso

J.A. Magnuson
Aloecorp
Harlingen

Wisconsin

James Campbell
Willow Foods
Beaver Dam

Canada

David Patterson
Bruce-Grey-Owen Sound Health Unit
Owen Sound, Ontario

Joan Zegota
Health Protection Branch
London, Ontario

New IAMFES Sustaining Member

Biolog, Inc.
3447 Investment Blvd.
Suite 2
Hayward, CA 94545

Business Exchange "Classifieds"

Equipment For Sale

BENTLEY INSTRUMENTS, INC.

Milk Testing Equipment

New and rebuilt milk analyzing equipment for fat, protein, lactose and solids testing. Installation, training, parts and service available.

Call for more information
(612) 448-7600

Bentley Instruments, Inc.
P.O. Box 150
Chaska, MN 55318

CIRCLE READER SERVICE NO. 330

- 1- 10,000 Gal. Insulated Storage Tank with Agit.
- 1- 9,500 Gal. Cold Wall Rectangular Storage Tank with Agit.
- 1- 8,000 Gal. Cold Wall Horizontal with Agit.
- 2- 7,500 Gal. Insulated Storage Tanks with S.S. Fronts.
- 2- 6,000 Gal. Insulated Storage Tanks with Agits.
- 1- 5,000 Gal. Vertical Tank with Cone Bottom.
- 1- 1,500 Gal. Dome Top Pressure Wall Processor with Agit.
- 2- 1,000 Gal. Pressure Wall Processors with Agit.
- 2 (set) 600 Gal. Pressure Wall Processors with Agit's.
- 1- Gaulin Homo 125E.
- 1- CIP System with 2 - 300 Gal. Tanks, Liquid Level Controls and Recorder, all mounted on Stainless Steel Base.

Midwest Food Supply Co., Inc.

Div./W. M. Sprinkman Corp.
504 Clay St., Waterloo, IA 50704 1-800-553-2762

CIRCLE READER SERVICE NO. 292

Services / Products

EXPAND BUSINESS & PROFITS

- Analyze Markets
- Exploit Opportunities
- Improve Sales

Programs Designed For Your Needs
Dairy & Food Industry Consultants
For More Than 20 Years

AGRITECH, INC.

1989 West Fifth Avenue
Columbus, Ohio 43212
(614) 488-2772

CIRCLE READER SERVICE NO. 117

Services / Products

Stop by our Exhibit at the 1991 IAMFES Annual Meeting



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

COMPLETE LABORATORY SERVICES

Ingman Labs, Inc.
2945-34th Avenue South
Minneapolis, MN 55406
612-724-0121

CIRCLE READER SERVICE NO. 315

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

Over 40 years Food Operation Experience

CIRCLE READER SERVICE NO. 297



Michelson Laboratories, Inc.

6280 Chale Drive, Los Angeles, CA 90040
Telephone: (213) 928-0553 / (714) 971-0673 / FAX (213) 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

Coming Events

1991

June

- 5, Tennessee Association of Milk, Water and Food Protection Annual Meeting**, will be held at the Ramada Airport, Nashville, TN. For more information contact Dennis Lampley at (615)360-0157.
- 10-14, Frozen Dough Operations**, sponsored by the American Institute of Baking, will be held in Manhattan, KS. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 10-14, Cookie Production (Ingredient Technology)**, sponsored by the American Institute of Baking, will be held in Manhattan, KS. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 11-12, Texas Association of Milk, Food and Environmental Sanitarians** will hold their Annual Meeting at the Howard Johnson, South, Austin, TX. For more information contact Janie Park at (512)458-7281.
- 11-12, Food Plant Safety**, sponsored by the American Institute of Baking, will be held in Atlanta, GA. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 13-14, Listeria and Food Safety**, sponsored by The Aseptic Processing Association, will be held in Laval, France. For more information contact the Conference Secretariat, ASEPT, B.P. 49, 53020 Laval Cedex, France.
- 17-20, Better Process Control School**. For more information contact Robert M. Grodner, Ph.D., Louisiana State University, Food Science Building, Baton Rouge, LA 70803-4280, (504)388-5206.
- 17-20, Basic Microbiology and Mold Monitoring Seminar** sponsored by the American Institute of Baking to be held at AIB, 1213 Bakers Way, Manhattan, KS 66502. For more information call (913)537-4750 or (800)633-5137.
- 17-21, Cookie Production (Processing Technology)**, sponsored by the American Institute of Baking, will be held in Manhattan, KS. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 24-25, The Hazardous Waste Regulation Course**, sponsored by Executive Enterprises, Inc., will be held at the O'Hare Marriott, Chicago, IL. For more information contact Executive Enterprises at (800)831-8333.
- 24-August 9, "Environment and Public Health"** to be presented by the Cook College Office of Continuing Professional Education, in cooperation with the New Jersey Department of Health. For information on registration requirements, please contact Rene Conlon, Office of Continuing Professional Education, Cook College, PO Box 231, New Brunswick, NJ 08903; (908)932-9271, FAX (908)932-8726.
- 25-26, Food Processors Sanitation Course, "A Basic Course for Today's Food Plants"** will be held at the Quality Inn-Chicago, 1 South Halsted Street, Chicago, IL 60661. For more information call Sanisafe & Associates at (708)272-0508.

- 24-28, Cracker Production**, sponsored by the American Institute of Baking, will be held in Manhattan, KS. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 26-25, Food Plant Safety**, sponsored by the American Institute of Baking, will be held in Manhattan, KS. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 27-28, Chemical Labeling Conference**, sponsored by Executive Enterprises, Inc., will be held at the Sheraton Plaza Chicago, Chicago, IL. For more information contact Executive Enterprises at (800)831-8333.
- 27-28, Food Basic Research & Product Development**, sponsored by International Business Communications, will be held at the Holiday Inn-Mart Plaza, Chicago, IL. For more information call (508)650-4700.

July

- 11-18, International Workshop on Rapid Methods and Automation in Microbiology, XI, and Mini-symposium July 11-12th** at Kansas State University. Contact Daniel Y.C. Fung, Director, Tel (913)532-5654 or FAX (913)532-5681, 207 Call Hall, KSU, Manhattan, KS 66506.
- 16-18, Texas Association of Milk, Food and Environmental Sanitarians** will hold a seminar entitled "Basic Pasteurization Course" will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information contact Janie Park of TAMFES at (512)458-7281.
- 21-24, International Association of Milk, Food and Environmental Sanitarians 78th Annual Meeting** to be held at the Galt House, Louisville, KY. For more information contact Julie at (800)369-6337 or (800)284-6336 (Canada).

August

- 5-9, Biotechnology: Principles and Processes**, will be held at the Massachusetts Institute of Technology, Cambridge, MA. For more information, please contact the Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139.
- 12-15, 105th Annual International Meeting and Exposition of the Association of Official Analytical Chemists** will be held at The Pointe at South Mountain, Phoenix, Arizona. For more information contact the AOAC, Suite 400, 2200 Wilson Boulevard, Arlington, VA 22201-3301; (703)522-3032; FAX (703)522-5468.
- 13-14, Food Plant Sanitation Workshop**, sponsored by the American Institute of Baking, will be held in Cherry Hill, NJ. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 13-14, Food Plant Sanitation Workshop**, sponsored by the American Institute of Baking, will be held in San Jose, CA. For more information contact AIB at (913)537-4750 or (800)633-5137.
- 20-21, Food Plant Sanitation Workshop**, sponsored by the American Institute of Baking, will be held in Cherry Hill, NJ.

For more information contact AIB at (913)537-4750 or (800)633-5137.

September

•9-13, Basic Food Microbiology Short Course, sponsored by the University of California, will be held at the Food Science and Technology Department, Cruess Hall, UC Davis Campus. For further information contact Robert J. Price, Food Science and Technology, University of California, Davis, CA 95616-8598; (916)752-2194.

•10-11, Marketing Development Seminar will be held at The Registry, Denver, CO. For more information contact the International Dairy Foods Association, 888 Sixteenth Street, NW, Washington, DC 20006; (202)296-4250.

•10-11, Food Plant Sanitation Workshop, sponsored by the American Institute of Baking, will be held in Chicago, IL. For more information contact AIB at (913)537-4750 or (800)633-5137.

•10-12, Texas Association of Milk, Food and Environmental Sanitarians will hold a seminar entitled "Special Problems in Milk Plants" at the Howard Johnson, Plaza South, IH 35 at Woodward, Austin, TX. For more information contact Janie Park of TAMFES at (512)458-7281.

•16-20, Wyoming Public Health Sanitarians Association will hold their Annual Meeting at the Holiday Inn, Cheyenne, WY. For further information contact Terry Carlile, Box 1182, Laramie, WY 82070; (307)742-3611.

•24-26, New York State Association of Milk and Food Sanitarians 68th Annual Conference will be held at the Sheraton Inn, Liverpool, NY (Syracuse). For more information contact Paul Dersam at (716)937-3432.

•25-26, Wisconsin Association of Milk and Food Sanitarians, Wisconsin Environmental Health Association and Wisconsin Dairy Plant Fieldmen's Association Joint Education Conference will be held at the Maritime Inn, Manitowoc, WI. For further information contact Neil M. Vassau, Publicity Chairman, P.O. Box 7883, Madison, WI 53707; (608)267-3504.

•25-27, BIOTECH USA '91 will be held at the Philadelphia Civic Center, Philadelphia, PA. For more information contact Gina Amatruda at (203)852-0500, ext. 266.

•29-Oct. 4, 8th World Congress of Food Science and Technology. The Westin Harbor Castle, Toronto, Canada. For further information, please write 8th World Congress, (IUFoST), 3340 Orlando Drive, Mississauga, Ontario, Canada L4V 1C7; or FAX (416)678-1229.

October

•1-2, Food Plant Sanitation Workshop, sponsored by the American Institute of Baking, will be held in Toronto, Ontario, Canada. For more information contact AIB at (913)537-4750 or (800)633-5137.

•1-4, Canadian Institute of Public Health Inspectors Annual Conference. For further information contact John Foruna, Public Health Inspector at Hamilton-Wentworth Regional

Department of Public Health Services, P. O. Box 897, Hamilton, Ontario, Canada, L8N 3P6; (416)546-3570 or FAX (416)521-8093.

•2-5, National Society for Healthcare Foodservice Management's Third National Conference will be held at the Washington Court Hotel on Capitol Hill, Washington, DC. For more information call or write the National Society for Healthcare Foodservice Management, 204 E. Street, NE, Washington, DC 20002; (202)546-7236.

•6-9, Annual Meeting and Convention: Milk Industry Foundation and International Ice Cream Association will be held at the Marriott River Center, San Antonio, TX. For more information contact the International Dairy Foods Association, 888 Sixteenth Street, NW, Washington, DC 20006; (202)296-4250.

•6-9, The 1991 National Frozen Food Convention and Exposition, sponsored by The National Frozen Food Association and the American Frozen Food Institute, will be held in Orlando, FL. For more information contact the National Frozen Food Association, 4755 Linglestown Road, Suite 300, Harrisburg, PA 17112, (717)657-8601, or the American Frozen Food Institute, 1764 Old Meadow Lane, Suite 350, McLean, VA 22102, (703)821-0770.

•16-17, Annual Conference of the North Central Cheese Industries Association will be held at the Earle Brown Center, University of Minnesota, St. Paul. For further information contact E. A. Zottola, Executive Secretary, NCCIA, P. O. Box 8113, St. Paul, MN 55108.

•26-30, Food & Dairy Expo '91, sponsored by Dairy & Food Industries Supply Association, to be held at the McCormick Place, Chicago. For more information contact DFISA, 6245 Executive Boulevard, Rockville, MD 20852-3938 (301)984-1444.

To insure that your meeting time is published, send announcements at least 90 days in advance to: IAMFES, 502 E. Lincoln Way, Ames, IA 50010-6666.

Index of Advertisers

Company	Page
Acculab	275
Agritech, Inc.	292
Aid Pack	255
Bentley Instruments, Inc.	292
L.J. Bianco & Associates	292
Charm Sciences, Inc.	Back Cover
Columbus Instruments	259
DQCI Services, Inc.	292
Educational Testing Service	245
Food & Dairy Expo '91	251
Ingman Laboratory	292
Michelson Laboratories	292
Midwest Food Supply Co., Inc.	292
Minnesota Valley Testing Laboratory	267
Nelson-Jameson, Inc.	264
Plastic Packaging Concepts, Inc.	267
SmithKline-Beecham Animal Health	Inside Front Cover
Unipath Co., Oxoid Division	251

IAMFES

International Association of Milk, Food and Environmental Sanitarians, Inc.

Prices Effective March 1, 1991

IAMFES Booklets

Qty.		Total \$
_____	Procedures to Investigate Waterborne Illness \$5.00/member; \$7.50/non-member	_____
_____	Procedures to Investigate Foodborne Illness - new 4th Edition \$5.00/member; \$7.50/non-member	_____
_____	Procedures to Investigate Arthropod-borne and Rodent-borne Illness \$5.00/member; \$7.50/non-member	_____
Multiple copies available at reduced prices.		Subtotal _____
		Shipping _____
		Add \$1.50 for first item, \$.75 for each additional item
		Booklet Total _____

3-A Sanitary Standards

Qty.		Total \$
_____	Complete set 3-A Dairy Standards \$33 member; \$49.50 non-member	_____
_____	Complete set 3-A Dairy & Egg Standards \$48 member; \$72 non-member	_____
_____	3-A Egg Standards \$28 member; \$42 non-member	_____
_____	Five-year Update Service on 3-A Sanitary Standards (additional postage not required) 3-A Dairy & Egg Standards \$44 member; \$66 non-member	_____
		Subtotal _____
		U.S. Shipping _____
		Add \$3.25 for each item
		Shipping _____
		Outside U.S. _____
		Add \$8.25
		3-A Sanitary Standards Total _____

PRINT OR TYPE . . . ALL AREAS MUST BE COMPLETED IN ORDER TO BE PROCESSED

Name _____ Company Name _____
Job Title _____ Office Phone # _____
Address _____
City _____ State/Province _____ Country _____ Zip _____

MAIL ENTIRE FORM TO:

IAMFES
502 E. LINCOLN WAY
AMES, IA 50010-6666

OR USE YOUR CHARGE CARD 1-800-369-6337
800-284-6336 (Canada)
515-232-6699
FAX 515-232-4736

**PAYMENT MUST BE ENCLOSED
IN ORDER TO PROCESS**

____ CHECK OR MONEY ORDER
____ MASTER CARD
____ VISA
____ AMERICAN EXPRESS

U. S. FUNDS on U. S. BANK

CARD # _____

EXP. DATE _____

YOUR SIGNATURE _____

IAMFES

International Association of Milk, Food and Environmental Sanitarians, Inc.

MEMBERSHIP APPLICATION

MEMBERSHIP

- Membership Plus \$70**
(Includes *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection*)
- Membership with *Dairy, Food and Environmental Sanitation* \$40**
- Check here if you are interested in information on joining your state/province chapter of IAMFES**

SUSTAINING MEMBERSHIP

- Membership with BOTH journals \$400**
Includes exhibit discount, July advertising discount, company monthly listing in both journals and more.

STUDENT MEMBERSHIP

- Membership Plus including BOTH journals \$35**
- Membership with *Dairy, Food and Environmental Sanitation* \$20**
- Membership with the *Journal of Food Protection* \$20**
*Student verification must accompany this form

- Surface** **POSTAGE CHARGES: Outside the U.S. add \$15 per journal surface rate or \$95**
- AIRMAIL** **per journal AIRMAIL ordered. U.S. funds only, drawn on U.S. Bank.**

PRINT OR TYPE . . . ALL AREAS MUST BE COMPLETED IN ORDER TO BE PROCESSED

Name _____ Company Name _____

Job Title _____ Office Phone # _____

Address _____ FAX # _____

City _____ State/Province _____ Country _____ Zip _____

Renewal _____ New Membership/Subscription _____

**PAYMENT MUST BE ENCLOSED
IN ORDER TO PROCESS**

MAIL ENTIRE FORM TO:

IAMFES
502 E. LINCOLN WAY
AMES, IA 50010

____ CHECK OR MONEY ORDER
____ MASTER CARD
____ VISA
____ AMERICAN EXPRESS

**U.S. FUNDS
on U.S. BANK**

CARD # _____

EXP. DATE _____

YOUR SIGNATURE _____

OR USE YOUR CHARGE CARD 1-800-369-6337
(800)284-6336 (Canada)
515-232-6699
FAX 515-232-4736

IAMFES

International Association of Milk, Food and Environmental Sanitarians Inc

DFES
5/91

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

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

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

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

IAMFES

International Association of Milk, Food and Environmental Sanitarians Inc

DFES
5/91

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

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

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.

Place
Stamp
Here

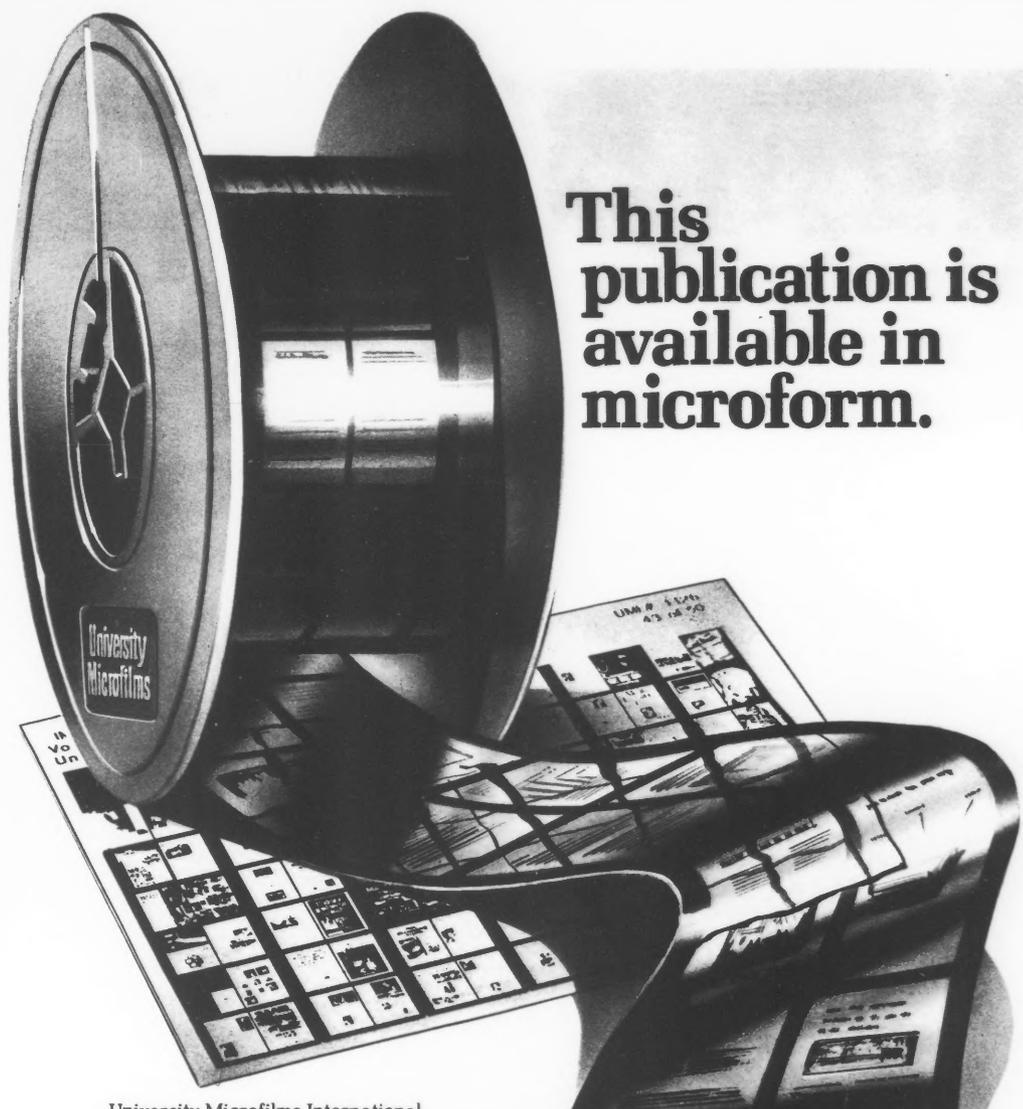
IAMFES

502 E. Lincoln Way
Ames, Iowa 50010

Place
Stamp
Here

IAMFES

502 E. Lincoln Way
Ames, Iowa 50010



**This
publication is
available in
microform.**

University Microfilms International reproduces this publication in microform: microfiche and 16mm or 35mm film. For information about this publication or any of the more than 13,000 titles we offer, complete and mail the coupon to: University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48106. Call us toll-free for an immediate response: 800-521-3044. Or call collect in Michigan, Alaska and Hawaii: 313-761-4700.

**University
Microfilms
International**

Please send information about these titles:

Name _____

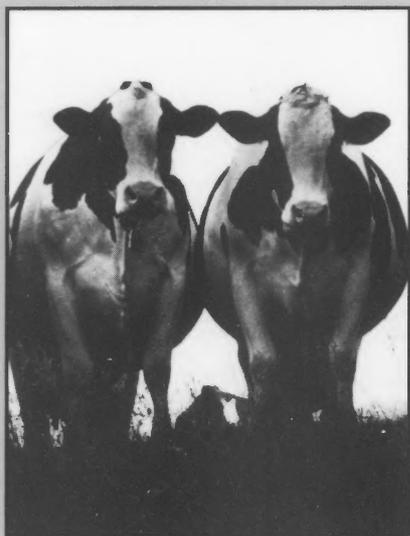
Company/Institution _____

Address _____

City _____ State _____ Zip _____

Phone () _____

CLEAN AND SIMPLE



CHARM FARM TEST

No food product is cleaner or healthier than milk. And no one is more concerned about the cleanliness of the milk supply than milk producers.

But making sure your milk product is residue-free hasn't always been easy. At one time, most testing for antimicrobial drugs was done at the plant and regulatory levels. If you were a producer, you sent out your bulk tank and hoped for the best.

But you didn't test the milk yourself. Because reliable, inexpensive testing systems that could be run right on the farm simply didn't exist.

That's all changed now. Ensuring a clean milk supply has never been easier—at all levels. The Charm Farm Test is the first broad spectrum test for antimicrobial drugs designed for use both on the farm and in the lab.

A **SINGLE TEST** detects beta-lactams, sulfa drugs, gentamicin, tetracyclines, tylosin and other antimicrobial drugs. And the Charm Farm Test is sensitive—it meets F.D.A. safe levels for more drugs than any other test that can be used on the farm. No preparation or training is required, and easy-to-read results are based on a color change. **The price per test is only \$1.25.**

The perfect testing tool for producers and veterinarians, the Charm Farm Test is also an excellent laboratory confirmation assay.

Give the Charm Farm Test a try. You'll see how easy it is to come clean.



CHARM SCIENCES INC.

36 FRANKLIN STREET, MALDEN, MASSACHUSETTS 02148-4120 TEL. (617) 322-1523 FAX (617) 322-3141

Stop by our Exhibit at the IAMFES Annual Meeting

Nothing works like a Charm.

Please circle No. 186 on your Reader Service Card

