ISSN: 1043-3546

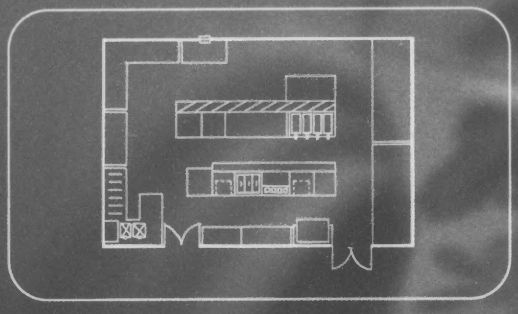
6200 Aurora Avenue•Suite 200W
Des Moines, Iowa•USA•50322

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. SEPTEMBER 1997

- 3-A Sanitary Standards
- A National Food Safety Initiative
- Call for 1998 Industry Awards



Proper dining etiquette includes forks on the left, knives on the right and UL Marks on all the food equipment.

The standard of excellence in the food industry doesn't just apply to the food and its preparation. It also applies to the food service equipment. That's where UL's product certification expertise comes in. You'll know food equipment meets nationally recognized standards if it bears the UL Classification Mark for public health. We're accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada in many public safety areas including food service equipment and drinking water additives. We use a team of experts including engineers, chemists and toxicologists who can assist you with technical questions. Plus our field representatives make follow-up visits to the factory at least four times a year to help maintain the UL Mark's integrity. Sure, proper etiquette is important. But proper certification is essential.

Underwriters Laboratories Inc.®

For more information, call one of our locations: Northbrook, IL 1-800-595-9844; Research Triangle Park, NC 1-800-595-9841; Camas, WA 1-800-595-9845; Melville, NY 1-800-595-9842; Santa Clara, CA 1-800-595-9843. Or visit our Web site at www.ul.com.

ABOUT THE COVER...

Photo courtesy of U.S. Filter. U.S. Filter's Membralox® ceramic membrane filters are ideal for dairy and food applications requiring selective separations for product recovery.

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

ARTICLES

ASSOCIATION NEWS

DEPARTMENTS

EXTRAS

INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863, USA
800.369.6337 or 515.276.3344; Fax: 515.276.8655

Executive Director: David W. Tharp
E-mail: dtharp@iamfes.org

Administrative Assistant: Tami J. Schafroth
E-mail: iamfes@iamfes.org

COMMUNICATIONS

Director of Communications: Carol F. Mouchka
E-mail: cmouchka@iamfes.org

Publications Specialist: Donna A. Bahun
E-mail: dbahun@iamfes.org

Publication Assistant: Michelle L. Sproul
E-mail: msproul@iamfes.org

Publication Proofreader: Pam J. Wanninger
E-mail: iamfes@iamfes.org

ADMINISTRATION

Director of Finance & Administration: Lisa K. Backer
E-mail: lbacker@iamfes.org

Accounting Assistant: Lori M. Beason
E-mail: iamfes@iamfes.org

Lending Library Coordinator: Tanya L. Smith
E-mail: iamfes@iamfes.org

Order Fulfillment/Receptionist: Karla K. Jordan
E-mail: iamfes@iamfes.org

MEMBERSHIP

Director of Marketing and Member Services: Rick L. McAtee
E-mail: rmcatee@iamfes.org

Membership/Meeting Coordinator: Julie A. Cattanach
E-mail: jcattanach@iamfes.org

SCIENTIFIC EDITOR

William LaGrange, Ph.D.
Iowa State University
Department of Food Science and Human Nutrition
Food Sciences Building
Ames, IA 50011-0001
515.294.3156; Fax: 515.294.8181
E-mail: foodsci@exnet.iastate.edu

ADVERTISING

McCleary Communications
Phone: 515.271.0543
Fax: 515.271.0555

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

Dairy, Food and Environmental Sanitation (ISSN-1043-3546) is published monthly beginning with the January number by the International Association of Milk, Food and Environmental Sanitarians, Inc. 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, USA. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, IA 50010, USA. Periodical Postage paid at Des Moines, IA 50318 and additional entry offices.

Manuscripts: Correspondence regarding manuscripts should be addressed to Carol F. Mouchka, Managing Editor, IAMFES, Inc.

News Releases, Updates, Coming Events and Cover Photos: Correspondence for these materials should be sent to Donna A. Bahun, Publications Specialist, IAMFES, Inc.

"Instructions to Contributors" may be obtained from Michelle Sproul, Publication Assistant, IAMFES, Inc.

Orders for Reprints: All orders should be sent to **Dairy, Food and Environmental Sanitation,** IAMFES, Inc. Note: Single copies of reprints are not available from this address; address single copy reprint requests to principal author.

Reprint Permission: Questions regarding permission to reprint any portion of **Dairy, Food and Environmental Sanitation** should be addressed to: Carol F. Mouchka, Managing Editor, IAMFES, Inc.

Business Matters: Correspondence regarding business matters should be addressed to Lisa K. Backer, Director of Finance & Administration, IAMFES, Inc.

Membership Dues: Membership in the Association is available to individuals. Dues are $75.00 per year and include a subscription to **Dairy, Food and Environmental Sanitation**. Dues including both **Dairy, Food and Environmental Sanitation** and **Journal of Food Protection** are $120.00. Student membership is $37.50 per year, with verification of student status, and includes **Dairy, Food and Environmental Sanitation** or **Journal of Food Protection.** Student membership with both journals is $60.00. No cancellations accepted.

Sustaining Membership: A sustaining membership in IAMFES is available to companies at a rate of $525.00 per year. For more information, contact Rick McAtee, Director of Marketing/Member Services, IAMFES, Inc.

Subscription Rates: $160.00 per year. Single copies $21.00 each. No cancellations accepted. For more information, contact Julie A. Cattanach, Membership/Meeting Coordinator, IAMFES, Inc.

Postage: Outside U.S. add $22.50 per journal (*DFES* or *JFP*) for surface delivery; add $95.00 per journal (*DFES* or *JFP*) for air mail delivery. U.S. FUNDS ONLY—ON U.S. BANK. Single copies add $9.00 per issue.

Claims: Notice of failure to receive copies must be reported within 30 days domestic, 90 days outside U.S. Correspondence regarding changes of address and dues must be sent to Julie A. Cattanach, Membership/Meeting Coordinator, IAMFES, Inc.

Postmaster: Send address changes to **Dairy, Food and Environmental Sanitation,** 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, USA.

A Note from the Scientific Editor...

To: All presenters of the 1997 IAMFES Annual Meeting

From: Bill LaGrange, Scientific Editor
Dairy, Food and Environmental Sanitation

Re: Submission of your paper for publication

There were a great number of terrific papers presented at this year's Annual Meeting. I attended many and was impressed by the presentations overall. If you presented a paper at the Annual Meeting of IAMFES in Orlando, consider submitting it in manuscript form for possible publication in *Dairy, Food and Environmental Sanitation*.

The Instructions for Authors were published in the February issue of *DFES*, use these as a guideline for preparation of your manuscript. If you have any questions regarding the preparation of your manuscript, call Michelle Sproul, IAMFES Publication Assistant, at 800.369.6337.

Consider seeing your paper in print in *Dairy, Food and Environmental Sanitation*. Publishing your manuscript here is an opportunity for over 3,000 industry professionals to receive your information, not to mention those who access it in libraries around the world. If you have any questions, please contact me at 515.294.3156. Thank you.

DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

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

Sustaining Members

3M Microbiology Products, 3M Center, Bldg. 275, St. Paul, MN 55144-1000; 612.733.9558

ABC Research, 3437 S.W. 24th Avenue, Gainesville, FL 32607; 352.372.0436

Accurate Metering Systems, Inc., 1651 Wilkening Road, Schaumburg, IL 60173; 708.882.0690

Applied Research Institute, 8 Blanche's Walk, P.O. Box 810, Newtown, CT 06470; 888.324.7900

APV Crepaco, 9525 W. Bryn Mawr Ave., Rosemont, IL 60018; 708.678.4300

ASI Food Safety Consultants, Inc., 7625 Page Blvd., St. Louis, MO 63133; 800.477.0778

Becton Dickinson Microbiology Systems, Inc., 7 Loveton Circle, Sparks, MD 21152-9212; 410.584.7188

Bentley Instruments, Inc., 4004 Peavey Road, Chaska, MN 55318; 612.448.7600

BioControl Systems, Inc., 19805 N. Creek Parkway, Bothell, WA 98011; 206.487.2055

Biolog, Inc., 3938 Trustway, Hayward, CA 94545; 510.785.2585

bioMérieux Vitek, Inc., 595 Anglum Road, Hazelwood, MO 63042-2395; 800.638.4835

Bioscience International, Inc., 11607 Magruder Lane, Rockville, MD 20852-4365; 301.230.0072

Capitol Vial, Inc., P.O. Box 446, Fultonville, NY 12072; 518.853.3377

Celsis-Lumac, Inc., 1801 Maple Ave., BIRL Bldg., Evanston, IL 60201; 847.467.6600

Charm Sciences, Inc., 36 Franklin Street, Malden, MA 02148; 617.322.1523

Cogent Technologies Ltd., 11140 Luschek Dr., Cincinnati, OH 45241; 513.469.6800

Copesan Services, Inc., 3490 N. 127th St., Brookfield, WI 53005; 800.267.3726

Dairy Quality Control Institute, 5205 Quincy Street, Mounds View, MN 55112-1400; 612.785.0484

DARDEN Restaurants, P.O. Box 593330, Orlando, FL 32859-3330; 407.245.5330

Darigold, Inc., 635 Elliott Ave., P.O. Box 79007, W. Seattle, WA 98119; 206.286.6772

Dean Foods, P.O. Box 7005, Rockford, IL 61101-7005; 815.962.0647

Decagon Devices, 950 N.E. Nelson Court, P.O. Box 835, Pullman, WA 99163; 509.332.2756

Difco Laboratories, Inc., P.O. Box 331058, Detroit, MI 48232; 313.462.8478

DiverseyLever, 46701 Commerce Center Drive, Plymouth, MI 48170; 313.414.5012

DonLevy & Associates, Inc., 1551 E. 89th Ave., Merrillville, IN 46410; 219.736.0472

Dynal, Inc., 5 Delaware Drive, Lake Success, NY 11042; 516.326.3270

Ecolab, Inc., 370 Wabasha St. N., St. Paul, MN 55102; 612.293.2364

Educational Foundation of the National Restaurant Assn., 250 S. Wacker Drive, Suite 1400, Chicago, IL 60606-3834; 800.765.2122

Electrol Specialties Company, 441 Clark Street, South Beloit, IL 61080; 815.389.2291

Evergreen Packaging, Division of International Paper, 2400 6th Street, S.W., Cedar Rapids, IA 52406; 319.399.3236

F & H Food Equipment Co., P.O. Box 3985, Springfield, MO 65808; 417.881.6114

Foss North America, Inc., 10355 W. 70th Street, Eden Prairie, MN 55344; 612.941.8870

FRM Chem, Inc., P.O. Box 207, Washington, MO 63090; 314.583.4360

Gardex Chemicals, Ltd., 7 Meridian Rd., Etobicoke, ON M9W 4Z6; 800.563.4273

GENE-TRAK Systems, 94 South Street, Hopkinton, MA 01748; 508.435.7400

Gist-brocades Dairy Ingredients Group, N93 W14560 Whittaker Way, Menomonee Falls, WI 53051; 800.423.7906

Glo Germ Company, 150 E. Center St., Moab, UT 84532-2430; 800.842-6622

Great Western Chemical Co., 1717 E. Fargo, Nampa, ID 83687; 208.466.8437

Hardy Diagnostics, 1430 W. McCoy Ln., Santa Maria, CA 93455; 805.346.2766

Hess & Clark, Inc./KenAg, 7th & Orange Street, Ashland, OH 44805; 800.992.3594

Sustaining Members

IBA, Inc., 27 Providence Road, Millbury, MA 01527; 508.865.6911

IDEXX Laboratories, Inc., One Idexx Drive., Westbrook, ME 04092; 207.856.0300

International BioProducts, Inc., 14780 N.E. 95th Street, Redmond, WA 98052; 206.883.1349

International Dairy Foods Association, 1250 H Street, N.W., Suite 900, Washington, D.C. 20005; 202.737.4332

Kalyx Biosciences, 20 Camelot Drive, Nepean, ON K29 5X8; 613.723.1114

Land O'Lakes, Inc., P.O. Box 116, Minneapolis, MN 55440-0116; 612.481.2870

Malthus Diagnostics, Inc., 35888 Center Ridge Road, North Ridgeville, OH 44039; 216.327.2585

Maryland & Virginia Milk Producers Cooperative Assn., Inc., 1985 Isaac Newton Square, West, Reston, VA 20190-5094; 703.742.6800

Medallion Labs, 9000 Plymouth Ave., Minneapolis, MN 55427; 612.540.4453

Metz Sales, Inc., 522 W. First Street, Williamsburg, PA 16693; 814.832.2907

Michelson Laboratories, Inc., 6280 Chalet Drive, Commerce, CA 90040; 562.928.0553

NSF International, 3475 Plymouth Road, Ann Arbor, MI 48105; 313.769.5523

NASCO International, 901 Janesville Avenue, Fort Atkinson, WI 53538; 414.563.2446

The National Food Laboratory, 6363 Clark Ave., Dublin, CA 94568; 510.551.4231

National Food Processors Association, 1401 New York Ave. N.W., Washington, D.C. 20005; 202.639.5985

Nelson-Jameson, Inc., 2400 E. Fifth Street, P.O. Box 647, Marshfield, WI 54449-0647; 715.387.1151

NESTLÉ USA, Inc., 800 N. Brand Blvd., Glendale, CA 91203; 818.549.5799

New Horizons Diagnostics, 9110 Red Branch Road, Columbia, MD 21045; 410.992.9357

Norton Performance Plastics Corp., P.O. Box 3660, Akron, OH 44309-3660; 216.798.9240

Organon Teknika, 100 Akzo Avenue, Durham, NC 27712; 919.620.2000

Oxoid, Inc., 800 Proctor Ave., Ogdensburg, NY 13669-2205; 800.567.8378

PE Applied Biosystems, 850 Lincoln Centre Drive, Bldg. 400, Foster City, CA 94404; 415.638.5413

Penn State University, University Creamery, 12 Borland Laboratory, University Park, PA 16802; 814.865.7535

PRISM Integrated Sanitation Management, 8300 Executive Center Drive, Miami, FL 33166-4680; 305.592.6312

Qualicon, A DuPont Subsidiary, P.O. Box 80357, Wilmington, DE 19880; 302.695.2262

R-Tech, P.O. Box 116, Minneapolis, MN 55440-0116; 800.328.9687

REMEL, L.P., 12076 Santa Fe Dr., Lenexa, KS 66215; 800.255.6730

Ross Laboratories, 625 Cleveland Avenue, Columbus, OH 43215; 614.227.3333

Seiberling Associates, Inc., 94 North High Street, Suite 350, Dublin, OH 43017-1100; 614.764.5854

Silliker Laboratories Group, Inc., 900 Maple Road, Homewood, IL 60430; 708.957.7878

Sparta Brush Co., Inc., P.O. Box 317, Sparta, WI 54656; 608.269.2151

Tekmar-Dohrmann, P.O. Box 429576, Cincinnati, OH 45242-9576; 513.247.7000

Tri-Dim Filter Corp., 999 Raymond St., Elgin, IL 60120; 847.695.2600

U.S. Filter, 10 Technology Dr., Lowell, MA 01851; 508.934.9349

VICAM, L.P., 313 Pleasant St., Watertown, MA 02172; 617.926.7045

Vulcan Chemical Technologies, Inc., 1902 Channel Drive, West Sacramento, CA 95691; 916.375.0167

Walker Stainless Equipment Co., 902 2nd Main St., Elroy, WI 53929; 608.462.8461

Warren Analytical Laboratory, 650 'O' St., P.O. Box G, Greeley, CO 80632; 800.945.6669

Weber Scientific, 2732 Kuser Road, Hamilton, NJ 08691-9430; 609.584.7677

West Agro, Inc., 11100 North Congress Avenue, Kansas City, MO 64153; 816.891.1528

Zep Manufacturing Co., 1310 Seaboard Industrial Blvd., Atlanta, GA 30318; 404.352.1680

COMMENTS

FROM YOUR PRESIDENT

By GALE PRINCE
IAMFES President

"Education is a major part of the food safety initiative"

September has been proclaimed National Food Safety Month. Why should food safety receive all this attention?

Dr. Mike Foster raised a similar question in a recent speech at an International Life Sciences Institute (ILSI) meeting. Dr. Foster asked why he didn't have food safety concerns when he was a boy growing up in Texas. Many of us with a few gray hairs can echo Dr. Foster's perplexment. In this era, food preparation was done in the home and eaten soon thereafter at the family dinner table. Meals were prepared from the basic food groups (vegetables, grains, meat, dairy, and fruits), much of which had probably been grown by the family. The key to food safety in those days was the time/temperature relationship between food preparation and consumption. The brief time from preparation to consumption probably covered any food safety handling errors. If an error led to an illness, it typically involved one individual or one family. You surely would not blame the illness on mother's cooking if you wanted to continue to eat!

Today, the time between preparation and consumption has increased the challenge of keeping food safe. Now, food is often produced on a larger scale in the production of "ready-to-eat" foods outside the home. This, in addition to increased time between the making of the food and our ingestion of it, has allowed failures in our food safety systems to become more evident. Today's family dinner table is much different than Dr. Foster and I remember. Families turn to new convenience foods that have been prepared for them, and many eat dinner on the run. The microwave oven, an appliance many couldn't cook a meal without, has turned us into a "heat and serve" generation.

The term "generation gap" floats around pretty freely these days. Food safety is one area where the so-called "gap" has clearly defined lines. We were able to worry about it less as children because the risks were simply lower, without a lot of attention being paid directly to them.

On January 25, 1997, U.S. President Bill Clinton announced the National Food Safety Initiative. This initiative focuses on food safety, from farm to table. All the processes in between are also discussed in his initiative. This is the first presidential initiative dealing strictly with food safety. Education is a major part of this Food Safety Initiative and is the only way to help the average person keep his or her food safe.

National Food Safety Month provides a nice backdrop for the launch and maintenance of a "High Impact" safe food handling campaign. A Memorandum of Understanding (MOU) has been signed by several federal agencies joined with consumer and food industry groups as a partnership for food safety education. The MOU is designed to bring together resources and launch a program that no individual entity would be capable of alone. There are likely to be many widespread benefits from this educational program.

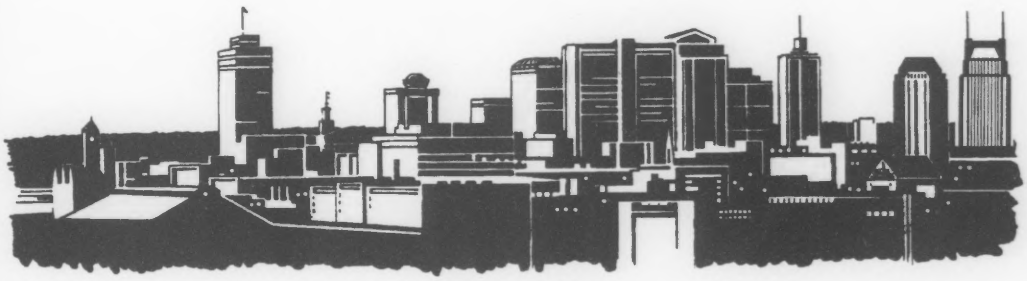
Each of us has a responsibility to bridge the food safety information gap that seems to grow larger everyday as we search for convenient new ways to deal with busy schedules. Take a quick inventory of what your goals are to promote better food safety practices in your current job. Too frequently we talk to each other about food safety problems without really setting goals or developing solutions to food safety.

All the fuss about food safety is a result of change. Changes in the way we handle food; changes in the way food is produced; changes in the way we prepare food, and our desire to retain the maximum benefit from the food we consume. Each day we learn new things about microbes, food, and humans. IAMFES provides a forum for members to share information on food safety so, hopefully, we can all make strides in winning the battle between those microbes and our own survival!

NASHVILLE

Start Planning Now!

85th IAMFES
Annual Meeting
August 16–19, 1998
Renaissance Nashville Hotel
Nashville, Tennessee

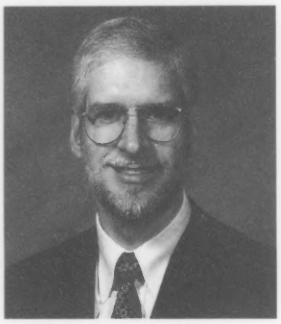


Nashville Skyline

Phone: 800.369.6337 or 515.276.3344;
Fax: 515.276.8655;
E-mail: iamfes@iamfes.org

COMMENTARY

FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP
IAMFES Executive Director

"The Foundation Fund certainly supplements our mission"

Today, I would like to expand upon the activities supported by the Foundation Fund. The Foundation was established in the mid-seventies to further the efforts of IAMFES and assist in serving the IAMFES mission.

To raise funds for the Foundation, the Sustaining Member program was established by the Executive Board and a number of dedicated IAMFES Members. In June of 1977, the first listing of Sustaining Members ran in our journals; there were 12 listed. Now we are proud to have over 80 Sustaining Members. A part of the original Sustaining Members' dues were allocated to the Foundation Fund. Today's Sustaining Members continue to support the Foundation in this manner. Over the years, the balance in the Foundation Fund has grown to more than $70,000. At the Annual Meeting in Orlando, the Foundation Fund Support Group agreed to adopt the slogan "$100,000 in 2000"; meaning they will work to raise the balance in the Foundation Fund to $100,000 by the year 2000. Your contributions to help achieve this goal are needed! Don't be surprised if Harry Haverland or other Members working with the Foundation Fund call you to solicit your donation.

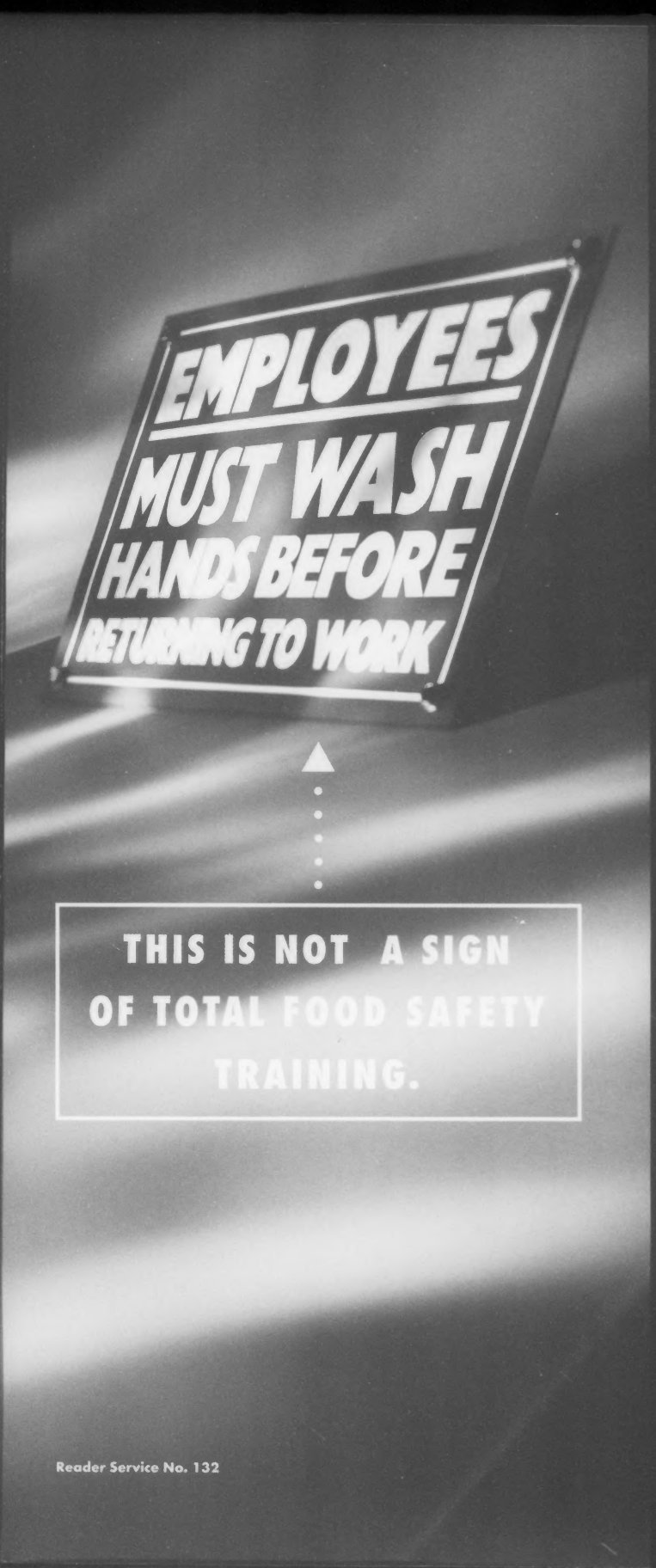
All contributions are welcome no matter what amount. Checks payable to the IAMFES Foundation may be sent with your Membership renewal or at any time throughout the year. Monies are welcome from individual Members and your employers. During your company budgeting process, use your influence to persuade your employer to support the IAMFES Foundation!

Now, what does the Foundation do with the money received? The Foundation has many programs that support the mission of IAMFES. They provide travel funds to speakers who might otherwise not be able to present at our Annual Meeting. This program has enabled many speakers over the years to contribute to the success of the Annual Meeting. Foundation funds are also used to send extra journals (*Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection*) to developing countries. The United Nations Food and Agriculture Organization assists us in this critical endeavor.

Each year, the Ivan Parkin Opening Session Lecture is sponsored by the Foundation. Over the years, Ivan Parkin Lecturers have delivered timely, informative topics and we have been honored with many leaders from the Food Safety arena. Also at the Annual Meeting, with the backing of the Foundation Fund, we conduct the Developing Scientist Competition for food science students. We have seen great growth in this event with over 30 students involved this past year. The majority of our competing students use this competition as a springboard to become involved with IAMFES and we are fortunate to have gained their expertise!

Have you borrowed video tapes from the IAMFES Lending Library? Are you aware that Foundation resources support this Library? We have an extensive selection of educational training tapes available to Members at no charge! This is truly a Member benefit and is fully supported by the Foundation. Be sure to review the list of videos available in this issue of *DFES*. Our Foundation also supports the Crumbine Award, presented annually to a local governmental health unit that demonstrates excellence at the local level in food protection.

All of the programs described are supported by the IAMFES Foundation Fund with monies collected or interest earned, without using the principle balance in the Fund. As you can see, the Foundation certainly supplements our mission. Please help us to achieve the Foundation Fund's goal of $100,000 in the year 2000.



THIS IS NOT A SIGN OF TOTAL FOOD SAFETY TRAINING.

THIS IS.

THE EDUCATIONAL FOUNDATION
SERVSAFE®
NATIONAL RESTAURANT ASSOCIATION

Food safety means more than just clean hands. To serve safely, you need the recognized industry standard for food safety training. You need SERVSAFE. SERVSAFE's complete system trains both managers and employees how to guard against foodborne illness. With SERVSAFE, you can serve safer, hands down. Call the Educational Foundation to get started.

National Restaurant Association
THE EDUCATIONAL FOUNDATION

1-800-765-2122
http://www.restaurant.org

Reader Service No. 132

Dairy, Food and Environmental Sanitation, Vol. 17, No. 9, Pages 550-554

Reduction of Bacterial Contamination in the Household Kitchen Environment through the Use of Self-Disinfecting Sponges

Carlos E. Enriquez,*[1] Veronica E. Enriquez,[2] and Charles P. Gerba[1,3]

SUMMARY

Outbreaks of foodborne disease have increased around the world; it has been estimated that a significant proportion originate in the home. Both opportunistic and definite pathogenic bacteria, including *Salmonella* spp., have been isolated from domestic cleaning tools, and kitchen cleaning utensils have been associated with the transfer of organisms to food in sufficient numbers to represent a health risk. This study determined total plate count on Trypticase soy agar, total coliform bacteria on mEndo agar, and fecal coliform bacteria on mFC agar in self-disinfecting and ordinary cellulose sponges and in cotton dishcloths used in a household kitchen environment. In addition, the transfer of bacteria from contaminated cleaning tools to hands and surfaces was studied. Samples of dishwater, water extracted from cleaning tools, and swabs of hands and kitchen surfaces previously in contact with cleaning utensils were plated in the corresponding culture media by the spread plate technique. This 5-day study was repeated three times. By the *T* test analysis, the self-disinfecting sponge showed a statistically significant reduced number of total and fecal coliform bacteria ($P < 0.01$ to 0.05). Moreover, the transfer of total and fecal coliform bacteria to fingertips was significantly lower when a self-disinfecting sponge was used. These results suggest that the use of self-disinfecting cellulose sponges for cleaning purposes in the kitchen may reduce the level of contamination by total and fecal coliform bacteria.

INTRODUCTION

Studies in Europe *(2, 14)* have shown that single homes account for the majority of foodborne outbreaks and also that the most common place where foods are mishandled is the domestic environment.

Each year the cost of foodborne bacterial illness in the USA is of approximately $4 to $6 billion *(8)* and the number of gastroenteritis cases related to foodborne pathogens is 6.5 million, leading to an estimated 9,000 deaths.

Although enterobacteria do not survive well under dry conditions *(13)*, the kitchen environment provides constant wet environments in which they may survive and multiply. Furthermore, both opportunistic and definitely pathogenic foodborne bacteria, including *Salmonella* spp. *(3)* and *Clostridium perfringens* (Glenn Songer, personal communication), have been isolated from cleaning sponges and dishcloths in the domestic environment.

A previous study on microbial contamination in 200 homes *(13)* determined that the highest isolation rates of enterobacteria (*Escherichia coli, Citrobacter freundii, Klebsiella pneumoniae*, and *Enterobacter cloacae*) in the kitchen area were from wet sites such as sinks, drain boards, and dishcloths. The heavy contamination of cleaning tools suggested that these may serve not only as reservoirs but also as disseminators of bacterial contamination in the kitchen.

An important source of contamination of foods is the transfer of pathogens by the food handler, either directly, or by cross-contamination through hands, surfaces, utensils, and equipment insufficiently cleaned or disinfected between handling of different foods *(7, 9)*.

It has been shown *(12)* that cleaning tools become heavily contaminated within hours of first use, and that the use of those cleaning tools with the purpose of cleaning food-preparation surfaces results in bacterial transfer.

The objectives of this study were to compare the level of bacterial contamination of cotton dishcloths and ordinary and self-disinfecting cellulose sponges under normal use in a household kitchen environment and to determine the transfer of bacteria from cleaning tools to hands and to food-preparation surfaces.

MATERIALS AND METHODS

Cleaning tools

Three 5-day experiments were conducted in a household environment during 3 consecutive weeks. Cleaning tools used in this investigation consisted of self-disinfecting cellulose sponges (3M, Home and Commercial Care Division, St. Paul, MN), generic cellulose sponges, and cotton dishcloths (Leshner Mills, Hamilton, OH). The proprietary active disinfectant in the self-disinfecting sponges is protected by U.S. Patent PCTUS9310316.

New cellulose sponges contain quaternary ammonium compounds as preservatives. To eliminate the disinfecting effect of these compounds, the experiments were started after doing ordinary dishwashing with all tested cleaning tools for 3 consecutive days.

Breakfast for approximately 9 people was prepared every day, using 9 plates, 18 pieces of silverware, 6 glasses, and 3 frying pans. After breakfast, soiled plates, silverware, glasses and frying pans were divided in three equal groups, and together with the corresponding cleaning tool, were soaked in 3 separate sinks for 10 min in warm water (approx. 43°C) with approximately 28 ml of Down dishwashing detergent (Procter & Gamble, Cincinnati, OH).

Sampling

Dishes were washed with the corresponding cleaning tools, and 10-ml dishwater samples taken immediately. Without rinsing, the cleaning tools were wrung out by hand compression to obtain approximately 1 ml from each one. An additional sample was obtained by wringing in a similar way after 24 h. After initial sampling three kitchen countertop surfaces of approximately 100 cm^2 each were wiped with the corresponding cleaning tools (before sampling, surfaces were ethanol flamed). Swab samples from these surfaces were taken after 10 and 60 min and 24 h. In addition, after 24 h, swab samples were taken every other day from fingers kept firmly in contact for 30 s with the corresponding cleaning tool (before sampling, fingers were soaked in ethanol and let dry).

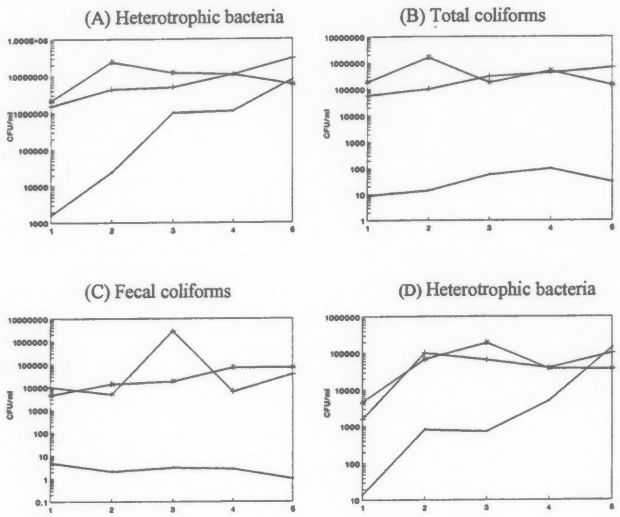
Between daily tests, each sponge without further rinse was allowed to air dry on a new 196-cm^2 polystyrene weighing dish.

A universal neutralizer (0.3%, polysorbate 80, 0.5%, sodium thiosulfate, 0.1%, L-histidine, and 0.25 N, phosphate buffer) adapted from reference *(1)* was used in all samples to avoid the disinfecting potential of chlorine present in tap water, and any residual disinfectant from the cleaning tools. Swabs samples were placed in 2 ml of universal neutralizer, whereas dishwater and wrung samples were mixed with 0.1 volume of 10-fold concentrated universal neutralizer.

Sample processing

Samples were stored at 4°C and transported to the processing laboratory at the University of Arizona, where they were assayed within 4 h of collection. All samples were serially diluted 10-fold, and dilutions were spread plated (0.1 ml) on tryptic soy agar (TSA) for total plate count, mEndo agar for total coliform bacteria, and mFC agar for fecal coliform bacteria. TSA and mEndo agar plates were incubated at 37°C for 24 h and mFC plates at 44.5°C for 24 h. CFU were enumerated with a colony-counter apparatus. Statistical analysis of the data was carried out by the *T* test procedure *(15)*.

Figure 1. Recovery of bacteria from wrung samples (A, B, and C) and from Formica® surfaces (D) after 10 min of wiping with cleaning tools as described. (A and B) Cotton dishcloth (✳), ordinary cellulose sponges (+), and O-cel-O Stay Fresh™ Sponge (•).



RESULTS

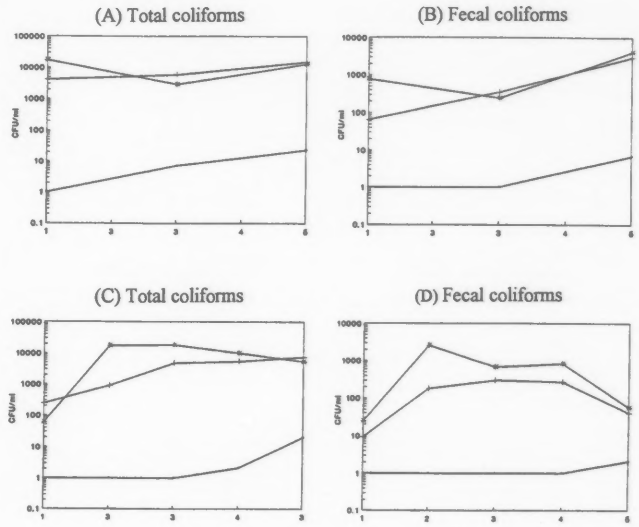
A similar pattern of bacterial contamination of cleaning tools was observed in all samples. Colonization of sponges or dishcloths by heterotrophic bacteria was not significantly affected by the type of cleaning tool. However, the initial number of heterotrophic bacteria was lower when self-disinfecting sponges were used. In contrast, the level of contamination by total and fecal coliform bacteria were significantly lower with self-disinfecting sponges.

Dishwater samples. Overall, the level of bacterial contamination was lower in dishwater samples with self-disinfecting sponges (data not shown). The numbers of heterotrophic bacteria on TSA were lower in the self-disinfecting sponge during the first 3 days of the study, but no statistical difference was found. After 4 days, the three types of cleaning tools presented a similar level of contamination by heterotrophs, but the levels of total and fecal coliform bacteria in dishwater samples were significantly lower when self-disinfecting sponges were used. Although the level of contamination in dishwater samples in which self-disinfecting sponges were soaked increased gradually after 4 days, the difference was still statistically significant at the 0.05 level.

Wrung samples. The bacterial contamination of wrung samples taken immediately after dishwashing was higher in ordinary sponges and cotton dishcloths. The first day, the number of heterotrophs was roughly 3 orders of magnitude higher in ordinary sponges and dishcloths than in self-disinfecting sponges. However, after 5 days the bacterial level among the three types of cleaning tools was comparable (Fig. 1A), and no significant difference was found. In contrast, the numbers of total and fecal coliform bacteria were approximately 3 to 4 $\log_{10}$ units lower in samples derived from self-disinfecting sponges, ranging from 10 to 100 CFU/ml, as opposed to 1×10^5 to 1×10^6 CFU/ml in dishcloths and ordinary sponges (Fig. 1B and 1C). The observed difference was statistically significant at the 0.01 level. A very similar pattern of heterotrophic bacteria and total and fecal coliforms was seen in wrung samples collected after 24 h of dishwashing. However, bacterial contamination, as expected, was slightly higher in ordinary sponges and dishcloths, reaching values of more than 1×10^7 CFU/ml of total or fecal coliform bacteria after 5 days, while in self-disinfecting sponges the number total and fecal coliform bacteria remained below 1×10^3 CFU/ml at that time, with a significant difference at the 0.01 level (data not shown).

Bacterial transfer to surfaces and fingers. The level of bacterial transfer to surfaces was measured by wiping Formica® surfaces at 10 and 60 min and 24 h. A low number of bacteria was recovered from swab samples taken after 60 min and 24 h (data not shown). However, those were considered background bacteria, as similar numbers were found on nonwiped surfaces. After 10 min however, large numbers of transferred bacteria remained culturable. Bacterial transfer to surfaces was greatly reduced with the use of self-disinfecting sponges, particularly total and fecal coliform bacteria (Fig. 2C and 2D). The extent of bacterial transfer, as assessed by total plate count, was also reduced when a self-disinfecting sponge was used, but no statistical difference was observed (Fig. 1D). While during the last 4 days of the experiment the number of total and fecal

Figure 2. Recovery of bacteria from finger surfaces after compression of cleaning tools for 30 s (A and B). Recovery of bacteria from Formica® surfaces after 10 min of wiping with the cleaning tools as described (C and D). Cotton dishcloth (✳), ordinary sponges (+), and O-cel-O Stay Fresh™ (•).



coliform bacteria transferred to surfaces by dishcloths and ordinary sponges remained close to 1×10^4 and 1×10^3 CFU/ml, respectively, the number transferred to surfaces by self-disinfecting sponges was less than 10 CFU/ml (Fig. 2C and 2D). This difference was statistically significant at the 0.01 level.

Manual compression of ordinary and self-disinfecting sponges and dishcloths resulted in a considerable transfer of heterotrophic bacteria to fingers. After 5 days, the number of heterotrophic bacteria transferred to fingers by self-disinfecting sponges and ordinary sponges and dishcloths were close to 1×10^4 and 1×10^5 CFU/ml, respectively (data not shown). However, the transfer of total and fecal coliform bacteria to fingers was reduced significantly with the self-disinfecting sponges. The number of total and fecal coliform bacteria recovered from finger surfaces was of 10 or less than 10 CFU/ml throughout the study (Fig. 2A and 2B).

DISCUSSION

This study demonstrates that large numbers of bacteria can colonize cleaning tools used for dishwashing in the domestic kitchen environment. These results are in agreement with those of previous studies *(10, 11, 13)* in which the recovery of large numbers of enterobacteria from draining boards, sinks, and dishcloths have been reported. It was suggested that heavily contaminated cleaning tools may serve not only as reservoirs, but also as disseminators of bacterial contamination in the kitchen. The fact that the number of bacteria increased progressively over time, as soiling of the cleaning tools did, suggests that food residues left in the cleaning tools after dishwashing serve as nutrients for colonizing bacteria. This finding has also been observed by others *(10, 11)*, who reported that dishcloths may become heavily contaminated during use in the domestic setting after three days of normal use, from 1.7×10^2 to 2.5×10^6 CFU/cm^2.

In this study, the use of self-disinfecting sponges resulted in a statistically significant reduced number of both total and fecal coliform bacteria. Similar results have been reported before. The previous study *(12)*, indicated that the use of a self-disinfecting cloth resulted not only in a significant reduction of cloth contamination, but also in a reduction of contamination of food preparation surfaces. Although the number of total and fecal coliform bacteria was significantly reduced in self-disinfecting cleaning tools, the number of heterotrophic bacteria enumerated by total plate count was similar in the three types of cleaning tools. The fact that the use of self-disinfecting sponges was not as effective in the elimination of total plate count bacteria may reflect the presence in the cleaning tools of a diverse variety of bacterial species resistant to the active antibacterial ingredient. *Salmonella* spp. and other enteric bacterial pathogens have been shown to die more rapidly in the self-disinfecting sponges than in ordinary sponges (3M Corporation, unpublished).

This study showed that the transfer of total and fecal coliform bacteria to surfaces and fingers is greatly reduced by the use of self-disinfecting sponges. Previous studies have indicated *(4)* that the number of bacteria found in the kitchen sink may be enough to survive on fingertips and to be transferred to food products. Moreover, it has been pointed out that bacterial transfer from contaminated cloth to fingers was greater than the transfer from contaminated surfaces *(10)*. Since transfer

of contaminating pathogens from hands to food has been associated with foodborne illness outbreaks *(5)*, the use of a self-disinfecting sponge may reduce the chances of food contamination by bacteria.

It has been shown that the use of phenolic disinfectant or hypochlorite to sanitize dishcloths does not result in a significant reduction in the number of bacteria *(11)*. Furthermore, bacterial regrowth was observed, especially when hypochlorite was used as a disinfectant, possibly because of the lack of residual chlorine left in the cloth. The use in the kitchen environment of a self-disinfecting sponge may overcome the problem of residual disinfectant, as the disinfecting component is part of the sponge itself.

In summary, it was demonstrated in this study that cleaning tools in the domestic kitchen environment quickly become heavily contaminated by heterotrophic bacteria and total and fecal coliform bacteria. In addition, it was shown that a self-disinfecting sponge is colonized by a significantly lower number of bacteria, and that it sharply reduces the transfer of total and fecal coliform bacteria to food preparation surfaces and hands. Since the kitchen environment is the most important source of foodborne outbreaks *(6)*, the use of a self-disinfecting cleaning tool in the kitchen environment may help in reducing the risk associated with foodborne disease.

ABOUT THE AUTHORS

*Corresdonding Author: [1]Department of Soil, Water and Environmental Science; Veterinary Science and Microbiology, Building # 90, Rm. 202, University of Arizona, Tucson, AZ 85721; Phone/Fax: 520.621.6163; E-mail: cenrique @ag.arizona.edu; [2]Department of Veterinary Science and Microbiology, and [3]Department of Microbiology and Immunology; University of Arizona, Tucson, AZ 85721.

REFERENCES

1. Association of Official Analytical Chemists. 1984. Official methods of analysis, 14th ed. Association of Official Analytical Chemists, Arlington, VA.
2. Djuretic, P. G., P. G. Wall, M. J. Ryan, H. S. Evans, G. K. Adak, and J. M. Cowden. 1996. General outbreaks of infectious intestinal disease in England and Wales 1992 to 1994. CDR. 6:R58-R66.
3. Enriquez, C. E., R. Enriquez-Gordillo, D. I. Kennedy, and C. P. Gerba. 1996. Bacteriological survey of used cellulose sponges and cotton dishcloths from domestic kitchens. Dairy, Food Environ. Sanit. 17:20-24.
4. Finch, J. E., J. Prince, and M. Hawksworth. 1978. A bacteriological survey of the domestic environment. J. Appl. Bacteriol. 45:357-364.
5. Pether, J. V. S., and R. J. Gilbert. 1971. The survival of salmonellas on fingertips and transfer of the organisms to food. J. Hyg. Camb. 69:673-681.
6. Roberts, D. 1982. Factors contributing to outbreaks of food poisoning in England and Wales 1970-1979. J. Hyg. Camb. 89:491-498.
7. Roberts, D. 1990. Sources of infection: food. Lancet. 336:859-861.
8. Roberts, T. 1988. Salmonellosis control: estimated economic costs. Poul. Sci. 67:936-943.
9. Sanbron, W. R. 1963. The relation of surface contamination to the transmission of disease. Am. J. Public Health. 53:1278-1283.
10. Scott, E., and S. F. Bloomfield. 1990. The survival and transfer of microbial contamination via cloths, hand and utensil. J. Appl. Bacteriol. 68:271-278.
11. Scott, E., and S. F. Bloomfield. 1990. Investigation of the effectiveness of detergent washing, drying and chemical disinfection on contamination of cleaning cloths. J. Appl. Bacteriol. 68:279-283.
12. Scott, E., and S. F. Bloomfield. 1993. An in-use study of the relationship between bacterial contamination of food preparation surfaces and cleaning cloths. Lett. Appl. Microbiol. 16: 173-177.
13. Scott, E., S. F. Bloomfield, and C. G. Barlow. 1982. An investigation of microbial contamination in the home. J. Hyg. Camb. 89:279-293.
14. Sheard, J. B. 1986. Food poisoning in England and Wales during 1983. Environ. Health. 94:57.
15. Stahl, S. M., and J. D. Hennes. 1980. Reading and understanding applied statistics. The C. V. Mosby Company, St. Louis.

Dairy, Food and Environmental Sanitation, Vol. 17, No. 9, Pages 555-574

Food Safety from Farm to Table...

A National Food-Safety Initiative Report to the President!

Reprinted from: *FDA Home Page:* http://cfsan.fda.gov/. Food and Drug Administration; U.S. Department of Agriculture, U.S. Environmental Protection Agency, Centers for Disease Control and Prevention, May 1997.

While the American food supply is among the safest in the world, there are still millions of Americans stricken by illness every year caused by the food they consume, and some 9,000 a year—mostly the very young and elderly—die as a result. The threats are numerous and varied, ranging from *Escherichia coli* (*E. coli*) O157:H7 in meat and apple juice, to *Salmonella* in eggs and on vegetables, to *Cyclospora* on fruit, to *Cryptosporidium* in drinking water—and most recently, to hepatitis A virus in frozen strawberries.

In his January 25, 1997 radio address, President Clinton announced he would request $43.2 million in his 1998 budget to fund a nationwide early-warning system for foodborne illness, increase seafood safety inspections, and expand food-safety research, training, and education. The President also directed three Cabinet members—the Secretary of Agriculture, the Secretary of Health and Human Services, and the Administrator of the Environmental Protection Agency—to identify specific steps to improve the safety of the food supply. He directed them to consult with consumers, producers, industry, states, universities, and the public, and to report back to him in 90 days. This report responds to the President's request and outlines a comprehensive new initiative to improve the safety of the nation's food supply.

The goal of this initiative is to further reduce the incidence of foodborne illness to the greatest extent feasible. The recommendations presented in this report are based on the public-health principles that the public and private sectors should identify and take preventive measures to reduce risk of illness, should focus our efforts on hazards that present the greatest risk, and should make the best use of public and private resources. The initiative also seeks to further collaboration between public and private organizations and to improve coordination within the government as we work toward our common goal of improving the safety of the nation's food supply.

Six agencies in the federal government have primary responsibility for food safety: two agencies under the Department of Health and Human Services (HHS)—the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC); three agencies under the Department of Agriculture (USDA)—the Food Safety and Inspection Service (FSIS), the Agricultural Research Service (ARS), and the Cooperative State Research, Education, and Extension Service (CSREES); and the Environmental Protection Agency (EPA). Over the last 90 days, these agencies have worked with the many constituencies interested in food safety to identify the greatest public-health risks and design strategies to reduce these risks. USDA, FDA, CDC, and EPA have worked to build consensus and to identify opportunities to better use their collective resources and expertise, and to strengthen partnerships with private organizations. As directed by the President, the agencies have explored ways to strengthen systems of coordination, surveillance, inspections, research, risk assessment, and education.

This report presents the results of that consultative process. It outlines steps USDA, HHS, and EPA will take this year to reduce foodborne illness, and spells out in greater detail how agencies will use the $43.2 million in new funds requested for fiscal year 1998. It also identifies issues the agencies plan to consider further through a public planning process.

The actions in this report build on previous Administration steps to modernize our food-safety programs and respond to emerging challenges. As part of the Vice President's National Performance Review (NPR), the

agencies have encouraged the widespread adoption of preventive controls. Specifically, the NPR report urged implementation of Hazard Analysis and Critical Control Point (HACCP) systems to ensure food manufacturers identify points where contamination is likely to occur and implement process controls to prevent it. Under HACCP-based regulatory programs there is a clear delineation of responsibilities between industry and regulatory agencies: Industry has the primary responsibility for the safety of the food it produces and distributes; the government's principle role is to verify that industry is carrying out its responsibility, and to initiate appropriate regulatory action if necessary.

The Administration has put in place science-based HACCP regulatory programs for seafood, meat, and poultry. In late 1995, the Administration issued new rules to ensure seafood safety. In July 1996, President Clinton announced new regulations to modernize the nation's meat and poultry inspection system. The Early-Warning System the President announced in January will gather critical scientific data to further improve these prevention systems. Additional actions outlined in this report will encourage the use of HACCP principles throughout the food industry.

The need for further action is clear. Our understanding of many pathogens and how they contaminate food is limited; for some contaminants, we do not know how much must be present in food for there to be a risk of illness; for others, we do not have the ability to detect their presence in foods. The public-health system in this country has had a limited ability to identify and track the causes of foodborne illness; and federal, state, and local food-safety agencies need to improve coordination for more efficient and effective response to outbreaks of illness. Resource constraints increasingly limit the ability of federal and state agencies to inspect food processing facilities (e.g., years can go by before some plants receive a federal inspection). Increasing quantities of imported foods flow into this country daily with limited scrutiny. Some food processors, restauranteurs, food-service workers, supermarket managers, and consumers are unaware of how to protect food from the threat of foodborne contaminants. These and other deficiencies will be addressed by key Administration actions outlined in this report.

THE FOOD-SAFETY SYSTEM MUST BE PREPARED FOR THE 21ST CENTURY

The system for identifying and preventing foodborne illnesses in use was largely created in the early 1900s. It must be modernized. The system cannot properly identify, track, and control food-related illness, or prevent, to the extent possible, future cases from occurring. In 1981, FDA inspected food firms every 2 to 3 years, but can now visit those firms, on average, only once every 10 years (although some plants that produce higher-risk foods may be inspected more frequently). State and federal resources are not closely coordinated. Our understanding of some disease-causing organisms is so limited that our ability to protect the public health is seriously constrained.

The Clinton Administration has already taken a number of steps to improve the safety of the food supply.

- In 1993, the Vice President's National Performance Review issued a report recommending that the government and industry should move toward a system of preventive controls.
- FSIS and FDA issued regulations that will require the meat, poultry, and seafood industries to follow HACCP procedures. These HACCP rules require food industries to design and implement preventive measures and increase the industries' responsibility for and control of their safety-assurance actions. FSIS and FDA will streamline their current regulations as part of their conversion to HACCP.
- In 1994, CDC embarked upon a strategic program to detect, prevent, and control emerging infectious disease threats, some of which are foodborne, and has made significant progress toward this goal in each successive year.
- The Food Quality Protection Act of 1996, including many provisions of the Administration's bill, streamlined regulation of pesticides by FDA and EPA and put important new public-health protections in place, especially for children.
- Last year, the President signed the Safe Drinking Water Act of 1996, which includes regulatory improvements to help states and water-utility managers prevent drinking-water contamination problems. Resources are provided for the first time for drinking-water infrastructure that will help hundreds of communities protect their residents from harmful contaminants.

The Clinton Administration has already taken a number of steps to improve the safety of the food supply.

These advances are significant, but they are not enough. New pathogens, new food products, huge increases in imported foods, the growing importance of food exports, and increasing antimicrobial resistance among foodborne pathogens present new challenges to the nation's food-safety programs. The food-safety system is in need of change, especially change that builds on the preventive principles embodied in HACCP.

IMMEDIATE ACTIONS TO IMPROVE FOOD SAFETY

Because there are many causes of foodborne illness, many points at which foods can become contaminated, and many factors that make some groups of people more susceptible than others, no single preventive measure will ensure the safety of all foods. However, practical preventive steps can be taken immediately to reduce the incidence of foodborne infections.

The Administration's food-safety efforts focus on the hazards and foods that present the greatest risks to public health and impose the greatest economic burden on the nation, emphasize development and implementation of preventive controls of those risks, and seek to ensure that preventive controls are cost-effective. The Administration is emphasizing the use of HACCP principles, and seeks opportunities for such controls through a collaborative process with the responsible sectors of the food industry and all other stakeholders.

Under this initiative, the federal government, in concert with state and local governments, industry and academia, would conduct research and risk assessments and cost-benefit analyses to determine how foodborne illnesses occur and can be prevented or controlled in the most efficient and cost-effective manner; improve surveillance and investigative efforts to locate and monitor illnesses caused by food; achieve more effective and efficient monitoring of the safety of the food supply through inspections of food processors; and reinvigorate education of all those involved in food preparation focusing on the use of safe practices. These issues, and actions and recommendations for addressing them are described below. Because the components of the food-safety initiative are interrelated, overlapping activities will be noted throughout this report (for example, among research and risk assessment, and education and inspection).

A NEW EARLY-WARNING SYSTEM FOR FOODBORNE DISEASE SURVEILLANCE

Background

The primary objective of the American system of public health is to prevent disease before it occurs. Although prevention of all disease might not be possible, stopping outbreaks of foodborne illness before they affect large numbers of people is a major goal. America needs an effective early-warning system that can detect and stop outbreaks before they spread. Such a system will also advance understanding of foodborne illness and further prevention efforts. In his January 25 radio address, the President announced a new national early-warning system for foodborne illness for which he is requesting funds in his FY98 budget.

Problem

The current public-health system in the United States has limited means to identify and track the causes of foodborne illness. A more effective early-warning system is needed to detect and stop outbreaks early before they spread. Also, the national and global increase in antimicrobial resistance is a compelling public-health problem. Human infections caused by resistant pathogens increase morbidity and mortality and increase health care costs as newer, more expensive antibiotics are needed to treat common infections.

Recommendations

Surveillance and investigation are powerful tools to detect new foodborne disease challenges, to determine what specific food sources are implicated in foodborne illness, and to learn how best to keep foods from becoming contaminated in the first place. Surveillance for antimicrobial resistance will allow early detection of resistance and containment of its spread. Rapid detection of outbreaks is critical to stopping them before they affect many people. A key element in an early-warning system is the ability to detect, compare, and communicate unusual patterns of illness and laboratory findings within and among states and federal partners.

Enhancing the capacity of states to monitor foodborne disease and to investigate and control outbreaks will lead to better general control measures and fewer illnesses. One way to achieve this is to enhance and expand the existing Foodborne Disease Active Surveillance Network (FoodNet) to identify, investigate, and control a broad spectrum of foodborne diseases. A second important way to enhance early warning is to increase the capacity of many states to deal with new foodborne challenges. These enhancements will help us identify outbreaks and other foodborne disease challenges early, and prevent illness and premature deaths related to foodborne diseases.

In cooperation with state and local health departments, the federal government is proposing to take the following steps to establish a national early-warning system for foodborne diseases, and to enhance surveillance of such disease. These changes will result in an improved system for promptly and accurately detecting and reporting foodborne illnesses and outbreaks so public-health agencies can rapidly institute appropriately and correctly focused measures to control the spread of foodborne disease. This system will also collect critical data to recognize trends and target prevention strategies, including systems based on HACCP principles, and to evaluate the effectiveness and efficiency of prevention strategies already in place.

Enhance and expand foodborne disease active surveillance

CDC, FDA, and FSIS support five FoodNet sites at state health departments to track cases of foodborne infections and to determine the sources of the most common ones. The existing sites will be strengthened,

and their number increased to seven in FY97, and to at least eight in the following year. The sites and federal food-safety agencies will be electronically linked to create a powerful new network to detect, respond to, and prevent outbreaks of foodborne illness. Adding additional sites will improve geographic and demographic representation, making this network more likely to detect diseases and outbreaks that are regional rather than national in distribution.

FY97 Activities

- Two new active surveillance sites, in New York and Maryland, will begin FoodNet activities.

FY98 Activities with Food-Safety Initiative Funds

- CDC, FDA, FSIS, and the Council of State and Territorial Epidemiologists (CSTE) will add at least one site to FoodNet, and CDC will enhance personnel resources at all sites to improve surveillance, analysis of data, and timely and appropriate release of information.
- CDC and the FoodNet sites will develop and conduct case-control studies of *Campylobacter* and *Cryptosporidium* infections to guide control efforts.

Enhance early detection of foodborne disease nationwide

The early-warning system will enhance improved early detection of foodborne disease in additional states in FY98 by providing resources for improved surveillance, investigation, control, and prevention of foodborne disease outbreaks. Although sophisticated laboratory studies can identify causes of illness and show relationships among pathogens, laboratory methods are insufficient without investigators who can collect samples, interview people, and trace the source of contamination to find out why the illness occurred. New electronic tools need to be developed to enable rapid detection of outbreaks and to enhance communication about outbreaks to appropriate agencies. CDC also should provide additional resources to states to increase their surveillance and response capacity for the serious long-term consequences of foodborne disease, such as hemolytic uremic syndrome (HUS).

FY97 Activities

- CSTE and CDC, in conjunction with FDA and FSIS, will develop a protocol for evaluating epidemiologic outbreak data. The group will also develop criteria for local and state health officials to provide information on outbreaks to federal authorities for review and necessary action.
- FoodNet sites will gather epidemiologic data on cases of HUS.

FY98 Activities with Food-Safety Initiative Funds

- CSTE and CDC, in conjunction with FDA and FSIS, will define critical capacity elements that state and local health departments require to conduct surveillance, investigation, control, and prevention of foodborne illnesses; CDC will help states remedy identified deficiencies.
- CDC and CSTE will develop an electronic module for collecting and transmitting data to CDC on outbreaks of foodborne illness.
- CDC will begin a case-control study of hepatitis A to determine the proportion of cases due to contamination of food so that optimal control strategies could be determined. Recognized foodborne outbreaks account for about 2 to 5% of annually reported hepatitis A cases and are usually caused by an infected food handler.
- Epidemic assistance for outbreaks of foodborne disease will be expanded when states request direct CDC participation in investigations.
- CDC and, where appropriate, FDA and FSIS, will collaborate with state health departments to improve diagnostics, outbreak detection, and electronic communications.
- *Vibrio* surveillance will be strengthened by CDC, FDA, and states by increasing personnel, epidemiologic, and laboratory resources devoted to the Gulf Coast *Vibrio* surveillance program.

Long-term Activities

- Surveillance and investigative systems should continue to be enhanced to improve the ability of state and local health departments to promptly and accurately identify foods that are the source of foodborne illness.

Modernize public-health laboratories

CDC should provide resources and training to upgrade public-health laboratory capabilities in FoodNet sites and in states without those sites so the laboratories can rapidly identify a broad range of foodborne pathogens, including parasites and viruses, and can use new techniques like DNA fingerprinting. The new capacities would allow rapid identification of the cause of some outbreaks that currently go undiagnosed.

FY97 Activities

- CDC will collaborate with FoodNet sites to determine serotypes of *E. coli* other than O157:H7 that cause HUS in children.

FY98 Activities with Food-Safety Initiative Funds

- The Association of State and Territorial Public Health Laboratory Directors (ASTPHLD) and CDC will improve diagnostic assays and provide additional resources to improve the capacity of state laboratories to detect foodborne pathogens, including selected viruses and parasites
- CDC will provide sufficient funds to states to support the production of serotyping reagents for *Salmonella*, which are critical for outbreak identification.
- CDC will develop DNA amplification-based tests for foodborne pathogenic bacteria that are difficult to detect by culture (e.g., Shiga-like toxin-producing *E. coli* other than *E. coli* O157:H7 and other disease-causing *E. coli*) and will provide resources and technical assistance to states to improve their capacity in diagnosing those pathogens.

Long-term Activities

- CDC should begin developing molecular alternatives to serotyping for *Salmonella*.

Create a national electronic network for fingerprint comparison

CDC should fund a new computer network and database system that would capture fingerprints of pathogens in a national database, linking CDC, FDA, FSIS, and states that have that new capacity into a national network. This technology would, for example, permit rapid recognition that an *E. coli* O157:H7 bacterium cultured from a patient in Washington was indistinguishable from one isolated from another patient in California. That might suggest to public-health investigators that a product distributed in California and Washington was contaminated with the same organism.

In addition to identifying, investigating, and reporting cases of foodborne disease in humans, microbiological surveillance of pathogens in foods, in food animals and their manures, and in animal feed, is important to control and prevent foodborne diseases and to evaluate the measures that reduce the risk of exposure. Therefore, to make the early-warning system fully operational and to translate its findings into long-term improvements in the safety of the food supply, additional surveillance activities would be required.

FY97 Activities

- CDC will provide resources and technical assistance to state health departments for DNA fingerprinting of *E. coli* O157:H7, and begin to establish a centralized national electronic database of DNA fingerprint patterns.

FY98 Activities with Food-Safety Initiative Funds

- The national electronic database of DNA fingerprint patterns of *E. coli* O157:H7 will continue to be expanded.
- In collaboration with participating state health department laboratories, FDA and FSIS, CDC will develop standardized methods for DNA fingerprinting of *Salmonella* serotypes *Typhimurium* and *Enteritidis* and will transfer the techniques to selected state health departments.
- CDC, ASTPHLD, and CSTE will develop guidelines for maximizing the utility of DNA fingerprinting at state health departments in foodborne disease surveillance and outbreak investigations.
- CDC, FDA, and FSIS will set up centralized national electronic databases of DNA fingerprint patterns of *S. typhimurium* and *Enteritidis*.

Long-term Activities

- CDC should continue to develop standardized DNA fingerprinting methods for other foodborne disease-causing bacteria as appropriate and should transfer the standardized methods to state health departments and appropriate federal laboratories.
- CDC should begin implementing automated foodborne disease outbreak detection algorithms based on the DNA fingerprint patterns submitted by state health department laboratories.

Increase national surveillance for antimicrobial resistance of foodborne pathogens

The problem of foodborne disease is increasing, in part, because foodborne infections are becoming more serious. One of the ways foodborne pathogens become more virulent is by acquiring resistance to antimicrobial agents, making such infections very difficult to treat. Therefore, CDC should expand surveillance for antimicrobial resistance in *Campylobacter*, *Salmonella*, and *E. coli* O157:H7 isolated in humans, and FDA and FSIS should take similar steps for those bacteria isolated from food-producing animals and their manures and from food products in a way that permits those data to be compared. CDC, FDA and FSIS should develop standard procedures for sharing information and for responding to increases in resistance or other "red-flag events" such as the discovery of an important new resistant bacterium.

FY97 Activities

- CDC, FDA, and FSIS will conduct surveillance of antimicrobially resistant *Salmonella* and *E. coli* O157:H7 isolates.

FY98 Activities with Food-Safety Initiative Funds

- CDC, FDA, and FSIS will initiate surveillance of antimicrobial resistance in isolates of *Campylobacter* from humans and animals, including poultry.
- FDA and CDC will conduct surveillance and epidemiologic studies to monitor and reduce the incidence of foodborne disease associated with emerging and drug-resistant pathogens.

Long-term Activities

- CDC, FDA, and FSIS should continue monitoring and comparing the antimicrobial resistance of *E. coli* O157:H7, *Salmonella*, and *Campylobacter* strains in humans and animals.
- FDA and CDC should conduct physician and veterinary drug-prescribing surveys, including patients and animal producers, to assess the effect of antimicrobial drug use on resistance patterns and prevalence to guide regulatory policy and educational campaigns.
- FDA should assist the World Health Organization (WHO) in the development of a veterinary database within the WHONET system. (WHONET is a system for standardized international reporting of antimicrobial resistance to WHO.)

Conduct surveillance of human pathogens in food-animal populations and enhance over-sight of animal feedstuffs, feeds, and manures for the effect of drugs and other therapies

FY98 Activities with Food-Safety Initiative Funds

- USDA, CDC, FDA, and EPA will convene a working group to discuss how to conduct surveillance of human pathogens in food animals and their manures, and should target one pathogen on which to begin surveillance in FY99.

Long-term Activities

- FDA should increase the monitoring of animal-feed processing to determine the nature and extent of pathogen contamination and the effect of control strategies on pathogen reduction in animals.

INTERSTATE OUTBREAK CONTAINMENT AND RESPONSE COORDINATION

Background

Four federal agencies are charged with responding to outbreaks of foodborne illness (including waterborne illness): FDA and CDC (at HHS), USDA, and EPA. All states, and many local governments, with widely varying expertise and resources, share responsibility with the federal government for response to such outbreaks. When an outbreak occurs, all of the relevant entities must work together to efficiently and effectively prevent deaths and minimize the number of illnesses. The better coordinated the response, the more quickly the outbreak will be contained.

Each of the four federal agencies has a potentially critical role when an outbreak occurs. CDC's primary responsibility is to assist state and local health departments in investigating outbreaks of illness and in identifying the cause of the outbreak. FDA, FSIS, and EPA also have responsibility for determining whether a product they regulate may be causing illness, and of halting the spread of illness by taking regulatory action against the suspect products, or wastes (other than animal manures) that have the potential to contaminate the air, land, or waters used to produce the food product. The type of food affected determines which regulatory agency has primary jurisdiction: FSIS regulates meat, poultry, and egg products; FDA regulates all other foods including shell eggs; and EPA regulates water and pesticides and manages organic and inorganic wastes used or disposed of on agricultural land. While each agency has clearly defined areas of responsibility, the successful containment of many outbreaks of foodborne illness involves more than one agency.

The states and many local governments also have a critical role. Identification and investigations of foodborne illness often begin at the community or state level. States share with the federal government the legal responsibility for protecting the health of their residents. Although foodborne outbreaks are sometimes local, most outbreaks implicate federal agency jurisdiction. Illnesses cross state borders, and most foods or food ingredients are processed or produced in another state or by international trading partners. Federal involvement is also necessary when contaminated food from a common source has been distributed to grocery stores, restaurants, and homes in more than one state.

In many outbreaks of foodborne illness, federal agencies work with state and local health authorities in their investigations and in implementation of control measures through consultation, diagnostic assistance, and by regulatory action against the products. In some instances, on-site assistance is requested by the local and state authorities from the CDC to establish the cause of an outbreak, and from other agencies to help find the source of the problem. For large or multistate outbreaks, federal agencies play a critical coordination role to ensure consistency of approach and implementation of needed control measures.

Companies responsible for affected products also have a critical role to play. Food companies are sometimes the first to recognize that their product is causing illness. In addition, food-product recalls are voluntary, although FDA may request a company to recall products. Federal and state agencies can benefit from industry's expertise about food products and their distribution patterns.

Problem

Although significant coordination already occurs among federal, state, and local agencies, better coordination is needed to meet new and growing threats to the nation's food supply. More than one agency is involved in virtually every large foodborne outbreak. Joint efforts are often hindered by a lack of communication or a misunderstanding of each agency's role in a particular situation.

Recommendations

Federal, state, and local governments should improve the coordinated management of interstate outbreaks. Improved coordination among the federal agencies, among federal, state, and local agencies, among the various state agencies, and between state and local agencies would enhance the level of public health protection, leverage agency resources and experience, and avoid duplication of effort.

The early-warning capability, comprised of FoodNet and strengthened state-surveillance capacity, and improved federal-state communications will enhance appropriate involvement of federal agencies in the investigation of foodborne disease outbreaks. Communication and exchange of information among the appropriate federal, state, and local government agencies must be improved.

Improve outbreak containment through better federal-state-local coordination of the evaluation of and response to foodborne illness

There are probably hundreds of times a year when at least one federal agency, working with state and local agencies, plays a role in detection, investigation, and containment of illnesses that may be caused by contamination of food. Occasionally (typically once or twice a year) the outbreak is sufficiently significant and complex to require the involvement of the highest level officials in the responsible federal agencies. When this occurs, it is essential that federal agencies speak with one voice.

A critical element of an effective, rapid response to a foodborne illness outbreak is ready communication by all the involved parties at the federal, state, and local level. Although there are communication systems in place, they need to be expanded and coordinated to achieve rapid exchange of information and data between key outbreak-response personnel in each agency at the federal, state, and local levels. This strengthened system will complement the data and information exchange systems described in the "Early Warning for Foodborne Disease Surveillance" section of this report.

As part of this initiative, the agencies have streamlined their outbreak-response procedures. The departments with a role in any foodborne illness outbreak will be determined by public-health responsibility and regulatory jurisdiction over the food products (or water) implicated in the outbreak. Each department with public-health responsibility and regulatory jurisdiction over food products (or water) implicated in an outbreak will designate a Coordinator responsible for that Department's activities related to the outbreak.

This new management system will provide a common set of objectives and strategies and one spokesperson that will speak on behalf of the federal government. Once there are indications to federal or state agencies of a large-scale problem, the staff will tell the Coordinator who will then coordinate the response among federal and state agencies.

Each agency has specific mechanisms in place to aid in this effort. FSIS has established an Emergency Response Program to prevent and control foodborne disease outbreaks involving meat, poultry, and egg products. Likewise, FDA's Division of Emergency and Investigational Operations serves this function for all other food products. Both FDA and FSIS maintain 24-h telephone service staffed with a duty officer trained to respond to emergencies and ongoing illnesses, including foodborne illness and outbreaks, who have access to emergency personnel throughout the agency, as well as with emergency contacts in other agencies. FDA's Division of Emergency and Investigational Operations will serve to coordinate with other agencies. CDC provides 24-hour emergency consultation for botulism and other foodborne disease clinical emergencies and stations Epidemic Intelligence Service officers in 15 to 20 states each year to support surveillance and emergency response at the state level.

In order to improve communications with state agencies, FDA has adopted a fax-on-demand and fax broadcast system. The fax broadcast system, containing a database of more than 900 state officials, permits messages to be sent any time of day or night to any list of state contacts, providing an early alert or update to foodborne illness investigations. The fax-on-demand system provides access to press releases from federal agencies, press releases from firms about their recall, as well as other information. FSIS communicates with state departments of health and coordinates outbreak response through CDC WONDER (Internet) and both FDA and USDA maintain liaisons at CDC to facilitate food-safety activities, including outbreak investigations. CDC has established rapid communication links with all state and territorial epidemiologists and public health laboratory directors providing rapid group electronic mail and group fax links, and conference calls in outbreak settings.

FDA has also instituted a 50-state conference call system to keep all state agencies up-to-date on major foodborne outbreaks. This system was first used for the outbreak involving *E. coli* O157:H7 in apple juice and was most recently used for the hepatitis A outbreak associated with frozen strawberries. FDA and CDC jointly participate in these calls to assure more effective follow up and control of outbreaks. FDA will modify the conference call system to involve appropriate states in the very early stages of any multistate outbreak, as well

as continuing the 50-state update conference calls, in order to ensure better communication among state and federal agencies.

FY97 Activities

- To further strengthen our outbreak-response systems, CDC, EPA, FDA, and FSIS will establish an intergovernmental group, the Foodborne Outbreak Response Coordinating Group (FORCG), to improve the approach to interstate outbreaks of foodborne illness. FORCG will provide for appropriate participation by representatives of state and local agencies charged with responding to outbreaks of foodborne illness. This group will also review ways to more effectively involve the appropriate state agencies when there is a foodborne outbreak.
- FORCG will review and evaluate outbreak response. FORCG will undertake these reviews after appropriate consultation with industry and consumer representatives. Based on these deliberations, FORCG will assess the infrastructure for outbreak response, make recommendations for improving the current system, and work with federal, state, and local governments, the food industry, health professionals, and consumer advocates to implement beneficial changes. FORCG will meet several times a year for this purpose.
- Under the new initiative there will be one person/position designated as the outbreak coordinator for each department or agency that has a role in the outbreak response. This position will be established as a formal institutional position, with appropriate backup designees. For outbreaks that fall within the purview of HHS, HHS will designate the Assistant Secretary for Health to be the primary person in charge of coordination for HHS. For outbreaks that fall within the purview of USDA, the Under Secretary for Food Safety will coordinate for USDA. EPA will designate the Assistant Administrator for Water as the primary person in charge of coordination for EPA when drinking water is involved.
- Standard procedures will be developed for the rapid exchange of data and information associated with foodborne illness outbreaks between involved agencies and for dissemination to the public. The procedures will be developed by FORCG and representatives from the appropriate state agencies. The procedures will cover the exchange of data and information associated with an outbreak and will complement systems established for exchange of information about day-to-day occurrences of foodborne illness. (See "A New Early-Warning System for Foodborne Disease Surveillance" section.) The procedures will also provide for rapid dissemination of accurate information to the public by the agency spokesperson.

Enhance state and local infrastructure for foodborne outbreak detection, evaluation, and response coordination

The epidemiology offices and laboratories within state and local health departments are charged with the surveillance of infectious and non-infectious conditions, and, along with other state and local officials, with the investigation of outbreaks. They collect surveillance data from physicians, laboratories, local health departments, and other sources. Yet, the resources available in many states and communities for the surveillance and investigation of foodborne diseases are limited and decreasing, thereby limiting the effectiveness of their response. As a result, outbreaks may go undetected or are never investigated.

CDC, EPA, FDA, and FSIS will address the problem first by assessing and cataloguing available state resources, and then by working with states and providing support for foodborne-disease-surveillance programs and assistance to better investigate outbreaks of foodborne illness.

FY97 Activities

- FORCG, with assistance from the Association of Food and Drug Officials, the Association of State and Territorial Health Officials, the Association of State and Territorial Public Health Laboratory Directors, the Council of State and Territorial Epidemiologists, and the National Association of State Departments of Agriculture, will begin a nationwide audit to catalogue the existing state and local food-safety program infrastructure.
- FORCG, in consultation with the appropriate outside organizations, will establish working groups with appropriate participation of federal, state, and local officials to develop recommended procedures for outbreak-response coordination at the state and local level.

FY98 Activities with Food-Safety Initiative Funds

- CDC, EPA, FDA, and FSIS will assist states and local governments in developing the infrastructure necessary to ensure proper detection, evaluation, and coordinated response to foodborne outbreaks.

RISK ASSESSMENT

Background

The impact of increased funding for development of methods and models directed at improving risk assessments will be to focus public resources on

reducing those risks that have the greatest consequences for human health. Risk assessment provides a strong foundation upon which efficient allocation of scarce food-safety resources can be made. While obvious severe hazards in the food supply will be addressed through the larger food-safety initiative, risk assessment provides an objective foundation upon which efficient allocation of scarce food-safety resources can be established. Furthermore, risk assessment often plays a central role in the development of any science-based system of preventive controls.

There has been a long history of performing safety assessments or risk assessments for foods, particularly chemicals and drug residues. Risk assessments, cost-benefit analyses, and evaluations of alternative risk-management strategies are required for all major regulations in USDA, a requirement imposed by the Federal Crop Insurance Reform and Reorganization Act of 1994 (P.L. 103-354). EPA is developing methods for required risk assessments under the Safe Drinking Water Amendments of 1996, including both microbial and chemical hazards. Sound risk assessments are important in various aspects of international trade, including the provisions of Codex Alimentarius and the World Trade Organization, the international bodies that govern standards for food safety, among other issues. Carefully formulated risk assessments based on high-quality data and scientific information generated from research lead to more informed risk management and better decisions.

Risk assessment also provides essential information for estimating and analyzing the costs and benefits of policy alternatives. Risk estimates are used to characterize the state of the world in the baseline and the alternative states expected to occur after taking action, whether through regulation, guidelines, or education campaigns. Ideally, results of risk estimates are in the form of distributions that capture the scientific uncertainty and population variability, but where that is not possible, point estimates of risk need to reflect the impact on the entire population.

Risk management and risk assessment must mutually inform each other but must remain separate and independent entities. Risk communication must be an integral part of all risk-related activities, including the public, industry, and all affected parties.

Good risk assessment requires good risk communication. Participation from industry, academia, and private risk organizations will be ensured in the interagency consortium's risk-assessment activities. Good risk communication must be ensured by interfacing with educators. Active communication between the risk assessment consortium and the research community is crucial to a successful initiative.

Risk assessment characterizes the nature and size of the risk to human health associated with hazards, and to make clear the degree of scientific certainty of the data and the assumptions used to develop the estimates. Risk assessments require specific information on the hazard and on the exposed population to provide meaningful information for those making risk-management decisions. Even for chemical hazards, for which risk-assessment methods have been most thoroughly developed, data gaps force the use of assumptions about exposure, hazard potency, and characteristics of the population at risk.

The food-safety system is in need of change, especially change that builds on the preventive principles embodied in HACCP.

Problem

Risk assessment is far less developed for foodborne pathogens. Intensive commitment is necessary to develop critically needed methods of analyzing the available data and addressing its uncertainty; methods that account for variability, specifically of living microbial pathogens, are essential. Chemical and radiological risks do not pose these special challenges, so extending these established methods to microbial risk is not sufficient.

The research needed to develop improved methods and models that will make it possible to perform quantitative microbial risk assessments to the degree of complexity required for most food-safety issues will require the integration of work in biological sciences, predictive microbiology, and applied mathematics. In some instances, the research needs overlap with those identified in the research section of this document. However, to reflect the multidisciplinary nature of the needed research programs and to highlight the critical nature of the research needs, research needs related to risk assessment are being presented as a separate item for consideration.

Recommendations

This initiative emphasizes the development, testing, and validation of microbial risk assessment and foodborne illness valuation methods. These efforts should support effective and efficient public response to foodborne illness concerns, whether the response is improved surveillance plans, better prevention stategies, or stronger inspection models. The initiative's activities focus on developing models for improving risk assessment, thereby more precisely targeting the prevention of foodborne disease by informing surveillance plans, prevention stategies for process-control systems and for food inspections based on HACCP principles, and research programs to fill critical food-

safety information gaps. Recommendations are being made in three areas.

Establish a risk assessment consortium

All federal agencies with risk-management responsibilities for food safety will establish jointly a consortium at which federal agencies can collectively advance the science of microbial risk assessment, and to assist agencies in fulfilling their specific food-safety regulatory mandates. The consortium should be inclusive in its risk-assessment activities, seeking expertise from risk-assessment professionals and scientists from public and private sources, as well as industry and consumer groups. The goal of the consortium would be to improve the quality of risk-assessment research by coordinating research priorities, eliminating redundancies of effort, and encouraging multidisciplinary research efforts. The consortium will have three primary functions:

- Develop a scheme for setting methodological research priorities based upon the value of information expected from each research activity.
- Serve as a clearinghouse for information about current and planned research projects pertinent to microbial risk-assessment techniques.
- Foster and, where possible, augment the research activities of the member agencies to accelerate particularly critical research projects.

FY97 Activities

- The consortium, which will include all interagency partners, will be established in 1997 as part of the Joint Institute for Food Safety and Applied Nutrition, a collaborative activity of FDA's Center for Food Safety and Applied Nutrition and Center for Veterinary Medicine and the University of Maryland. The initial focus of the initiative will be on pathogenic microorganisms.
- The consortim will begin the process of establishing a clearinghouse that will collect and catalogue available methodology, specifically simulations necessary to address microbial growth and death variables offered by the private sector, trade associations, federal and state agencies, and international sources. The consortium will work with its member agencies to catalogue their microbial risk-assessment-research advances and identify data sets that would provide the scientific data needed to develop new models. The consortium will be inclusive in its risk-assessment activities, seeking expertise from risk-assessment professionals and scientists from public and private sources, and industry and consumer groups.

FY98 Activities with Food-Safety Initiative Funds

- A series of public meetings will be held to develop a strategy to address long-term research needs for the analysis of farm-to-table scenarios, including potential pathogen introduction at each level (e.g., farm, processing, transportation, home, restaurant, and retail food handling), food-consumption data, and computer modeling. A strategic plan will be developed for research into dose-response calculations, chronic sequelae, biomarkers, and adapting surveillance data. This process will include a broad spectrum of academic, industry and government expertise that will be obtained through an acceptable process such as an advisory committee.
- Begin a comprehensive review of existing data and federal information-collection programs to determine the extent to which they may fill existing data gaps, and suggest additional data needs to better support risk assessments.

Long-term Activities

- The consortium will continue to collectively identify critical research needs, propose effective research on analytical approaches and methods, and reach consensus on the priority of these needs based on their potential to reduce the uncertainty of risk-management decisions in food safety and provide the greatest positive impact. Research supported and conducted through this initiative would cover several areas critical to developing our ability to conduct risk assessments for foodborne disease-causing organisms and to assess the effectiveness of control measures.

Develop and validate exposure assessment models based on probabilistic methodology

Risk assessment of foodborne illness is dependent on accurately estimating the probability that various quantities of a toxin or pathogen will be ingested by the consumer (i.e., exposure assessment). This initiative addresses numerous data and modeling deficiencies in estimating exposure to microbial and chemical contaminants. Specifically, research will be conducted into the development of models and simulations based on probabilistic methods for the occurrence of microbial pathogens and chemical hazards in food at all stages of the food chain; typical behaviors of commercial and home preparation operations; validation of dynamic exposure assessment models; evaluation of intake data regarding food-consumption patterns of the general population and sensitive subpopulations; and specific data on microbial behavior in food vehicles of sporadic and epidemic disease. Research on how to incorporate data related to biomarkers should be pursued.

(Biomarkers are surrogates that indicate that exposure has occurred or that some effect has occurred, particularly when actual evidence of exposure or effect is difficult or impossible to obtain.)

FY98 Activities with Food-Safety Initiative Funds

Working with FDA, EPA, and USDA, the consortium will identify priority research programs in two areas that are in need of augmentation: exposure assessment methods, and techniques for acquisition and analysis of experimental data for model development. Initial areas identified include:

- Addressing the dynamics of foodborne pathogens in agricultural environments (e.g., pathogen reservoirs, feed, and animal manure).
- Quantifying effects of key processing steps on levels of pathogens.
- Quantifying effects of key commercial food service preparation procedures, marketing facilities, and home food-handling practices.
- Designing and proposing ways to integrate the collection of exposure and dose-response data into outbreak investigation.

Long-term Activities

Future initiatives would be fluid to adjust to results of short-term research, emerging food-safety needs, and changes in the direction of research programs within individual agencies. Additional research would likely include the development of modeling techniques to assess human exposure resulting from the subtherapeutic use of veterinary antibiotics in food-producing animals. To reduce uncertainties in exposure estimates, the consortium will work with researchers who are conducting focused food-consumption surveys targeting foods consumed by a variety of subpopulations (e.g., the elderly, children).

Develop and validate dose-response-assessment models for use in risk assessment

Research is needed to accurately estimate the relationship between the quantity of a biological agent and the frequency and magnitude of adverse human health effects in a population. Dose-response assessments typically include estimates of the rates of infection, morbidity, and mortality.

FY98 Activities with Food-Safety Initiative Funds

Working with FDA, EPA, and USDA, the consortium will identify priority research programs in dose-response-assessment methods and models that need to be augmented. Initial areas identified include:

- Methodology to incorporate the use of biomarkers in exposed populations into risk-assessment models.
- Identification and development of criteria for objective models that permit high-to-low-dose extrapolation.
- Development of criteria that will be used to select or weigh alternative models (theories) for extrapolating from empirical data to quantitative descriptions of risk.

Long-term Activities

Risk-assessment research priorities in this area will be collectively established by the interagency consortium. Additional research includes studying whether threshold or non-threshold models for infectivity are more appropriate for describing low-dose infectivity rates for infectious and toxicoinfectious microorganisms. Further research is also needed into the use of biomarkers of susceptibility, chronic sequelae, microbiological toxicokinetics, and infectious dose.

RESEARCH

Background

Food-safety research is critically needed to develop the means to identify and characterize more rapidly and accurately foodborne hazards, to provide the tools for regulatory enforcement, and to develop effective interventions that can be used as appropriate to prevent hazards at each step from production to consumption. FDA, CDC, EPA, NIH, ARS, and CSREES, conduct research related to pathogenic microorganisms and other contaminants that threaten the safety of food. That research supports the needs of both the federal and state food-safety agencies and the many food industries.

Problem

New foodborne pathogens have emerged over the past ten years. Other microorganisms, previously thought to be innocuous, have been linked to life-threatening diseases after acquiring new virulence genes and antimicrobial resistance. Many of those organisms cannot be detected readily due to either a lack of suitable methods or their sporadic occurrence in foods. Certain foodborne pathogens are increasingly associated with resistance to time-tested controls, such as heating, refrigeration, and acid. In some cases, that ability appears to be linked with increased virulence or new ways to evade our immune defenses. The various research programs of FDA, ARS, CSREES, CDC, EPA, and NIH need to better coordinate their research efforts on the highest-priority issues and work together more effectively to leverage each other's resources.

Recommendations

Prevention of foodborne pathogens in foods requires an understanding of how foods become contaminated during their production, processing, and distribution, and the availability of practical interventions to control or eliminate the biologic agent. Selection of target pathogens and foods ideally are guided by risk assessment. Research is also needed to support HACCP implementation to verify that critical control points in HACCP systems are working, and to target the data gaps that hamper HACCP and risk assessment. Among the recognized data gaps, the following areas were identified as priority research needs. (Research activities listed for FY97 and FY98 are not necessarily completed in those years. Therefore, activities listed as long-term are additional activities.)

Improved detection methods

Many pathogens cannot be easily detected in foods, e.g., *Cyclospora* in raspberries. Among the needs for improved diagnostics, methods are needed for rapid, cost-effective testing for pathogens in food animals and their manures, in agriculture and aquaculture products, animal feeds, and processed food products. Methods development must address the low-level, sporadic incidence of many pathogens in foods. Research will be coordinated with EPA's efforts to develop better test methods for *Cryptosporidium* and other pathogens in water and drinking water. Improved methods are needed for the identification and subtyping of foodborne pathogens in human and animal clinical specimens. The development of effective sampling plans and enrichment techniques are vital parts of detection methodology.

FY97 Activities

- EPA, CDC, ARS, CSREES, and FDA, in conjunction with states and academia, will conduct research to develop detection methods and control measures for *Cyclospora*.

FY98 Activities with Food-Safety Initiative Funds

- ARS, FDA, and EPA will enhance ongoing research to develop test methods for *Campylobacter*, *Salmonella*, Toxoplasma, *E. coli* O157:H7 and other Shiga-like toxin-producing *E. coli*, *Cryptosporidium*, hepatitis A and Norwalk viruses, and naturally occurring mycotoxins and marine toxins in foods.
- FDA will expand its ongoing research on the development of methods for detecting foodborne pathogens in animal feeds.

Long-term Activities

- FDA, ARS, CSREES, and EPA should undertake research to develop test methods for *Vibrio vulnificus* in foods.

Understanding resistance to traditional preservation technologies

Microorganisms that are resistant to antimicrobial agents and processing techniques that have been relied on traditionally to eliminate or prevent the growth of foodborne pathogens have become increasingly important causes of serious foodborne disease. Research is needed to determine how microorganisms associated with foodborne disease become tolerant to various types of antimicrobials and to traditional food-safety safeguards, such as heat or cold, low pH, high salt, and disinfectants, and to elucidate factors in animal- and plant-production systems and processing environments that influence the development of resistance. The physiological and genetic bases of resistance are not understood well enough to prevent breakthrough of newly emerging pathogens. Such research will help identify food production, processing, and handling practices that are likely to contribute to pathogen contamination or proliferation. That research is also needed to guide improvement of traditional techniques and the development of new interventions.

Long-term Activities

- ARS, CSREES, and FDA should undertake research into physiological, genetic, and other factors that cause foodborne-disease-causing microorganisms to develop resistance to preservation technologies.

Understanding antibiotic drug resistance

Pathogens in food-producing animals and their manures may become resistant to antibiotics and drugs, particularly when used improperly. One possible solution might be to modify drug withdrawal periods. Such an approach would require scientific data to be developed on how the resistance profiles of microbial populations in animals change in response to the elimination of a drug. Work involving resistance to traditional preservation technologies and antibiotic drug resistance must be based on a sound understanding of microbial, physiologic, and genetic adaptive mechanisms.

FY98 Activities with Food-Safety Initiative Funds

- FDA and ARS will conduct research to identify and characterize the factors that lead to the development of multiple drug (antibiotic) resistance in foodborne pathogens in farm and aquaculture animals, including establishing the gene-transfer mechanisms and selective pressures.

- ARS and FDA will investigate techniques for manipulating the microbial ecology of the intestinal tract of agricultural and aquaculture animals to prevent the development of antibiotic resistance or select for nonresistance. Research will emphasize competitive exclusion techniques (probiotics) and the use of extended drug-withdrawal periods. Probiotics are benign bacteria that can be used to out-compete pathogenic bacteria.

Prevention techniques: pathogen avoidance, reduction, and elimination

Contaminants are introduced into the food supply at numerous points along the way from farm to table. Food animals and their manures can carry human pathogens, without any clinical manifestations. Likewise, fresh fruits, fresh vegetables, and grains can harbor pathogens or mycotoxins without any discernable loss of quality. In such cases, traditional approaches of segregating contaminated foods are ineffective, and active interventions are needed. In particular, new interventions are needed to prevent and control the pathogens listed below in raw agricultural commodities and seafood. Developments in this area would be expected to provide new approaches for controlling a variety of other foodborne contaminants.

FY98 Activities with Food-Safety Initiative Funds

For *Campylobacter*, *Salmonella*, *Toxoplasma*, *E. coli* O157:H7, and other Shiga-like toxin-producing *E. coli*, and *Cryptosporidium*, FDA and ARS, often in partnership with universities and industry, will:

- Expand research into the microbial ecology of foodborne pathogens and how initial colonization in plants and animals can be prevented.
- Expand research on new methods to reduce or eliminate pathogenic microorganisms and mycotoxins from agricultural and aquaculture animals before slaughter or harvest, including the use of probiotics.
- Develop new methods to reduce or eliminate pathogenic microorganisms and mycotoxins from plants before harvest.
- Develop new disinfection methods and systems for improved sanitation of production (including on-farm) processing and marketing equipment and facilities.
- Expand research on new methods of decontamination of meat, poultry, seafood, fresh produce, and eggs.
- Initiate research to develop new techniques for eliminating animal feeds as a source of foodborne pathogens.

Long-term Activities

- ARS, CSREES, and FDA should undertake research to develop new decontamination methods for contaminants such as *Vibrio* and Norwalk virus on or in marine-harvested and aquaculture-reared seafood, and for *Cyclospora* and hepatitis A virus on fresh produce.
- ARS, CREES, and FDA should work with industry and academia to develop new techniques that provide alternatives to traditional thermal processing for eliminating pathogens. Collaboration among these parties, particularly with industry participation, will facilitate rapid evaluation of the safety and effectiveness of new technologies, and ultimately, approval of processes.
- FDA, FSIS, and EPA should work with industry and academia to develop criteria for evaluating the efficacy and safety of the new intervention technologies.

Food handling, distribution, and storage

Food production, processing, and consumption often occur thousands of miles apart. Stresses associated with the transportation of live animals and fresh produce can contribute to the dissemination of foodborne pathogens. Effective packaging and proper food-storage conditions are critical to maintaining the level of safety achieved by processing.

Long-term Activities

- ARS, CSREES, and FDA should undertake research to identify factors that contribute to the spread of microorganisms during transportation of live animals and fresh produce and develop techniques for eliminating cross-contamination.
- FDA, ARS, and CSREES should work with industry and academia to develop and assess the effectiveness of in- or on-package sensors of storage conditions to alert consumers of products not stored safely.

Charge an interagency committee convened by the office of science and technology policy (OSTP) to coordinate federal research priorities and planning

Numerous opportunities exist for collaboration and the development of research partnerships among federal and state agencies, the private sector, and academia. A mechanism is needed to coordinate food-safety research among federal agencies, to link research with the activities and needs of the agencies, to better leverage agency resources and experience, and avoid duplication of effort. Such a coordination mechanism

could be provided by an OSTP-convened interagency committee. That committee would review food-safety responsibilities and research programs of the various agencies with a view to recommending direction of research funds and programs in accordance with those responsibilities.

IMPROVING INSPECTIONS AND COMPLIANCE

Background

Inspection of commercial food processors is an integral part of the food-safety assurance system. Inspections are carried out by federal, state and local authorities. In addition to other food-inspection responsibilities, state and local officials also have primary responsibility for inspecting restaurants, supermarkets, and other retail establishments. At the federal level, FSIS has responsibility for meat and poultry inspection in slaughter and processing plants and egg-product-processing plants, and for all imported meat, poultry, and egg products. FDA conducts periodic, random inspections of all other food-processing plants; that entails fewer than 700 inspectors and laboratory personnel for 53,000 U.S. plants and for all other imported foods.

Problem

The number of inspections conducted by FDA has decreased steadily since 1981, when 21,000 inspections were conducted, so that today resources exist to carry out only about 5,000 inspections per year. An FDA-regulated plant is inspected by FDA, on average, only once every 10 years. FDA also relies upon the states to conduct some inspections under contract, but that number has dropped from 12,000 in 1985 to 5,000 now. Moreover, because the number of imports has doubled over 5 years, with no real increase in inspectors, a smaller percentage of imports are inspected at entry.

Given the limited inspection coverage, FDA is finding an increasing number of problems–the number of products recalled for life-threatening microbial contamination has increased almost five-fold since 1988. Federal budget constraints will likely prohibit significant funding increases in the future, so FDA must find new ways to provide adequate inspection coverage.

Food-safety research is critically needed to develop the means to identify and characterize more rapidly and accurately foodborne hazards.

Recommendations

Scientists and other food-safety experts have concluded that the most effective and efficient mechanism to ensure that food processors identify and control hazards that could threaten food is the application of HACCP principles. FDA's seafood HACCP regulations go into effect in December 1997. FSIS began to implement its HACCP and Pathogen Reduction Requirements for the meat and poultry industries in 1997 with phase-in to be completed in 2000. HACCP programs allow government and industry resources to be used more appropriately, allowing the government and industry to focus on the greatest risks. To ensure that HACCP is properly implemented, and to ensure more efficient and effective monitoring of the safety of the food supply, recommendations are being made in the following areas.

Enhance development of HACCP procedures

FY97 Activities:

- Based on the best science available, FDA will propose appropriate regulatory and non-regulatory options, including HACCP, for the manufacture of fruit and vegetable juice products.
- Based on the best science available, FSIS will propose appropriate regulatory and non-regulatory options, including HACCP, for egg products.
- FDA and USDA will immediately identify preventive measures to address public-health problems, such as those recently associated with fruits and vegetables, e.g., hepatitis A virus associated with frozen strawberries. This will be accomplished through a comprehensive review of current production and food-safety programs including inspection, sampling, and analytical methods.
- FSIS and FDA will jointly publish an ANPR in which they will evaluate the public-health, food-technology, and regulatory issues involved in reducing the risk of human illness from *Salmonella enteritidis* in shell eggs. The ANPR will solicit information and comment on all elements of risk in the farm-to-table chain to ensure any resulting regulatory actions will be both reasonable and effective in reducing risk.
- FDA will evaluate whether and how to propose to require the use of HACCP in other appropriate food commodities and animal feeds.
- FDA will provide additional training in seafood HACCP and FSIS will complete HACCP training of inspectors in large meat and poultry plants.
- FSIS and FDA will evaluate expanding existing cooperative agreements so that plants producing meat and nonmeat foods are inspected by FSIS inspectors trained in FDA inspection standards. FSIS inspectors are already in these plants, and their presence could be better used to maximize use of federal resources without loss of inspection coverage for FSIS-regulated foods.

- FSIS will conduct a series of public meetings to discuss:
- How HACCP requirements will be implemented in slaughter plants and how the roles and responsibilities of inspection personnel will change with that implementation.
- The design and testing of new inspection concepts consistent with HACCP principles to achieve food-safety and other consumer-protection objectives through distribution and retail channels to consumers.
- FSIS and state associations will complete development of HACCP-based control measures for meat and poultry processing at the retail level.

FY98 Activities with Food-Safety Initiative Funds

- FDA and USDA will cooperate in evaluating the feasibility of HACCP for commodities such as fresh fruit and vegetables. The process could also consider whether it is appropriate to use USDA inspectors to inspect plants that manufacture products regulated by both agencies or even products that must meet different regulatory requirements from the two agencies, such as fresh produce used in the school lunch program.
- FDA will implement seafood HACCP by hiring approximately 80 investigators to conduct inspections to ensure proper implementation of seafood HACCP.
- A performance-based organization (PBO), will be created, with Congressional approval, as the organizational structure for the voluntary fee-for-service seafood program currently located at the Department of Commerce's National Marine Fisheries Service. The Departments of Commerce and Health and Human Services will consider whether to locate the PBO at FDA, which would consolidate voluntary and mandatory seafood programs within one agency and provide limited additional resources for implementation of seafood HACCP, while continuing the voluntary fee-for-service program.
- FSIS will continue to propose changes to current regulations to harmonize with HACCP.

Long-term Activities

- FDA should further the use of HACCP principles, as appropriate, for other foods, including animal feeds, and use risk-assessment techniques where possible.

Enhance the safety of foods in retail food establishments particularly at state and local levels

More than 3,000 state and local regulatory agencies have primary responsibility for monitoring retail food establishments to ensure that consumers are protected. U.S. retail establishments include approximately 785,000 commercial and institutional food establishments, 128,000 grocery and convenience stores, and 1.5 million vending operations. Workers in these establishments have highly diverse backgrounds and training.

FY97 Activities

- FDA and FSIS will hold a series of meetings with state and local regulators in five regions to establish retail program standards in accordance with the 1997 model state code (the Food Code) to enhance national uniformity.

FY98 Activities with Food-Safety Initiative Funds

- FSIS and FDA will provide HACCP training to state and local inspectors that will augment the training program for federal inspection personnel, more fully covering the farm-to-table process.
- See also "Education: Improve Retail Food-Service and Institutional Education."

Long-term Activities

- The Food Code should be adopted by all 50 states.

Enhance federal-state inspection partnerships

State inspection programs are an important component of the nation's food-safety inspection system. The move toward HACCP will pose a challenge to the states that federal agencies can help the state system to meet. If HACCP is to be an effective program for ensuring that food processors have modern, state-of-the-art food-safety procedures in effect, FDA must improve its inspection capabilities, so that the highest-risk food plants are inspected at least once per year. New federal-state partnerships focused on coordinating inspection coverage (particularly between FDA and the states), are major steps in this direction.

FY97 Activities

- FSIS will hold two public meetings on the issue of interstate distribution of state-inspected meat and poultry products. The purpose of these public meetings is to obtain information and comment from all stakeholders on this issue.

FY98 Activities with Food-Safety Initiative Funds

- FDA will develop additional federal-state partnerships to improve coordination between the federal food-safety agencies and state regulators for the training of state inspectors in food-safety standards applicable at all levels, including retail. FDA is currently involved in 92 partnerships with states; approximately 30 of those deal with inspection activities.
- FDA will expand the number of federal-state partnerships to include more extensive HACCP training of state inspectors, the seafood industry, and the retail food industry.
- FSIS will initiate HACCP training for state inspectors with respect to meat and poultry products.

Long-term Activities

- FDA and FSIS should work more closely with industry, professional and trade associations, and academia to ensure effective implementation of HACCP principles, particularly at the production, processing, and retail levels.
- FDA should create a data system to compile inspection data from federal and state inspections, as well as provide the states with equipment and technology for the rapid sharing of inspection results.

Enhance coverage of imported foods with specific attention to foods regulated by FDA

Wharf examinations and sampling of foods being offered for import into the United States have dropped by 50% in just the past four years. Today, FDA is responsible for about 2.2 million import food entries (i.e., shipments), an increase from 1.5 million entries just 5 years ago, with the same number of staff.

FY98 Activities with Food-Safety Initiative Funds

- FDA will work to increase the number of mutual recognition agreements (MRAs) with trading partners. Under MRAs, the trading countries ensure that food is produced and manufactured under equivalent systems that provide a comparable level of safety.
- FDA will initiate a federal-state communication system through which states can inform federal agencies of problems found with imported products in their jurisdictions.
- FDA will initiate a system for certifying and accrediting private laboratories, including use of a quality-assurance procedure, that will be authorized to test samples of food products for contaminants. Such private parties would provide a service to food firms wishing to demonstrate that their products meet applicable federal standards.
- When FDA and FSIS become aware of possible public-health problems associated with a regulated food product (e.g., through occurrence of foodborne illness outbreaks, sample analysis, or inspections), the agencies will provide technical assistance to the foreign country importing the product.

Long-term Activities

- FSIS should continue to verify foreign government-inspection progress for conformance with the new HACCP and Pathogen Reduction Requirements; that activity will begin in 1997 and should be completed in 2000.
- The laboratory-certification process should be extended to include assessing the utility of existing accrediting bodies with FDA providing performance standards and oversight to the process.
- FDA should expand the federal-state communication system states use to inform federal agencies of problems found with imported products in their jurisdictions. As part of that expansion, FDA should evaluate the feasibility of combining the communication system with the federal-state inspection data system discussed above, making the data and information more widely accessible.
- FDA should review and evaluate ways to increase coverage of imports through such means as increased personnel, increased partnerships, or innovative information-sharing with the states.

Enhance safety of foods during transportation

In considering whether and how to regulate the transportation of meat, poultry, seafood, eggs, and other foods to safeguard the public from pathogenic microorganisms and other hazards, FSIS and FDA published an ANPR on November 22, 1996.

FY98 Activities with Food-Safety Initiative Funds

- FDA and FSIS will evaluate the comments and information received in response to the ANPR as a basis for determining what, if any, regulatory approach to take, including development of guidelines. These guidelines may include such elements as suggested performance standards for temperature control, providing information on prior cargo, and cleaning information for the food-shipper's use, to ensure the safety of the food at its destination.

Long-term Activities

- FDA and FSIS, through partnerships with states, should provide training and training materials to the transportation industry on safe food transportation. (See "Education: Improve Industry Education in the Transportation Area.")

EDUCATION

Background

An integral part of the overall food-safety initiative is providing food-safety education to a variety of audiences: consumers (the general public and specific groups at risk for foodborne illness); public-health professionals and physicians; retail, food-service, and institutional food preparers; veterinarians, animal and other food producers; and food-transportation workers. The challenge is to create educational messages that address the risks relevant to each audience throughout the food chain. Research and risk assessment are important elements in identifying these risks and devising appropriate messages. Realizing that educational efforts are cost-effective investments, federal, state and local governments, private organizations, consumer groups, and industry have fostered educational programs to address foodborne illness.

Problem

Despite educational efforts, foodborne illness remains prevalent throughout the United States. For example, from 1988 to 1992, *Salmonella* caused 69% of the 796 bacterial foodborne disease outbreaks; 60% of those *Salmonella* outbreaks were caused by *Salmonella enteritidis*. *S. enteritidis* also resulted in more deaths than any other pathogen, with 85% of these deaths occurring among residents of nursing homes.

One reason is that food preparers and handlers at each stage of the food chain lack the knowledge of risks involved and the related safe food-handling practices. Food preparers in the retail sector must be made aware of how they can prevent food contamination and reduce pathogen growth, particularly by preventing cross-contamination with other foods and by properly cooking foods such as eggs. Without the knowledge of food-safety practices and proper food-handling procedures, foodborne illness cannot be significantly reduced. Food-safety messages should be developed to reach individuals at each stage from the farm to the table.

Risk assessment and research are needed to determine the most effective ways to overcome barriers to use of safe food-handling practices and to ensure use of safe food-handling practices by specific audiences. Consumers' food-handling practices and the choices they make in the foods they eat will either increase or decrease the chances of foodborne illness. Studies show that more than 50% of the public eats raw or undercooked eggs, 23% eats undercooked hamburger, 17% eats raw clams and oysters, and 26% do not wash cutting boards after using them for raw meat or poultry.

Health professionals and physicians also need specific knowledge about causes and effects of foodborne illness to more effectively detect and treat the illnesses. Producers of animals used in human food production and veterinarians treating such animals must be made aware of food-safety aspects of drugs and drug residues. Finally, those responsible for the transportation of food are often unaware that mishandling of food during shipment can result in contamination.

Recommendations

The goal of this initiative is to target and change unsafe food-handling practices by people throughout the food chain, including food-service workers, and especially those providing food to populations at high risk of foodborne illness. Objectives include: (1) forming partnerships and alliances to maximize resources and broaden the impact and scope of educational efforts; (2) designing messages by conducting research to identify barriers to safe food handling, upon which educational programs will be centered; and (3) expanding the use of innovative outreach methods, including the use of new technologies.

Implementation of the education goals and objectives of the initiative combined with the other elements of the initiative will significantly increase the number of consumers and food-service workers being reached with effective and persuasive food-safety messages.

Improve consumer, retail, and food-service education

FY97 Activities

The 1997 consumer food-safety education partnership

A memorandum of understanding was signed in May 1997, formalizing a food-safety education partnership that includes industry, consumer groups, FDA, CDC, USDA, and the Department of Education. Participants in the partnership will launch a nationwide food-safety education campaign for the general public. The campaign will center on four key food-safety concepts tested for maximum consumer understanding and will include a slogan, logo or identifiable character. At present, the Partnership is reviewing proposals from national public-relations and communications firms to conduct a public awareness and education campaign. The industry groups have contributed almost $500,000 to date. Plans for the nationwide campaign will be announced at the food-safety education conference, *"Changing Strategies: Changing Behaviors,"* sponsored by FSIS, CSREES, FDA, and CDC to be held June 12-13 in Washington, D.C. The partnership will promote September as National Food Safety Month, as already designated by industry, and launch the food-safety education campaign during the month.

Identify key food-safety education principles through establishment of an expert council

Convene the National Food Safety Education Council, an independent scientific review board to periodically review food-safety education messages. The Council, which will include food scientists and educators, will serve to identify emerging food-safety risks that require public education. Risk assessment will be used to identify at-risk audiences for targeted food-safety education programs.

Other FY97 Activities

- The agencies will form alliances with industry, consumer, trade, state and local food-protection agencies, and academic organizations to share food-safety education materials and conduct joint food-safety education activities in order to leverage resources and expand the reach of the alliances. For example, FDA, FSIS, and CSREES will form an alliance, joining expertise of federal, state and local agencies, industry, and professional and trade associations to promote and implement the 1997 Food Code and develop multilingual communication techniques targeted to specific groups to overcome communication barriers.
- See "Inspections: Enhance Safety of Foods in Retail Food Establishments."

FY98 Activities with Food-Safety Initiative Funds

- FDA, CDC, FSIS, and CSREES will promote and incorporate food-safety education into school programs.

Conduct research to identify barriers to safe food-handling, upon which educational programs will be centered

FY97 Activities

Under the auspices of the National Food Safety Education Council:

- HHS and USDA will develop national safe-food-handling guidelines like the Dietary Guidelines and review them periodically.

FY98 Activities with Food-Safety Initiative Funds

- Conduct additional research necessary to determine the best way to communicate key food-safety principles in order to achieve behavior change.
- Conduct research necessary to develop a visual communication tool that conveys food-safety principles, as the food guide pyramid does for nutrition principles.

Long-term Activities

- Through partnerships and alliances, implement an education campaign to use the new educational tools especially targeted to school programs and specific at-risk audiences.

Expand existing information systems

FY97 Activities

- Expand existing information systems, such as the existing Foodborne Illness Education Information Center, while laying the groundwork for a National Clearinghouse for Food Safety Education. Innovative methods for sharing food-safety information will be explored, including the consolidation of government food-safety Internet sites to reach larger audiences and provide easier access to information through a single site.

FY98 Activities with Food-Safety Initiative Funds

- Establish the National Clearinghouse for Food Safety Education.
- Consider use of food labels and other point-of-sale materials to convey food-safety information.
- In food service, develop and initiate a highly focused multilingual program to change food workers' unsafe food-preparation behaviors. The programs will address the impact of the high turnover in food-service workers and target teenage workers, small businesses, and new entrepreneurs.

Long-term Activities

- Evaluate program and continue to support those programs initiated in FY97 and FY98.

Improve veterinarian and producer education

Long-term Activities

- Use existing mechanisms, such as the Cooperative Extension Service and professional associations, to strengthen and implement programs to educate producers, veterinarians, and state and local regulators about proper drug use and the incorporation of HACCP principles into industry quality-assurance programs to reduce foodborne pathogens.
- Encourage the evaluation and improvement of veterinary and producer education at veterinary and agriculture colleges to address foodborne pathogens in animals and their manures.
- Develop and disseminate guidelines and educational materials through existing networks to food producers and the veterinary medical community.

Improve health-professional education

Long-term Activities

- In cooperation with FDA, FSIS, and CSREES, CDC should train public-health professionals on foodborne disease and clinical microbiology and foodborne illnesses with nontraditional symptoms by using multimedia and distance-learning techniques and the National Laboratory Training Network.

Improve industry education in the transportation area

Long-term Activities

- Form an alliance among government agencies and the private sector to develop educational materials and train food-transportation vehicle owners and operators and food-processing establishments on hazards associated with the transportation of food products, particularly hazards associated with temperature control, prior cargo, and sanitation methods.
- See also: "Inspections: Enhance Safety of Foods During Transportation."

A BLUEPRINT FOR A BETTER FOOD-SAFETY SYSTEM

Background

The actions described in this report will significantly improve the safety of the nation's food supply, but the agencies recognize that this 90-day report does not address a number of critical issues facing our food-safety programs. The agencies recommend a longer-term strategic planning effort to consider how to best address important challenges and make the best use of the agencies' limited resources. This process will involve all public and private stakeholders, including consumer groups, affected families, state and local governments, and industry. One function of the strategic-planning process is to consider how to make the best use of each agency's limited resources.

Through this initiative, and previous activities, we have laid the groundwork for a strategic planning effort. For example, federal agencies, consumer groups, and industry have worked together to incorporate HACCP into meat, poultry, and seafood regulatory programs. And there is now a broad recognition of the need to carefully implement these programs, and to consider how to apply preventive measures in other areas of concern. A strategic-planning effort could build on this common ground, and tackle some of the difficult public-health, resource, and management questions facing federal food-safety agencies.

As discussed throughout this report, USDA, HHS, and EPA have responsibilities for ensuring the safety of the U.S. food supply. USDA and HHS also have ancillary responsibilities for the quality of our food. These responsibilities include the grading of agricultural commodities and grain by the Agricultural Marketing Service and the Grain Inspection Service, the importation of foreign plants and animals by APHIS, and the quality and wholesomeness of food purchased by the federal school lunch program. FDA sets standards of quality for a variety of food products. Regulatory requirements applicable to food products are largely established by FSIS for meat, poultry and egg products, and by FDA for all other products.

In recent years, there has been increasing evidence that foodborne diseases can be caused by microbial contamination in seafood, fresh fruits, vegetables, and other products. Moreover, during the Clinton Administration, both agencies have looked to a new and similar approach to food regulation. FSIS has adopted HACCP for the products that it regulates and FDA has adopted HACCP for seafood products, and is considering the HACCP approach for other products. During the next few years, the HACCP regulations that these agencies have adopted will go into effect, and more may well follow.

Developing a strategic plan

Over the past 90 days, the federal food-safety agencies have engaged a wide range of stakeholders in discussions about food-safety issues through a series of public meetings and through written comments to public dockets. Although these discussions have identified some ideas for approaches to strategic planning, they have more clearly established the need for continuing discussions about the process for developing a strategic plan.

Therefore, the agencies will initiate a longer-term strategic planning process to develop a strategic plan for improving the food-safety system. The process will facilitate the participation of all interested parties. Extensive, structured discussions will be needed to build trust in the process, and to obtain agreement on priorities, strategies for achieving change, and ways for measuring progress.

Because it is critical that the process be inclusive and equitable, the agencies will give interested parties an opportunity to comment on the possible approaches for structuring the dialogue before its implementation. The agencies will provide specific information regarding the general objective, scope, and conduct of the dialogue and strategic-planning process, management of the process, selection criteria for participants, and other relevant factors. Unanimous agreement is unlikely. Therefore, the agencies will use a general consensus to shape the planning process.

Broad participation of stakeholders is central to the success of the discussions. The achievement of such broad participation can be accomplished in a number of ways. The agencies will hold meetings in various regions of the United States, which will also ensure broad participation. These meetings will involve multiple sectors to ensure broad and balanced participation of all stakeholders in the food-safety system. The meetings will be open and their proceedings, products, and the process for producing those products transparent.

Issues for consideration

A major challenge in developing a strategic plan will be attaining consensus on priorities for action to enhance food safety within the highly complex food-safety oversight system. Reaching agreement on priorities is compounded by the complexity of the food supply and the different perspectives of the various

oversight agencies and groups. Federal and state agencies have established programs in research, risk assessment, education, surveillance, and inspection, and agencies are working to better coordinate activities within these programs. Nevertheless, a better system of identifying and setting priorities within these areas is essential to maximizing the use and effect of limited agency resources in reducing the incidence of foodborne illness and enhancing the safety of the food supply.

During the course of the stakeholder discussions, a variety of issues, ranging from specific to broad, surfaced as priority topics for discussion. A number of stakeholders suggested the need to consider such broad policy questions as:

- Key public-health, resource, and management questions facing federal food-safety agencies.
- Structure of strategic, coordinated, long-range risk-assessment and research agendas.
- Consideration of improvements for coordination and planning of food-safety regulation to optimize federal and state prevention, intervention, and control actions.
- Means to improve exchange of information about foodborne disease outbreaks.

More focused, technical issues were also suggested for consideration, among them:

- Technical and policy issues associated with agricultural manures (important potential sources of microbial contaminants of foods). Animal manures are currently excluded from regulation. Therefore, an EPA regulatory mechanism to control human health impacts resulting from improper application to or burial of manures in farm and other lands does not exist.
- Technical and policy issues associated with microbial-control technologies, including food irradiation.
- Developing a global approach to evaluating new, emerging, and potential foodborne diseases such as Transmissible (Bovine) Spongiform Encephalopathy–T(B)SE–and a process for responding to prevent the spread of such diseases.

Prepare a 3- to 5-year strategic plan

Participants in the planning process would be charged with developing a strategic long-range agenda that could be used to help set priorities, improve coordination and efficiency, identify gaps in the current system, and enhance and strengthen prevention and intervention strategies, and identify measures to show progress. Each agency will incorporate the relevant parts of the strategic plan into its Government Performance and Results Act (GPRA) strategic plan, commensurate with its budget.

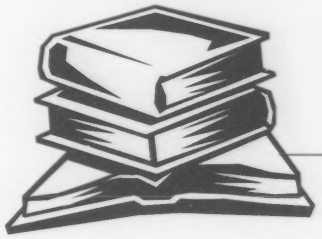
Measure progress to evaluate the effectiveness of the plan in reducing the annual incidence of foodborne illness

After the plan's implementation, progress would be reviewed to determine the strategic plan's effect on reducing the annual incidence of foodborne illness. Measurable goals and objectives would provide a basis for establishing progress. Measurements could be based on a decline in the number of foodborne illnesses and deaths, a decline in the number of outbreaks, more effective prevention and intervention programs, more rapid, coordinated, and effective responses to foodborne illness outbreaks, increases in inspection coverage for domestic and imported products, changes in behavior, and better detection and quantification methodologies.

Dairy, Food and Environmental Sanitation, Vol. 17, No. 9, Page 575

Book reviewed by: Bill LaGrange, Ph.D., Iowa State University, Ames, IA

Book Review



"Monograph on Residues and Contaminants in Milk and Milk Products"

Edited by:
The International Dairy Federation
Brussels, Belgium

IDF has compiled very useful reviews, in a 130-page monograph, of nine types of residues and contaminants that can and do find their way into milk and dairy foods during the course of milk production and processing. These chapters are written by European dairy and food experts. Each chapter follows a defined format that includes an introduction, chemical structure(s) of the residue or contaminate in question, the sources of contamination, route of carry-over into milk and dairy foods, principles of analysis, occurrence in milk and dairy foods, significance to human health, recommendations on prevention, decontamination of milk and dairy foods, risk assessment of the contaminate, and a listing of references related to the chapter's subject. The nine residues and contaminants discussed in this monograph include the following: antimicrobial drugs; parasite drugs; hormones for therapeutic use including BST; pesticides; heavy metals and trace elements; nitrate, nitrite, and nitrosamines; mycotoxins; persistent polyhalogenated environmental chemicals like PCBs; and detergents and disinfectants. This monograph would be a very useful reference for people involved, in any way, with the dairy industry.

For copies of "Monograph on Residues and Contaminants in Milk and Milk Products":
Mail requests to: IDF, 41, Square Vergote, B-1030 Brussels, Belgium.

Awards Nominations

The International Association of Milk, Food and Environmental Sanitarians welcomes your nominations for our Association Awards. Nominate your colleagues for one of the Awards listed below. Only IAMFES Members are eligible to be nominated. You do not have to be an IAMFES Member to nominate a deserving professional.

To request nomination forms, contact:

IAMFES
6200 Aurora Avenue, Suite 200W
Des Moines, Iowa 50322-2863

By telephone: 800.369.6337; 515.276.3344;
Fax: 515.276.8655 or E-mail: iamfes@iamfes.org.

You may make multiple nominations. Be sure to indicate which Award nomination form(s) you desire. All forms vary and cannot be universally used.

Nominations deadline is February 20, 1998. All forms must be received at the IAMFES office by February 20, 1998.

* Persons nominated for individual awards must be current IAMFES Members. Black Pearl nominees must be a company employing current IAMFES Members.
* Previous award winners are not eligible for the same award.
* Executive Board Members and Awards Committee Members are not eligible for nomination.
* Presentation of awards will be during the Awards Banquet at the IAMFES Annual Meeting in Nashville, Tennessee on August 19, 1998.

Nominations will be accepted for the following Awards:

Black Pearl Award—Award with Black Pearl
Presented in recognition of a company's outstanding achievement in corporate excellence in food safety and quality. Sponsored by Wilbur Feagan and F&H Food Equipment Company.

Honorary Life Membership Award—Plaque and Lifetime Membership in IAMFES
Presented to Member(s) for their devotion to the high ideals and objectives of IAMFES and for their service to the Association.

Harry Haverland Citation Award—Plaque and $1,000 Honorarium
Presented to an individual for years of devotion to the ideals and objectives of IAMFES. Sponsored by DiverseyLever Corporation.

Harold Barnum Industry Award—Plaque and $1,000 Honorarium
Presented to an individual for outstanding service to the public, IAMFES and the food industry. Sponsored by NASCO International, Inc.

Educator Award—Plaque and $1,000 Honorarium
Presented to an individual for outstanding service to the public, IAMFES and the arena of education in food safety and food protection.

Sanitarian Award—Plaque and $1,000 Honorarium
Presented to an individual for outstanding service to the public, IAMFES and the profession of the Sanitarian. Sponsored by Ecolab, Inc., Food and Beverage Division.

CALL FOR ABSTRACTS

IAMFES
85th Annual Meeting – August 16-19, 1998
Nashville, Tennessee

Instructions for Preparing Abstracts

Procedure

- Type abstract in space provided on the abstract form. Abstracts must be double-spaced in a font size no smaller than 12 point. Left and right margins must be no less than 1/2 inch.
- Type in the title, CAPITALIZE the first letter of the first word and proper nouns.
- List the names of authors and institution(s). Capitalize first letters and initials.
- Give the full name, title, mailing address and the office telephone number of the author who will present the paper.
- If the paper is to be presented by a student entered in the Developing Scientist Awards Competitions, check the box to indicate this and have the form signed by your Major Professor or Department Head. **(For more information on the Developing Scientist Awards Competitions, see the following pages.)**
- Check the most appropriate box to indicate the general subject area of the paper. Indicate subject if checking "other." Mail two (2) printed copies and one (1) on 3 ½ inch disk (saved as text export or ASCII file) of the abstract to be received by January 12, 1998 to:

Carol Mouchka
IAMFES
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863

Enclose two (2) self-addressed postcards for each abstract that is submitted. One will be returned to acknowledge receipt of the abstract and the other to notify the author of acceptance or rejection.

***NOTE: Your abstract must be received by the IAMFES office no later than January 12, 1998. Photocopies of the abstract form may be used.**

Content of the Abstract

The abstract should describe briefly:

(a) the purpose of research/objectives;
(b) methodology;
(c) essential results;
(d) conclusions/significance/ implications.

Presentation Format

Papers may be presented orally or by poster format at the discretion of the IAMFES Program Advisory Committee. Oral presentations will be scheduled so a speaker has a maximum of 15 minutes, including a 2 to 4 minute discussion. Carousel projectors for 35-mm slides will be available. Other equipment may be used at speaker's expense. Prior authorization must be obtained.

OVERHEAD PROJECTORS ARE NOT TO BE USED.

Subject Matter for Papers

Papers should report the results of applied research on: food, dairy and environmental sanitation; foodborne pathogens; food and dairy microbiology; food and dairy engineering; food and dairy chemistry; food additives and residues; food and dairy technology; food service and food administration; quality assurance/control; mastitis; environmental health; waste management and water quality. Papers may also report subject matter of an educational and/or nontechnical nature.

Criteria for *Acceptance* of Abstracts

1. Abstract must accurately describe briefly:
   (a) the problem studied/objectives;
   (b) methodology;
   (c) essential results;
   (d) conclusions/significance/ implications.

Results should be summarized. **Do not use tables or graphs.**

2. Abstract must report the results of original research pertinent to the subject matter described above in subject matter for papers section.
3. Research must be based on accepted scientific practices.
4. Research should not have been previously presented nor intended for presentation at another scientific meeting; paper should not have appeared in print prior to the Annual Meeting.

Typical Reasons for *Rejection* of Abstracts

1. Abstract was not prepared according to "Instructions for Preparing Abstracts."
2. Abstract does not contain essential elements described above in #1, "Criteria for Acceptance."
3. Abstract reports inappropriate or unacceptable subject matter, is not based on accepted scientific practices, or the quality of the research or scientific approach is inadequate.
4. Work reported appears to be incomplete.
5. The abstract was poorly written or prepared.
6. Results have been presented/ published previously.
7. The abstract was received after the deadline for submission.
8. Abstract contains information that is in violation of the IAMFES Policy on Commercialism.

Additional Abstract Forms

Photocopies of the abstract form may be used.

Membership in IAMFES

Membership in IAMFES is NOT a requirement for presenting a paper at the IAMFES Annual Meeting.

IAMFES Abstract Form

DEADLINE: Must be Received by January 12, 1998

Title of Paper _____

_____

Authors _____

_____

Full Name and Title of Presenter _____

_____

Institution and Address of Presenter _____

_____

Office Phone Number: _____
Fax Number: _____
E-mail: _____

General Subject Area

- ☐ Quality Assurance/Control
- ☐ Food Microbiology
- ☐ Dairy Microbiology
- ☐ Waste Management
- ☐ Lab Methods
- ☐ Foodborne Pathogens
- ☐ Chemical Residues
- ☐ Environmental Health
- ☐ Food Service
- ☐ Sanitation
- ☐ Food Safety
- ☐ Processing
- ☐ Epidemiology
- ☐ Nontechnical/ Education
- ☐ Other _____

Check the format you prefer.

- ☐ Oral
- ☐ Poster
- ☐ Video Theater
- ☐ No Preference

Developing Scientist Awards Competitions ☐ Yes

Major Professor/Department Head approval (signature and date) _____

Selected presentations, with permission, will be recorded (audio or visual).

I authorize IAMFES to record my presentation.
Signature _____. Date: _____
I do not wish to be recorded.
Signature _____. Date: _____

Please TYPE abstract, DOUBLE-SPACED, in the space provided here.

Call for Entrants in the Developing Scientist Awards Competitions (Supported by the IAMFES Foundation)

IAMFES is pleased to announce continuation of its program to encourage and recognize the work of students and recent graduates in the field of food safety research. Qualified individuals may enter **either** the Developing Scientist Oral Competition **or** the Developing Scientist Poster Competition.

Purpose:

1. To encourage students and recent graduates to present their original research at the IAMFES Annual Meeting.
2. To foster professionalism in students and recent graduates through contact with peers and professional members of IAMFES.
3. To encourage participation by students and recent graduates in IAMFES and its Annual Meeting.

DEVELOPING SCIENTIST ORAL AWARDS COMPETITION:

The Developing Scientist Oral Awards Competition is open only to **graduate students enrolled in M.S. or Ph.D. programs or recent M.S. or Ph.D. graduates** in programs at accredited universities or colleges where research deals with environmental, food or dairy sanitation, protection or safety. **Competition entrants cannot have graduated more than one year prior to the deadline for submitting abstracts.**

Prior to the Annual Meeting, up to ten finalists will be selected for Competition and awards will be presented at the Annual Meeting to the top three presenters (first, second and third places). Presentations are limited to fifteen minutes which should include two to four minutes for discussion.

Awards: First Place, $500 and an engraved plaque; Second Place, $300 and a framed certificate; Third Place, $100 and a framed certificate. Award winners will also receive a complimentary, one-year IAMFES membership including both *Dairy, Food and Environmental Sanitation* **and** *Journal of Food Protection*.

DEVELOPING SCIENTIST POSTER AWARDS COMPETITION:

The Developing Scientist Poster Awards Competition is open to **enrolled undergraduate and graduate students or recent graduates from undergraduate or graduate programs** at accredited universities or colleges where research deals with environmental, food or dairy sanitation, protection or safety. **Competition entrants cannot have graduated more than one year prior to the deadline for submitting abstracts**.

Prior to the Annual Meeting, up to ten finalists will be selected for Competition and awards will be presented at the Annual Meeting to the top three presenters (first, second and third places). The presentation must be mounted on an eight feet by four feet (8' × 4') display board provided at the Annual Meeting for the duration of the assigned Poster Session. The presenter must be present at his or her poster for the specified time (approximately two hours) during the assigned session.

Awards: First Place, $500 and an engraved plaque; Second Place, $300 and a framed certificate; Third Place, $100 and a framed certificate. Award winners will also receive a complimentary, one-year IAMFES membership including both *Dairy, Food and Environmental Sanitation* **and** *Journal of Food Protection*.

INSTRUCTIONS TO DEVELOPING SCIENTIST AWARDS ORAL AND POSTER COMPETITIONS ENTRANTS:

1. Abstracts must be received by the IAMFES office no later than January 12, 1998.
2. In addition to adhering to the general procedures for abstract preparation and submission required of all individuals submitting abstracts, Competition entrants must submit **one additional** copy of their abstract (i.e., a total of three (3) copies must be submitted). **Competition entrants must also mark the appropriate box on the abstract form to indicate their intention to participate in the Developing Scientist Awards Competition and to designate whether it is "oral" or "poster."**
3. Both the Competition entrant and his or her presentation must be recommended and approved for the Competition by his or her major professor or department head, who must sign the abstract.
4. The work must represent original research done by the Competition entrant and must be presented by the Competition entrant.
5. Competition entrants may enter only one paper in either the Oral or the Poster Competition.

ADDITIONAL INFORMATION:

1. Acceptance of papers by IAMFES for presentation at the Annual Meeting is independent of acceptance as a Competition finalist. Competition entrants who are chosen as finalists will be notified of their status by the Competition Chair by June 1, 1998.
2. All Competition entrants (not just Competition finalists) with abstracts accepted by IAMFES will receive a complimentary, one-year IAMFES membership which includes their choice of *Dairy, Food and Environmental Sanitation* or *Journal of Food Protection*.
3. All Competition finalists will receive a complimentary Awards Banquet ticket and are expected to be present at the banquet where the award winners will be announced and recognized.
4. All Competition entrants are required to pay the registration fee (i.e., student member rate, member rate, or nonmember rate). Nonmembers may join IAMFES and receive the member rate.

JUDGING THE DEVELOPING SCIENTIST AWARDS COMPETITIONS:

Abstracts and presentations will be evaluated by an independent panel of judges. Selection of up to ten finalists for the Developing Scientist Oral and Poster Awards Competitions will be based on evaluations of the abstracts and the scientific quality of the work (see judging criteria). All Competition entrants will be advised of the judges' decisions by June 1, 1998.

Only the Competition finalists will be judged at the Annual Meeting and will be eligible for the awards. All other Competition entrants with abstracts accepted by the IAMFES Program Advisory Committee will be expected to present their papers/posters as part of the regular Annual Meeting program, but their presentations will not be judged and they will not be eligible for the awards.

JUDGING CRITERIA FOR THE DEVELOPING SCIENTIST AWARDS COMPETITIONS:

ABSTRACT:

Clarity; comprehensiveness; conciseness.

SCIENTIFIC QUALITY:

Adequacy of experimental design; extent to which objectives were met; difficulty and thoroughness of research; validity of conclusions based upon data; technical merit; contribution to science.

ORAL PRESENTATION OR POSTER PRESENTATION:

Organization (clarity of introduction, objectives, methods, results and conclusions); quality of visuals; quality and poise of presentation and in answering questions.

***NOTE: Your abstract must be received by the IAMFES office no later than January 12, 1998. Photocopies of the abstract form may be used.**

IAMFES Policy on Commercialism

1. INTRODUCTION

No printed media, technical sessions, symposia, posters, seminars, short courses, and/or all related type forums and discussions offered under the auspices of IAMFES (hereafter referred to as IAMFES forums) are to be used as platforms for commercial sales or presentations by authors and/or presenters (hereafter referred to as authors) without the expressed permission of the IAMFES staff or Executive Board. IAMFES enforces this policy in order to restrict commercialism in technical manuscripts, graphics, oral presentations, poster presentations, panel discussions, symposia papers, and all other type submissions and presentations (hereafter referred to as submissions and presentations), so that scientific merit is not diluted by proprietary secrecy.

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

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

2. TECHNICAL CONTENT OF SUBMISSIONS AND PRESENTATIONS

2.1 Original Work

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

2.2 Substantiating Data

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

2.3 Trade Names

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

2.4 "Industry Practice" Statements

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

2.5 Ranking

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

2.6 Proprietary Information (See also 2.2.)

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

2.7 Capabilities

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

3. GRAPHICS

3.1 Purpose

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

3.2 Source

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

3.3 Company Identification

Names or logos of agencies or companies supplying the goods or services must not appear on the graphics, except on the first slide of the presentation. Slides showing products may not include predominant nameplates. Graphics with commercial names or logos added as background borders or corners are specifically forbidden.

3.4 Copies

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

4. INTERPRETATION AND ENFORCEMENT

4.1 Distribution

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

4.2 Assessment Process

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

4.3 Author Awareness

In addition to receiveing a printed copy of this policy, all authors presenting in an IAMFES forum will be reminded of this policy by the PAC chair, their session convenor, or the IAMFES staff, whichever is appropriate.

4.4 Monitoring

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

4.5 Enforcement

While both technical reviewers, session convenors, and/or IAMFES staff may check submissions and presentations for commercialism, ultimately it is the responsibility of the PAC chair to enforce this policy through the session convenors and IAMFES staff.

4.6 Penalties

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

New Members

ARGENTINA

Carolina Lombardi
Chr. Hansen Argentina
Quilmes, Buenos Aires

AUSTRALIA

Philip Myers
Tecra Diagnostics Roseville, NSW

CANADA

Melinda Chin
Maple Leaf Meats
Edmonton, Alberta

Timothy Finkle
Ottawa, Ontario

Stevie Joy
Nabisco Ltd.
Unionville, Ontario

Rick P. Kane
Canadian Food Inspection Agency
Canning, Nova Scotia

Ruff Lowman
Canadian Federal Insp. Agency
Nepean, Ontario

Matthew Palmer
3-M, London, Ontario

John Spaetzel
Nabisco Ltd., Etobicoke, Ontario

John Wendell
J. M. Schneider Inc.
Kitchener, Ontario

Patti Wilson
Canadian Food Inspection Agency
Dartmouth, Nova Scotia

ENGLAND

Donal P. Hynes
Kerry Ingredients, Fareham

JAPAN

Hisa Kazuo
Ikari Corporation, Marashino, Chiba

MEXICO

Martha E. Diaz-Cinco
Hermosillo, Sonona

PORTUGAL

Francisco X. Malcata
Escola Superior Biotecnologia
Portugal

SINGAPORE

Chin Yook Chan
F & N (Singapore) Pte. Ltd.
Singapore

SPAIN

Pablo Salvador Fernandez-Escamez
C.E.B.A.S., Murcia

UNITED STATES

ALABAMA

Danielle Benefield
Auburn University, Auburn

Ramona A. Gould
U.S. Army, Fort Rucker

Sarah Lewis
Tuskegee University, Tuskegee

Timm L. Soldwish
Wayne Farms, Union Springs

Yibei Zhang
Tuskegee University, Tuskegee

CALIFORNIA

Hamid R. Farzi
Otis Spunkmeyer, San Leandro

William R. Leach
County of Mendocino, Ukiah

M. Sushil
Watson Industries, Canoga Park

D. L. Thompson
Dept. of Food & Agriculture
Sacramento

DISTRICT OF COLUMBIA

Rolenda Chuyate
National Food Processors Assn.
Washington

Isaac G. Sterling
USDA, AMS, Science & Tech.
Washington

FLORIDA

Robert Beard
Ecolab Food & Beverage
Ft. Walton Beach

Linda R. H. Beasley
FMC Corporation, Lakeland

Michael Bradley
University of Florida, Gainesville

Diana Compel
Tropicana Products, Inc.
Bradenton

Ken Kenyon
Deibel Labs, Alachua

Wayne Kordek
Velda Farms Inc., Winter Haven

Barbara Millenburch
Ft. Lauderdale

Steven Pao
Florida Dept. of Citrus, Lake Alfred

Terri Slifko
USF, Dept. of Marien Science
St. Petersburg

GEORGIA

Isabel Blackman
University of Georgia, Athens

David Charest
Poulenc, Inc., Lithonia

Yen-chang Chen
Georgia State University, Decatur

Doris D'Souza
University of Georgia, Griffin

Yongsoo Jung
University of Georgia, Griffin

Charles P. Lattuada
USDA-FSIS-OPUS-MD, Athens

Phillip Schulz
Popeye's, Atlanta

ILLINOIS

William C. Centrella, II
Idexx Food Safety Net Lab
Crest Hill

Troy R. Jones
The Suter Co., Sycamore

Dawn M. Mettler
IDEXX Food Safety Net Lab
Elmhurst

Cheryl Miller
Celsis, Evanston

Gary M. Smith
Silliker Laboratories, Homewood

KANSAS

John S. Kotrola
Kansas State University, Manhattan

MAINE

Howie Gu
IDEXX Laboratories, Inc., Westbrook

MARYLAND

Anne M. Derrick
KPL, Inc., Gaithersburg

Les Kirkegaard
KPL, Inc., Gaithersburg

Ned Rice
Toneco Enterprises, Brandywine

MASSACHUSETTS

Barbara A. Kulig
Town of West Springfield
West Springfield

Jane Anderson
Town of Bedford of Health, Bedford

MICHIGAN

Alfredo DeLosReyes
Borden Italian Foods, Warren

Gary P. Jansen
Stroh Brewing Co., Detroit

Doug Park
Michigan Dept. of Agriculture
Lansing

Phillip Powers
Kraft Foods & Co., Battle Creek

Jerry Wojtala
Michigan Dept. of Agriculture
Lansing

MINNESOTA

Melissa A. Drummonds
Northern Star Foods, Minneapolis

Karen Hesselroth
3M, St. Paul

David Jobe
Land O'Lakes, Thief River Falls

Albert K. Keller
Whey Systems, Inc., Mantorville

Sandra McDonald
3M Microbiology Products, St. Paul

Steven Mesia
Gold'n Plump Poultry, St. Cloud

Karen Mullery
3M Microbiology, St. Paul

Michael Williams
3M Inc., St. Paul

NEW YORK

Barbara M. Gerzonich
New York State Dept. of Health
Cohoes

Eileen M. Wachowski
Specialty Brands, Inc., New Rochelle

Sheldon Westman
Food Serv. Associates, Dunkirk

OHIO

Jack Bohannon
The Iams Company, Lewisburg

Elizabeth A. Hoffman
Columbus Health Dept., Columbus

Cynthia E. Miller
Ross Products, Columbus

OREGON

Marcia A. Torres-Mora
Oregon State University
Corvallis

PENNSYLVANIA

Mitzi Steffes
Pennsield Farms, Manheim

Richard C. Whiting
Microbial Food Safety
Wyndmoor

TEXAS

Alan Strickland
The Dow Chemical Co., Freeport

Richard Worfel
U.S. Army, San Antonio

VIRGINIA

E. Archer Taylor
Reston

WASHINGTON

Carlos Abeyta
Bothel

WEST VIRGINIA

Charles L. Wilson
USDA, Kearneysville

WISCONSIN

Judith Burnham
Promega, Madison

Susan Clark
Westby Coop Creamery, Westby

Charles Giambrone
SC Johnson & Son Inc.
Racine

Kathleen Manner
Wisconsin Dept. of Agriculture
Madison

Michael J. Stein
Nestle USA, Eau Claire

Affiliate Officers

ALABAMA ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Ronnie Sanders ... Montgomery
Pres. Elect, Lance Hester ..... Montgomery
Vice Pres., Ed Mabry ..... Cowarts
Sec'y. Treas., Patricia Lindsey ..... Guntersville
Past Pres., Ken Reamer ..... Montgomery
Delegate, G. M. Gallaspy ..... Montgomery

Mail all correspondence to:
Patricia Lindsey
Marshall County Health Dept.
P.O. Drawer 339
Guntersville, AL 35976
205.582.4926

ALBERTA ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Doug Karlson ..... Edmonton
Past Pres., Tony Warwaruk ..... Edmonton
Pres. Elect, Elaine Dribnenky ..... Red Deer
Sec'y., Gary Gensler ..... Edmonton
Treas., Bonnie Jensen .... Edmonton

Mail all correspondence to:
Doug Karlson
Dairyworld Foods
16110-116 Avenue
Edmonton, Alberta
Canada T5M 3V4
403.455.9935

CALIFORNIA ASSN. OF DAIRY & MILK SANITARIANS

Pres., Les Wood ..... Benicia
Past Pres., John Jackson ..... LaHabra
1st Vice Pres., Ed Wensel . Livermore
2nd Vice Pres., Gary Timmons ..... Ontario
Exec. Sec'y. Treas., John Bruhn ..... Davis
Recording Sec'y.,
Anne Quilter Goldstein ..... San Rafael
Delegate, John Bruhn ..... Davis

Mail all correspondence to:
Dr. John Bruhn
Department of Food Science & Technology
101B Cruess Hall
University of California - Davis
Davis, CA 95616-8598
916.752.2191

CAROLINA'S ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Tom Williamson ..... Raleigh, NC
Vice Pres., Joe Neely ..... Columbia, SC
Sec'y., Susan Grayson ..... Raleigh, NC
Treas., Beth Johnson ..... Columbia, SC
Delegate, Beth Johnson ..... Columbia, SC

Mail all correspondence to:
Tom Williamson
Env. Health Service Section
P.O. Box 29534
Raleigh, NC 27626-0534
919.733.3123

CONNECTICUT ASSN. OF DAIRY & FOOD SANITARIANS, INC.

Pres., Colleen Mears ..... Windsor Locks
Vice Pres., David Herrington ..... Middlefield
Sec'y., Donald Shields ..... Hartford
Treas., Kevin Gallagher ..... Hartford
Delegate, Satyakam Sen ..... Bristol

Mail all correspondence to:
Kevin Gallagher
Dept. Consumer Protection
(Food Div.)
State Office Bldg., Rm #167
165 Capitol Avenue
Hartford, CT 06106
203.566.4716

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

Pres., Marian Ryan ..... Winter Haven
Pres. Elect, Buddy Levins ..... Tallahassee
Past Pres., Kathleen Ward ..... Jacksonville
Sec'y. Treas., Bill Thornhill ..... Winter Haven
Delegate, Peter Hibbard .... Orlando

Mail all correspondence to:
Bill Thornhill
3023 Lake Alfred Road
Winter Haven, FL 33881
941.299.6555

GEORGIA ASSN. OF FOOD & ENVIRONMENTAL SANITARIANS

Pres., Ed Giera ..... Atlanta
Vice Pres., Tori Stivers ..... Atlanta
Past Pres., Yao-wen Huang .... Athens
Sec'y., Judy Harrison ..... Athens
Treas., James C. Camp .... Newnan
Delegate, David Fry ..... Lilburn

Mail all correspondence to:
Judy Harrison
GAFES Secretary
Cooperative Extension Service
Hoke-Smith Annex
University of Georgia
Athens, GA 30602
706.542.3773

IDAHO ENVIRONMENTAL HEALTH ASSN.

Pres., Edgar Hale ..... Coeur d'Alene
Pres. Elect, Edward Marugg ..... Pocatello
Past Pres., Steve Bastian .... Preston
Sec'y. Treas., Tom Hepworth ..... Pocatello
Delegate, Edgar Hale .. Coeur d'Alena

Mail all correspondence to:
Tom Hepworth
Fort Hall SLF
1500 N. Fort Hall Mine Rd.
Pocatello, ID 83204
208.236.0607

ASSOCIATED ILLINOIS MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Wayne Knudson ..... Cary
Pres. Elect, Karen Engebretson ..... Rockford
1st Vice Pres., Gary Kuhlmann ..... Springfield
2nd Vice Pres., Leroy Dressel ..... Highland
Sec'y. Treas., Nicolette Oates ..... Palos Heights
Past Pres., Alan Lundin ..... Cherry Valley
Delegate, Charles Price .... Lombard

Mail all correspondence to:
Nicolette Oates
11920 South 74th Avenue
Palos Heights, IL 60463
773.722.7100

INDIANA ENVIRONMENTAL HEALTH ASSN., INC.

Pres., Cyndi Wagner ... Indianapolis
Pres. Elect, Stephanie Dunlap ..... Indianapolis
Vice Pres., Dave Lamm ..... Indianapolis
Treas., Rick Brown ..... Winchester
Sec'y., Tom Prendergast ..... Indianapolis
Past. Pres., Sylvia Garrison ..... Martinsville
Delegate, Helene Uhlman ..... Hammond
Auditor, Melissa Ackerman ..... Indianapolis
Auditor, Jennifer Warner ..... Indianapolis

Mail all correspondence to:
Helene Uhlman
Hammond Health Dept.
649 Conkey Street, East
Hammond, IN 46324
219.853.6358

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

Pres., Herb Belz ..... Slater
Pres. Elect, Norieta Kramer ..... Waterloo
Past Pres., Loren Johnson ..... Le Mars
Sec'y. Treas., Monica Streicher ..... Arlington
Delegate, Randy Hanson .... Dubuque

Mail all correspondence to:
Monica Streicher
3281 40th Street
Arlington, IA 50606
319.933.4521

KANSAS ASSN. OF SANITARIANS

Pres., Marvin Simonton ..... Wellington
Past Pres., Dan Hutchinson ..... Topeka
1st Vice Pres., Joseph Malinowski ..... Junction City
2nd Vice Pres., Mary Glassburner ..... Chanute
Sec'y., Chris McVey ..... Emporia

Mail all correspondence to:
Chris McVey
Lyon County Health Dept.
420 W. 15th Avenue
Emporia, KS 66801
316.342.4864

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

Pres., Ed Cecil ..... Owensboro
Pres. Elect, Jim Wesley .... Somerset
Vice Pres., John Summers ... Hazard
Past Pres., Keith Brock ..... Lebanon
Sec'y., Pam Kuist ..... Princeton
Treas., Judy True ..... Frankfort
Delegate, Ed Cecil ..... Owensboro

Mail all correspondence to:
Judy True
Local Health Personnel
275 East Main Street
Frankfort, KY 40621
502.564.3796

KOREA ASSN. OF DAIRY, FOOD AND ENVIRONMENTAL SPECIALISTS

Pres., Choon IL Chung ..... Seoul
1st Vice Pres., Kook Hee Kang ..... Kyunggi-do
2nd Vice Pres., Duck Hwa Chung ..... Kangwon
Sec'y., Dong Kwan Jeong ..... Pusan
Auditor, Yoh Chang Yoon ... Seoul

Mail all correspondence to:
Dong Kwan Jeong
Department of Food
and Nutrition
Kosin University
Youngdo-Ku
Puasan 606-701
Korea
82.51.400.2330

MASSACHUSETTS MILK, FOOD & ENVIRONMENTAL INSPECTORS ASSN.

Pres., David Kochan ..... Northampton
Past Pres., Max Bookles ..... Pittsfield
Vice Pres., Gail Lawrence ..... Springfield
Sec'y. Treas., Fred Kowal ..... Chicopee
Delegate, Barb Kulig ..... West Springfield

Mail all correspondence to:
Fred Kowal
45 Beaumont Avenue
Chicopee, MA 01013
413.592.5914

METROPOLITAN ASSN. OF DAIRY, FOOD AND ENVIRONMENTAL SPECIALISTS

Pres., Eileen Wachowski ..... New Rochelle, NY
Past Pres., Donald Hammer ..... Marlton, NJ
1st Vice Pres., Gloria Dougherty ..... Montague, NJ
2nd Vice Pres., Carol A. Schwar ..... Alpha, NJ
Sec'y. Treas., Dennis Tidwell ..... Hamilton, NJ
Delegate, Fred Weber ..... Hamilton, NJ

Mail all correspondence to:
Fred Weber
2732 Kuser Road
Hamilton, NJ 08691-9430
609.584.7677

MICHIGAN ENVIRONMENTAL HEALTH ASSN.

Pres., Chuck Lichon ..... Midland
Pres. Elect, Janet Morlick ..... Flint
Past Pres., Dick Fleece ..... Manchester
Treas., Bruce DuHamel ..... Corunna
Sec'y., Tom Olson ..... Holland
Delegate, Ron Holben ..... Lansing

Mail all correspondence to:
Chuck Lichon
220 W. Ellsworth
Midland, MI 48640
517.832.6656

MINNESOTA SANITARIANS ASSN., INC.

Pres., Dan Erickson ..... St. Paul
Pres. Elect, Elaine Santi ..... Iron
Vice Pres., Mike Pronchinscke ..... Preston
Sec'y. Treas., Paul Nierman ..... Mounds View
Past Pres., Greg Pittman ..... Montgomery
Delegate, Paul Nierman ..... St. Paul

Mail all correspondence to:
Paul Nierman
Dairy Quality Control Institute
5205 Quincy Street
Mounds View, MN 55112-1400
612.785.0484

MISSISSIPPI ENVIRONMENTAL HEALTH ASSN.

Pres., Charlie Busler ..... Meridian
Pres. Elect, Royce Freeman ..... Hattiesburg
Sec'y. Treas., Randy Gibbs ..... Decatur
Past Pres., Robert Course ..... Greenwood
Delegate, Randy Gibbs ..... Decatur

Mail all correspondence to:
Randy Gibbs
c/o Newton Co. Health Dept.
P.O. Box 218
Decatur, MS 39327
601.635.2337

MISSOURI MILK, FOOD & ENVIRONMENTAL HEALTH ASSN.

Pres., David Gailey ..... Jefferson City
Pres. Elect, Don Falls ..... Jefferson City
Vice Pres., Stephen St. Clair ..... Hannibal
Sec'y., Linda Wilson ..... Springfield
Treas., Patrick Shannon ..... Jefferson City
Past Pres., Dianna Pasley ... Hillsboro
Delegate, Dianna Pasley ..... Hillsboro

Mail all correspondence to:
David Gailey
MO Dept. of Health
Hospital Licensure
P.O. Box 570
Jefferson City, MO 65102
573.751.6302

NEBRASKA ASSN. OF MILK & FOOD SANITARIANS

Pres., Michelle Westland ... Lincoln
Vice Pres., Roger Biltoft ..... Lincoln
Sec'y. Treas., Michelle Westland ..... Lincoln
Past Pres., Curt Sales ..... Lincoln
Delegate, Fred Cook ..... Omaha

Mail all correspondence to:
Michelle Westland
Laboratory
Douglas Co. Health Dept.
1819 Farnam St.
Omaha, NE 68183
402.444.7496

NEW YORK STATE ASSN. OF MILK & FOOD SANITARIANS

Pres., Charles Richardson ..... Baldwinsville
Pres. Elect, William Byrne, Jr. ..... Syracuse
Past Pres., Ronald Gardner ..... Ithaca
Exec. Sec'y., Janene Lucia ..... Ithaca
Delegate, Steven Murphy .... Ithaca

Mail all correspondence to:
Janene Lucia
Cornell University
172 Stocking Hall
Ithaca, NY 14853
607.255.2892

NORTH DAKOTA ENVIRONMENTAL HEALTH ASSN.

Pres., Allen McKay ..... Devils Lake
1st Vice Pres., Kevin Misek ..... Rugby
2nd Vice Pres., Mike Walton ..... Bismarck
Past Pres., Dan Mattern ..... Bismarck
Sec'y. Treas., Deb Larson ..... Bismarck
Delegate, Bob Dykeshoorn ..... Bismarck
Member-at-Large, Jim Schothorst ..... Grand Forks

Mail all correspondence to:
Debra Larson
State Dept. of Health
600 E Blvd. Avenue
Bismarck, ND 58505-0200
701.328.1292

OHIO ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., James Baker ..... Lancaster
1st Vice Pres., Robert Clark ..... Uhrichsville
2nd Vice Pres., Hermine Willey ..... Columbus
Sec'y. Treas., Donald Barrett ..... Canal Winchester
Past Pres., Gloria Swick ..... New Lexington
Delegate, Gloria Swick ..... New Lexington

Mail all correspondence to:
Donald Barrett
Health Dept.
6855 Diley Road N.W.
Canal Winchester, OH 43110
614.645.6195

ONTARIO FOOD PROTECTION ASSOCIATION

Pres., Jean Allen ..... Toronto
Vice Pres., Bill Boylan ..... Mississauga
Sec'y., Maureen Howes .... Rexdale
Treas., Helen Hingston .. Bramalea
Past Pres., Sue Fraser ..... Concord
Delegate, Jean Allen ..... Toronto

Mail all correspondence to:
Jean Allen
CIBUS Consulting Inc.
39 Parkview Hill Crescent
Toronto, Ontario M4B 1P4
416.755.5988

PENNSYLVANIA ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Jacqueline Hornack ..... Hazeleton
Pres. Elect, Craig Weaver ..... Stoystown
Vice Pres., Patrick Campbell ..... Ambridge
Sec'y., Eugene Frey ..... Lancaster
Treas., Robert Mock ..... New Berlinville
Past Pres., Clifford Kendall ..... Altoona
Delegate, Eugene Frey .... Lancaster

Mail all correspondence to:
Eugene Frey
Land O'Lakes
629 N. Marshall Street
Lancaster, PA 17602
717.397.1719

SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSN.

Pres., Rex Van Den Berg ..... Pierre
Pres. Elect, Shannon Jordre ..... Pierre
Past Pres., Rich McEntaffer ..... Pierre
Sec'y. Treas., Curt Thelen ..... Sioux Falls
Delegate, Darwin Kurtenbach ..... Pierre

Mail all correspondence to:
Curt Thelen
Sioux Falls City Health Department
132 N. Dakota Avenue
Sioux Falls, SD 57102-0590
605.367.7075

TENNESSEE ASSN. OF MILK, WATER & FOOD PROTECTION

Pres., Gail Smith ..... Chattanooga
Pres. Elect, Dwain Patterson ..... Brentwood
1st Vice Pres., Suzie Sykes ..... Little Rock, AR
Sec'y. Treas., Dennis Lampley ..... Bon Aqua
Bd. Mem. at Lge., Jim Byington ..... Blountville
Past Pres., Genevieve Christen ..... Knoxville
Delegate, Ruth Fuqua .... Mt. Juliet

Mail all correspondence to:
Dennis Lampley
7346 Sack Lampley Road
Bon Aqua, TN 37025
615.360.0157

TEXAS ASSN. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS

Pres., Jaime Cantu . Corpus Christi
Past Pres., Don Ritch ..... Dallas
Sec'y. Treas., Ron Richter ..... College Station
Archivist, Joe Goddard .. Lubbock
Delegate, Janie Park ..... Austin

Mail all correspondence to:
TAMFES
Ron Richter
Dept. of Animal Science
Texas A & M
College Station, TX 77843-2471
409.845.4409

VIRGINIA ASSN. OF SANITARIANS & DAIRY FIELDMEN

Pres., Bennett Minor ..... Mechanicsville
1st Vice Pres., Michael Hodges ..... Martinsville
Sec'y. Treas., David Dansey ..... Richmond
Past Pres., Randy Osbor ..... Independence
Delegate, David Danse ..... Richmond

Mail all correspondence to:
David Dansey
Box 1163
Richmond, VA 23209-1163
804.786.1452

WASHINGTON MILK & FOOD SANITARIANS ASSN.

Pres., Jim Watkins ..... Lake Tapps
Pres. Elect, Greg Rood ..... Roy
Past Pres., Stephanie Olmsted ..... Seattle
Sec'y. Treas., Lloyd Luedecke ..... Pullman
Delegate, Stephanie Whitman ..... Kent

Mail all correspondence to:
Lloyd Luedecke
NW 312 True Street
Pullman, WA 99163
509.335.4016

WISCONSIN ASSN. OF MILK & FOOD SANITARIANS

Pres., Bill Wendorff ..... Madison
Pres. Elect, Amy Bender ..... Richland Center
Past Pres., Fritz Buss .... Marshfield
1st Vice Pres., John Christy ..... Tomah
2nd Vice Pres., George Nelson ..... Menomonie
Sec'y., Randall Daggs ..... Sun Prairie
Treas., Neil Vassau ..... Madison
Delegate, Randall Daggs ..... Sun Prairie

Mail all correspondence to:
Randall Daggs
6699 Prairie View Drive
Sun Prairie, WI 53590
608.837.2087

WYOMING ENVIRONMENTAL HEALTH ASSN.

Pres., Stephanie Whitman ..... Laramie
Pres. Elect, Laurie Leis ..... Casper
Sec'y., Shirley Etzell ..... Lander
Treas., Jennifer Rucinski ..... Laramie
Past Pres., Terry Carlile ..... Evanston
Delegate, Shirley Etzell ..... Lander

Mail all correspondence to:
Shirley Etzell
26 Gulch Creek Road
Lander, WY 82520
307.332.6629

UpDates

Steven McWilliams Joins Walker Stainless Equipment as Chief Engineer of Transportation Group

Walker Stainless Equipment Co., Inc., is pleased to announce the appointment of Steven McWilliams to the position of Chief Engineer of Transportation Group.

McWilliams comes to Walker with over ten years experience as Transportation Engineer. He has serviced the industry while at Kronert Manufacturing and other transportation-related companies. Steve is an ASME Member with an engineering degree from Purdue University.

McWilliams will be responsible for sanitary, food grade and chemical transportation products.

Osmonics Announces New General Manager for Operations in Upland

Osmonics, Inc. announced that Gary Shushnar has been appointed the new General Manager for Osmonics' operations in Upland, CA.

Shushnar comes to Osmonics with a strong background in manufacturing, finance, planning and engineering. Prior to joining Osmonics, Shushnar had been directing Pacific Intertech, Inc., an international semiconductor material supply and consulting firm in California. He has also held many management positions with Siemens Solar Industries in his 15-year career with this company, including the positions of Controller, Director of Manufacturing Administration, and Director of Marketing. Prior to Siemens, Shushnar was an Electrical Engineer with several engineering construction companies. Shushnar holds an MBA from UCLA, a BSEE from Carnegie-Mellon, and is a licensed Professional Engineer in California and Pennsylvania.

New Vice President of Manufacturing Appointed by Captive Plastics

Captive Plastics Inc. has recently appointed Les Herold as Vice President of Manufacturing.

Mr. Herold brings with him 14 years of experience in engineering and manufacturing. Prior to joining the team at Captive Plastics, he held the position of Vice President of Manufacturing in North America for Zeller Plastik, a specialty injection molder. Mr. Herold earned his B.S. in chemical engineering from the University of Illinois.

AIB Doubles Professional Safety Staff

AIB's Department of Occupational Safety Education continues to grow with the addition of two new occupational safety auditors, Steven Hicks and Mitchel Krenz.

Hicks and Krenz join AIB Safety Director Jon Anderson and Jim Orth and expand AIB safety's ability to provide occupational safety auditing for OSHA compliance and safety training to employees in the food industry.

Hicks has ten years experience in occupational safety, environmental compliance, and health program management. He is certified as an instructor for the OSHA 501 training courses and for the OSHA Hazardous Waste Operations Emergency Response. Hicks graduated from Central Missouri State University, Warrensburg, MO, with a BS in industrial safety. He has 10 years experience as an OSHA Trainer and Safety Auditor with Quaker Oats Co. Hicks will be based in St. Joseph, MO.

Krentz has three years experience in occupational safety in major industries. A graduate of Western Illinois University, Macomb, IL, with a degree in occupational and industrial safety, Krentz also has OSHA General Industry Certification from the U.S. Department of Labor. Krentz will be based in Chicago, IL.

Mike Larson Joins Walker Stainless Equipment as Transportation Operations Manager

Walker Stainless Equipment Co., Inc., is pleased to announce the promotion of Mike Larson to the position of Transportation Operations Manager.

Larson has served Walker with 14 years experience in supervisory, purchasing, production and facilities management. He has six years of design engineering experience on the plant floor and his engineering degree is from University of Wisconsin - Platteville.

Larson will be responsible for transportation fabrication, parts management and transportation services. For complete information contact Walker Stainless Equipment Company.

Court Decides on Meat and Poultry Regulation Inequities

On July 23, 1997, the U.S. District Court for the Southern District of Iowa issued its opinion in Kenney vs. Glickman, a case filed by six beef producers three years ago alleging that the Food Safety and Inspection Services (FSIS) regulations permitting moisture absorption during the chilling of poultry carcasses violated the Poultry Product Inspection Act (PPIA). The judge ruled that USDA's regulation that allows for water to be added to poultry up to 8 to 9 percent is arbitrary and capricious. The court found that the moisture limits for whole birds were invalid because the agency, when adopting the regulations in 1970, failed to provide an adequate justification for why the particular limits were selected, why the limits cannot be reduced, and why the regulations were different than those applicable to red meat products. USDA lawyers, agency officials and Justice Department lawyers are reportedly taking the position that if the water limits are arbitrary and capricious, then there are no limits to the amount of absorption for the purpose of chilling. When NMA Directors met with FSIS Administrator Tom Billy in Washington, D.C. last April, Billy indicated that FSIS was preparing a proposal to be released by year's end that would allow water to be added to both meat and poultry for food safety purposes. Such product would be subject to proper labeling. The court ruled in favor of Secretary of Agriculture Dan Glickman on two other issues: (1) The absorption of moisture during chilling does not render the carcasses adulterated, deferring to the agency's interpretation of the PPIA, and (2) the failure to declare the presence of absorbed moisture on product labels does not render the poultry products misbranded, again deferring to the agency's interpretation of the PPIA.

NEWS

Outbreak of a Rare Phage Type (DT124) of *Salmonella typhimurium* in Finland

Investigators at the National Public Health Institute in Finland are keen to learn of any outbreaks and isolations of *Salmonella typhimurium* DT124 in other European countries, because of the rarity of this phage type in Finland and the possibility that it has been introduced through, for example, an imported animal feed. An outbreak of acute gastrointestinal illness was reported on 1 August among participants who had attended the national game shooting competition held from 21 to 27 July in northern Finland. There were 2,500 participants registered plus an unidentified number, as yet, of accompanying family members. The first case became ill on 27 July and clusters of patients were notified from several geographically distinct places. Preliminary inquiries made to the Game Shooting Union network revealed that some 100 people had gastroenteritis. Initial questioning has revealed that only participants (about 200) who attended an event in the evening of 26 July, where only two roasted whole pigs and beer were served, became ill. The pigs had been kept in a cool room for two days after slaughtering until they were transported to the site on 26 July where they were roasted and served. So far, some 10 stool specimens have been collected for microbiological examination from clusters of patients seeking medical care in various places in Finland. *S. typhimurium* DT124 has been cultured from four stool specimens. This phage type is very rare in Finland. Samples have been taken from the remnants of one of the roasted pigs served in the evening, as well as from a third, which was slaughtered and transported but has been kept frozen since the event.

Launch of the English Version of Dr. Pierre Gélinas's Book "Répertoire Des Micro-organismes Pathogènes"

No one is safe from food poisoning. Most cases are benign, but the presence of microbial pathogens in food may pose a serious health risk. Prevention begins with a knowledge of our microbial foes and the means available to keep them from "bugging" us in our everyday lives.

Previously published in the original French, the *Handbook of Foodborne Microbial Pathogens* (Répertoire des microorganismes pathogèns transmis par les aliments) is now available in English thanks to a copublishing arrangement between Polyscience and the Governors' Foundation. The *Handbook* describes the main microbial pathogens according to their incidence and the threat they pose to public health. Bacteria, viruses, protozoans, worms, algae and moulds are all clearly and understandably catalogued in the *Handbook*, as well as the illnesses they generally cause and the specific prevention and control measures that can be taken against them.

The author, Dr. Pierre Gélinas, holds a master's and a doctorate in food science and technology from

Laval University. He is a Researcher at Agriculture and Agri-Food Canada's Food Research and Development Centre (FRDC) in St-Hyacinthe. The English version can be ordered from Polyscience Publications Inc., Morin Heights, Quebec, Canada.

The Governors' Foundation promotes technological innovation in the food industry by supporting food science and technology research and development projects. The Food Research and Development Centre gives firms in the food and beverage sector access to pilot facilities as well as the technical and scientific support they need to carry out their research and development work.

For more information, please contact: Pierre Gélinas, Researcher, FRDC, Phone: 514.773.1105 or refer to the Internet at *http://fondgouv.qc.ca/gelinas.htm.*

To order: Polyscience Publications Inc., P.O. Box 148, Morin Heights, Quebec J0R 1H0, Phone: 514.226.5870, 800.840.5870, Fax: 514.226.5866, E-mail: *polysci @ietc.com.*

Salmonella Live Vaccine

A biologist at Washington University in St. Louis has developed a live vaccine that should greatly decrease the incidences of food poisoning and deaths in humans infected by *Salmonella* bacteria. Roy Curtiss III, Ph.D., George William, and Irene Koechig Freiberg Professor of Biology at Washington University, have genetically engineered the most common strain of *Salmonella* infecting chickens and developed it as an oral vaccine to be given to poultry. Curtiss deleted two key genes in the strain *Salmonella typhimurium* UK-1; the deletion weakens the bacteria, allowing it in vaccine form to induce an immune response in a chicken without making the bird sick.

When given a dose of the vaccine, either as a spray or in drinking water, newborn chicks, breeders and laying hens develop a lifelong immunity to *Salmonella*. The immunity in both breeders and laying hens is transferred to offspring and eggs that people consume. The vaccine is in its final stage of testing by scientists at Megan Health, Inc., in St. Louis. The United States Department of Agriculture (USDA) is expected to license the vaccine by the end of 1997. Megan's vaccine will be the first *Salmonella* vaccine for poultry marketed in the United States. Curtiss reported the results in testing this vaccine July 29, 1997, at the International Veterinary Vaccines and Diagnostics Conference held in Madison, WI.

When virulent bacteria are introduced into an organism, a fight ensues between the bacteria and the host's immune system. "By deleting the genes, we make sure that the *Salmonella* has its hands tied behind its back," Curtiss explains. "With those two genes, the *Salmonella* could defend itself against the chicken's natural host defense system, its antibodies, and possibly kill the bird. But by giving the bird the weakened strain contained in the vaccine, the bird always wins."

Bigger winners in this development are American consumers and the poultry industry. There are higher incidences of *Salmonella* poisoning reported in recent years, and there is increasing evidence that *Salmonella* bacteria are becoming resistant to antibiotics. *Salmonella* poses the greatest risk for very young children, the elderly and people with compromised immune systems, such as AIDS patients. A notoriously underreported disease, *Salmonella* infection is diagnosed about 40,000 times yearly in the United States, although experts believe that nearly four million people annually become sickened by *Salmonella*. Consuming undercooked eggs and raw eggs used in dressings and condiments are the most common avenues of infection. But the bacteria also are harbored in chickens that elude inspection and make it to the grocery store.

Salmonella bacteria also invade swine and cattle herds, and Curtiss is working on different strains of *Salmonella* to come up with vaccines for those animals. A hallmark of his vaccine is that it is oral and designed to stimulate all three lines of defense; the secretory immune system, which protects the gastrointestinal tract, lungs and genital and urinary organs; the blood, which sends antibodies to fight toxins; and specialized killer cells. Most vaccines are injected and trigger only the second and third lines of defense. In a related development, Curtiss announced the success of a recombinant vaccine that uses the weakened *Salmonella* vaccine as a carrier to immunize chickens against another profit-robbing disease in poultry, *Escherichia coli* . This vaccine has been designed and constructed by Megan Health, Inc., Scientist Kenneth Roland using some recombinant *Salmonella* clones from the Curtiss laboratory. This vaccine presents a one-two combination that immunizes chickens against both *Salmonella* and *E. coli*, certain strains of which cause respiratory disease in poultry. The virulent strains are called avian pathogenic *E. coli* (APEC). They hurt producers in production units, where the sick birds spread the disease and die, and at the processing plants, where *E. coli*-infected carcasses are condemned by inspectors. Each year, millions of chickens are lost to *E. coli.*

"We're able to take the genetically engineered *Salmonella* strain and make it express some proteins and other properties from APEC, which imparts immunity to APEC as well," Curtiss says. "The recombinant vaccine is approaching its final round of construction and efficacy testing at Megan Health, and we're

anticipating USDA approval on it in a couple of years." In his 17 years working with *Salmonella* vaccines, Curtiss has used the recombinant approach with *Salmonella* to research vaccines that would provide immunity to malaria, typhoid fever, leprosy and many livestock diseases. Such vaccines would be especially welcome in Third World countries, where these diseases still are common, because they can be taken orally and do not require refrigeration.

New Nationwide DFSR Fax Broadcast System

Dial the FAX-ON-DEMAND number above, and follow the voice prompts.

You may request an index of available documents (up to four documents at one time). Currently we have about 60 documents in the system, including FDA Press Releases, Talk Papers, Enforcement Reports, industry newsletters and other documents. As new interests and needs develop, we anticipate the list of current categories and documents will grow.

A new nationwide DFSR FAX Broadcast System has also instituted. This will FAX emergency/priority messages to specific program groups, e.g., State Boards of Pharmacy, State Health Commissioners, State Food Program Directors, etc. It will be used in conjunction with the new DFSR FAX-on-demand system.

The existing NRSTEN system will be totally replaced by these new communications systems. We will advise you in advance when they are fully operational. Many of you will be contacted soon with test messages and brief surveys as we fine tune the new systems. We will be sending test messages to one program group at a time to confirm the accuracy of the FAX numbers entered into the database. In the meantime, we ask for your patience and cooperation as we implement these new changes. Any questions may be directed to Bob Racer or Carl Vassar here in DFSR 301.443.6200, or Fax: 301.443.2143.

Video Explains How to Avoid the Potholes of Poor Groundwater Protection

Should you be concerned about the quality of your groundwater? How can a community best keep the water supply safe from contamination? A new video from Penn State's College of Agricultural Sciences can help answer these questions.

The Groundwater Protection Action Group: A Roadtrip to Success is the third educational video in a four-part series about protecting water resources. The video takes viewers on a road trip with the fictional Riley family as they learn four ways to make a groundwater protection action group successful.

The 23-minute video covers how groups can develop useful maps, create land use, and contaminant inventories, choose protection strategies, and monitor groundwater protection programs.

This video is aimed at water supply officials, public educators, cooperative extension personnel, municipal planning officials, school children, and older students, and community special interest groups.

Technical advisers for the project included Robillard; William Sharpe, Professor of forest hydrology; and Charles Abdalla, Associate Professor of agricultural economics and Co-director of the Pennsylvania Groundwater Policy Education Project.

The video series is funded by Penn State's College of Agricultural Sciences and the Department of Agricultural and Biological Engineering. Production services were provided by Shelow-Porterfield Productions of Boalsburg.

For an order form or more information about these videos or groundwater, contact the Department of Agricultural and Biological Engineering, The Pennsylvania State University, 246 Agricultural Engineering Building, University Park, PA 16801; Phone: 814.865.7685; Fax: 814.863.1031. People with Internet access can visit the department's site on the World Wide Web: http://server.age.psu.edu/.

Osmonics Debuts Expanded Web Site www.osmonics.com

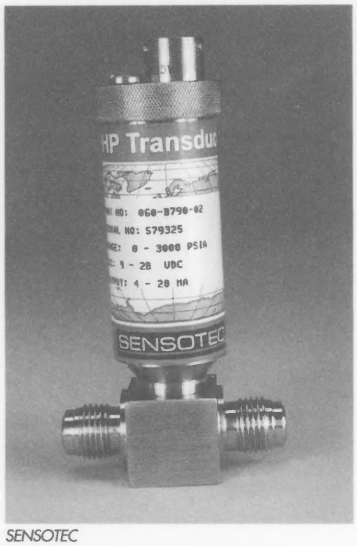
Osmonics has expanded its Web site to make it more information-packed. Visitors to the site can go directly to a specific section by clicking on the respective button. Along with the indepth Product section with over 1,000 pages, the site also features a new Technology section. Included in this section is the second edition of the *Pure Water Handbook*.

The Web site also includes an Employment section whereby interested applicants can click to find open positions by location or by department. The Finance section offers the latest quarterly shareholder reports and the complete 1996 annual report. On-line press kits and a list of upcoming events (including trade shows) are available in the What's New section.

Most of the information offered may be printed, while other information can be ordered on-line.

See us on the Web at www.osmonics.com; Phone: 800.848.1750; Fax: 612.933.0141; or write to: Osmonics, 5951 Clearwater Dr., Minnetonka, MN 55343-8995.

Industry**Products**



SENSOTEC

UHP Pressure Transducers

SENSOTEC announces a new family of pressure transducers for Ultra-High Purity gas applications. The Model UPF Flow Through Pressure Transducer sets new standards for stability, reliability, and accuracy for demanding UHP applications in the semiconductor industry. The true flow-through design has an internal surface finish of <7Ra with zero dead volume and no weld seams. We precisely machine the body and fittings of the Model UPF from a single piece of high quality 316L VAR stainless steel making this rugged unit largely immune to stresses from vibration or torque applied to the transducer body during installation.

The sensor electronics are hermetically sealed at full vacuum with a welded header which provides more stable output and secondary containment for added safety. The field-replaceable amplifier provides 0-5 VDC or 4-20 mA output and meets U.S. and CE standards for EMI, RFI, and ESD immunity.

The Model UPF provides stable +/- 0.18% FS accuracy and full scale ranges from as low as 0-100 psi up to 0-3000 psi. The transducer is available with either 1/4" tube stubs or face seal connections for easy integration into new or existing gas stick, gas panel, and gas cabinet designs.

SENSOTEC, Inc., Columbus, OH

Reader Service No. 310

New 3M Electronic Pipettor Takes the Effort Out of Pipetting

Food processors will find that microbial testing is even easier and more efficient with the use of 3M's new Electronic Pipettors and sample-ready 3M Petrifilm Plates.

The 3M Electronic Pipettor is pre-programmed to perform direct pipetting and the most common dilutions used with Petrifilm plates. Automated features make the 3M Electronic Pipettor simple to operate, help reduce the risk of human error, and provide precise handling for small volumes of liquids.

The lightweight, ergonomic design of the 3M Electronic Pipettor makes it comfortable to use, especially for technicians with smaller hands and those prone to the repetitive strain injuries that can be experienced with manual pipetting. A simple click of the thumb is all it takes to operate.

The 3M Electronic Pipettor – 1 mL meets the American Public Health Association "Standard Methods for the Examination of Dairy Products" pipette accuracy criteria. It also is available in 5 mL size. The cordless electronic pipettor comes with a rechargeable battery and a magnetically mounted stand for convenient storage and recharging.

3M Pipettor Tips can be purchased separately. They feature a wide mouth to help improve accuracy and reduce the risk of becoming clogged with food particles. Both 1 mL and 5 mL tips can be purchased in bulk or racks.

3M, St. Paul, MN

Reader Service No. 311

Isolation and Detection of *Salmonella* in One Step

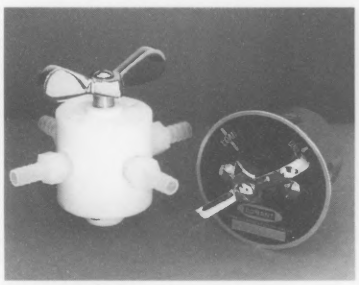
Introducing Rainbow® Agar Salmonella, a selective culture medium which allows for the isolation and detection of *Salmonella* spp. in one step within 16 to 24 h. This new medium is an addition to Biolog's line of Rainbow products, joining Rainbow® Agar O157.

Rainbow Agar Salmonella is superior in performance to all other *Salmonella* culture media currently in use, including Hektoen Enteric Agar, XLD Agar, and XLT4 Agar. *Salmonella* colonies grow as characteristic black colonies on this clear medium. The *Salmonella* colonies are easily detected even in areas of mixed and heavy growth. Rainbow Agar Salmonella also detects the more difficult species of *Salmonella* such as *S. typhi*, *S. paratyphi C*, and *S. choleraesuis* that are often missed on other media. The enhanced capabilities of this medium are based upon an improved chemistry of the classic trait of *Salmonella* spp. to produce hydrogen sulfide. This improvement along with less toxic selective agents allows the detection of even weak hydrogen sulfide producing *Salmonella* strains.

Rainbow Agar is extremely easy to use and allows the laboratories to culture *Salmonella* directly from a wide variety of specimens. Incubation conditions are the same as that of traditional culture media.

Biolog, Inc., Hayward, CA

Reader Service No. 312



Conant Controls, Inc.

Teflon® Selector Valves Withstand Chemicals, High Temperatures

A new line of 2 to 12-way Teflon® selector valves for use in instrumentation and equipment requiring chemical resistance and the ability to operate over a wide temperature range is being introduced by Conant Controls, Inc. of Medford, MA.

Conant ChemSelect™ Teflon® Selector Valves feature all virgin PTFE wetted parts which are impervious to moisture, chemically inert, and operate at up to 450°F and 120 psi pressure. Designed to simplify piping arrangements and the potential for leakage, these panel mount selector valves come in 2 to 12-way configurations, depending upon size.

Capable of performing multiple mixing, venting, and flow directing functions within a single valve body, Conant ChemSelect™ Teflon® Selector Valves can be supplied with 1/16" to 1/2" NPT ports. Customized name plates are optional and other materials of construction can include various engineering plastics, stainless steels, and alloys.

Conant ChemSelect™ Teflon® Selector Valves are priced according to mixing configuration and quantity.

Conant Controls, Inc., Medford, MA

Reader Service No. 313

Fast Loop Sample Filters

A new, line of Balston® stainless steel sample filters designed specifically to protect process analyzers and monitoring equipment are now available from Whatman, Inc.

The models 31S6, 31G, 41S6, 41G, and the 91S6 remove solids and liquids from gases with 99.99% efficiency at 0.01 µm, and solid particulate removal from liquids to .2 µm. These filters protect analyzers from sample impurities which are the most frequent cause of maintenance problems for instruments in an industrial environment.

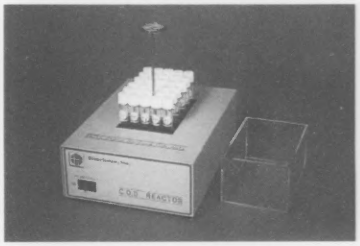
These new filters are lower in cost than the Balston conventional stainless steel filter line. They are also more compact in design resulting in a smaller internal volume and faster sampling times.

The new improved design requires no tools to change the filters. Other design features include 1/2" NPT ports, maximum temperature of up to 400°F, and maximum pressure of up to 500 psig.

To satisfy the extremely wide range of requirements for analyzer sample filters, Whatman also supplies complete lines of Balston filter housings in teflon®, monel, and other corrosion-resistant materials, plus a choice of high-efficiency filter elements which are inert to virtually all liquids and gases.

Whatman, Inc., Haverhill, MA

Reader Service No. 314



Bioscience, Inc.

New Expanded COD Reactor Capacity

For laboratories doing a large number of micro-COD analyses, Bioscience, Inc. now offers an expanded 30-tube reactor. The company's standard reactor holds fifteen 16-mm diameter tubes.

The new heater block is specially designed for the digestion of COD samples, provides an accurate digestion temperature of 150°C for a two-hour period, and is equipped with a plastic safety shield. It is compatible with all commonly used micro-COD vials.

The EPA-accepted COD test system is built around premixed reagents in twist-cap vials. The cap is removed and either 2.5 ml

(standard) or 0.5 ml high range of the sample is added to the vial. The cap is replaced and the sample and reagents digested for two hours in the reactor. The results are then determined via titration or in a spectrophotometer.

Three test ranges of reagents are available for low (5 - 150 mg/1 COD), standard (20 - 900 mg/1 COD) and high (100 - 4500 mg/1 COD) concentrations. Reagents for low and standard ranges can also be provided in mercury-free form. A convenient COD Data Management Software System automates data collection, quality control, record keeping and report writing.

Bioscience, Inc., Bethlehem, PA

Reader Service No. 315

Dilution Vials

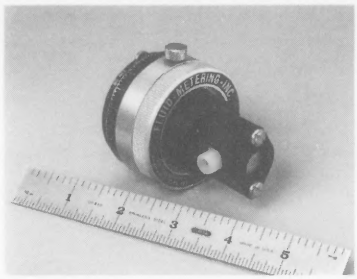
The Dilulok dilution vials by Hardy Diagnostics makes serial dilutions a breeze. Filled to 90 or 99 mls with Butterfield's Phosphate Buffer, the Dilulok will save you time and money. Manufactured to meet AOAC, FDA, APHA and USDA guidelines, pH 7.2 +/- 0.2, 99 mls +/- 2 mls, and manufactured in a clean room environment to prevent bacterial contamination. Flip-top lid allows you to open the vial with one hand. Wide mouth opening accommodates larger samples. The Dilulok is also offered with Phosphate Buffer with Magnesium Chloride or Peptone Water 1%.

Hardy Diagnostics, Santa Maria, CA

Reader Service No. 316

New Ultra Low-Flow Pump Heads for Zero Dead Volume Applications

The New LF (Low Flow) Pump Heads and Q661 Small Bore Tubing Kits from Fluid Metering, Inc. (FMI) feature standard wetted materials of Ceramic and Fluorocarbon which provides an excellent, chemically resistant fluid path and millions of trouble-free cycles. Flow rates are available from 0 to 0.10 and 0 to 0.72 milliliters per stroke (dependent on the pump head) with repeat accuracy of better than 0.1%.



Fluid Metering, Inc.

The New LF Heads feature integrally molded ¼-28 female low dead volume ports, which allows for quick connections of 1/16" or 1/8" O.D. micro bore tubing and fittings like those provided in FMI's Q661 Small Bore Tubing Kit which include 10 fittings along with 10 feet of tubing.

The LF option is available at no additional cost on FMI "H" and "Q" style pump heads.

Fluid Metering, Inc., Syosset, NY

Reader Service No. 317

In-Line UV Disinfection for Food Processing Applications

Now available from Aquionics, the in-line ultraviolet disinfection system provides powerful non-chemical disinfection of process and storage water in food processing applications.

Aquionics' in-line system utilizes multiwave ultraviolet lamps which drastically reduce the size of the treatment chamber and allow the unit to be positioned perpendicular to the path of the water. This makes it simple to retrofit into existing piping, even in areas with strict space requirements.

With a wide spectrum of wavelenghts, the multiwave lamp acts not on just the DNA, but also on the cell membranes, proteins, lipids, and enzymes of microorganisms providing complete microbial control. Aquionics' in-line system also reduces the formation of chemical by-products.

Available options include a UV sensor that constantly monitors the UV intensity of the system to complement a quality insurance plan and a wiper mechanism that automatically cleans the UV lamps without worker interruption.

Aquionics, Erlanger, KY

Reader Service No. 318

Vidas® Immunoanalysis System Offers Simplicity, Rapidity, Reliability

bioMérieux Vitek offers VIDAS®, a fully-automated immunoanalysis system for food pathogen microbiology testing. VIDAS allows quality assurance, quality control (QA/QC) personnel to rapidly and economically inspect food samples for *E. coli* O157, *Salmonella*, *Listeria*, *Listeria monocytogenes*, *Campylobacter* and Staphylococcal entertoxins A-E.

Designed for direct antigen detection, VIDAS utilizes ELFA (Enzyme-Linked Fluorescent Assay) technology to automatically screen enriched samples for pathogens. Five, six-test sections are available for use to test from one to 30 samples at a time. Additional readers can be added to increase testing capacity. The closed reagent/sample system ensures technologist and laboratory safety.

bioMérieux Vitek, Hazelwood, MO

Reader Service No. 319

BusinessExchange

Services/Products

RISK ANALYSIS SCIENTIST

The U.S. Department of Agriculture, Food Safety and Inspection Service, Office of Public Health and Science, Epidemiology and Risk Assessment Division, has a Risk Analysis Scientist position to be filled at the GS-14 level. The incumbent must possess a skill in performing quantitative microbial risk assessment in order to accomplish microbial risk and cost-benefit analyses related to food safety and public health. Applicants must call (202) 720-8601 to request a copy of vacancy announcement number FSIS-97-20A for the eligibility requirements, summary of duties, and procedures on how to apply for this position. Complete applications must be postmarked no later than October 14, 1997. This is a reannouncement of FSIS-97-20, previous appplicants need not reapply. USDA is an Equal Opportunity Employer.

ASSISTANT PROFESSOR OF FOOD SCIENCE (MUSCLE FOODS) COLLEGE OF AGRICULTURAL SCIENCES, PENN STATE

The Department of Food Science seeks applicants for the position of Assistant Professor of Food Science in the area of processing and manufacturing of muscle foods with emphasis in food safety. This tenure track position has a 30% research and 70% extension responsibility. The individual will be expected to establish and maintain a strong extension program in the processing and manufacturing of muscle foods (primarily poultry, beef, and pork) with an emphasis on food safety. The individual will communicate effectively with clientele in person and via distance education technologies. The individual will be expected to establish and maintain an externally funded research program that focuses on problem-solving food safety research relevant to the muscle foods processing/manufacturing industry. Applicants must have an earned doctorate in food science or related field with strong background in food microbiology. Experience with microbial foodborne pathogens and muscle foods processing is highly desirable. A competitive salary, commensurate with qualifications and experience, and including an attractive benefits package is available. The closing date for applications is November 1, 1997, or until a suitable candidate is found. Anticipated starting date is January 1, 1998, or as negotiated. Applicants should submit a letter of application, resume, academic transcripts, statement of research and extension interests (including interest and experience in HACCP and distance education) and the names and addresses of three professional references to: Dr. Stephen J. Knabel, 106 Borland Lab, Box MD, The Pennsylvania State University, University Park, PA 16802. An Affirmative Action/Equal Opportunity Employer. Women and Minorities Encouraged To Apply.

Dairy, Food and Environmental Sanitation, Vol. 17, No. 9, Pages 598-604

IAMFES Lending Library

DAIRY

- **The Bulk Milk Hauler: Protocol & Procedures**–(8 minute videotape). Teaches bulk milk haulers how they contribute to quality milk production. Special emphasis is given to the hauler's role in proper milk sampling, sample care procedures, and understanding test results. (Iowa State University Extension-1990)
- **Causes of Milkfat Test Variations and Depressions**–(30 minute-140 slides-tape-script). This set illustrates the many factors involved in causing milkfat test variations or depressions in your herd, including feeding, management, stage of lactation, age of samples, handling of samples, and testing procedures. The script was reviewed by field staff, nutritionists, laboratory personnel and county extension staff. It is directed to farmers, youth and allied industry. (Penn State-1982)
- **Cold Hard Facts**–This video is recommended for training personnel associated with processing, transporting, warehousing, wholesaling and retailing frozen foods. It contains pertinent information related to good management practices necessary to ensure high quality frozen foods. (National Frozen Food Association-1993)
- **Ether Extraction Method for Determination of Raw Milk**–(26 minute videotape). Describes the ether extraction procedure to measure milkfat in dairy products. Included is an explanation of the chemical reagents used in each step of the process. (CA-1988)
- **The Farm Bulk Milk Hauler**–(30 minute-135 slides-tape-script). This set covers the complete procedure for sampling and collecting milk from farms. Each step is shown as it starts with the hauler entering the farm lane and ends when he leaves the milk house. Emphasis is on universal sampling and automated testing. Funds to develop this set were provided by The Federal Order #36 Milk Market Administrator. (Penn State-1982)
- **Frozen Dairy Products**–(27 minute videotape). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients; emphasis is on what to look for in a plant inspection. Everything from receiving, through processing and cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA-1987) – Reviewed 1997.
- **The Gerber Butterfat Test**–(7 minute videotape). Describes the Gerber milkfat test procedure for dairy products and compares it to the Babcock test procedure. (CA-1990)
- **High-Temperature, Short-Time Pasteurizer**–(59 minute videotape). Provided by the Dairy Division of Borden, Inc. It was developed to train pasteurizer operators and is well done. There are seven sections with the first covering the twelve components of a pasteurizer and the purpose and operation of each. The tape provides the opportunity for discussion after each section or continuous running of the videotape. Flow diagrams, processing and cleaning are covered. (Borden, Inc.-1986) – Reviewed 1997.
- **The How and Why of Dairy Farm Inspections**–(15 minute-110 slides-tape-script). This was developed at the request of seven northeast dairy cooperatives and with their financial support. Emphasis is on clean cows, facilities and equipment and following proper procedures. Regulatory agencies cooperated in reviewing the script and taking pictures. This was developed for farmers, youth and allied industry. (Penn State-1984)
- **Mastitis Prevention and Control**–(2-45 minute videotapes). This video is ideal for one-on-one or small group presentations. Section titles include: Mastitis Pathogens, Host Defense, Monitoring Mastitis, Mastitis Therapy, Recommended Milking Procedures, Postmilking Teat Dip Protocols, Milk Quality, Milking Systems. (Nasco-1993)
- **Milk Plant Sanitation: Chemical Solution**–(13 minute videotape). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titrations are reviewed... alkaline wash, presence of chlorine and iodophor, and caustic wash and an acid wash in a HTST system. Emphasis is also placed on record keeping and employee safety. (1989)
- **Milk Processing Plant Inspection Procedures**–(15 minute videotape). Developed by the California Department of Food and Agriculture. It covers pre- and post-inspection meeting with management, but emphasis is on inspection of all manual and cleaned in place equipment in the receiving, processing and filling rooms. CIP systems are checked along with recording charts and employee locker and restrooms. Recommended for showing to plant workers and supervisors. (CA-1986)

- **Pasteurizer: Design and Regulation**–(16 minute videotape). This tape provides a summary of the public health reasons for pasteurization and a nonlegal definition of pasteurization. The components of an HTST pasteurizer, elements of design, flow-through diagram and legal controls are discussed. (Kraft General Foods-1990)

- **Pasteurizer Operation**–(11 minute videotape). This tape provides a summary of the operation of an HTST pasteurizer from start-up with hot water sanitization to product pasteurization and shut-down. There is an emphasis on the legal documentation required. (Kraft General Foods-1990)

- **Processing Fluid Milk**–(30 minute-140 slides-script-tape). It was developed to train processing plant personnel on preventing food poisoning and spoilage bacteria in fluid dairy products. Emphasis is on processing procedures to meet federal regulations and standards. Processing procedures, pasteurization times and temperatures, purposes of equipment, composition standards, and cleaning and sanitizing are covered. Primary emphasis is on facilities such as drains and floors, and filling equipment to prevent post-pasteurization contamination with spoilage or food poisoning bacteria. It was reviewed by many industry plant operators and regulatory agents and is directed to plant workers and management. (Penn State-1987)

- **Safe Milk Hauling–You're the Key**–(34 minute videotape). Recommended for anyone who samples, measures and collects milk from dairy farms. The purpose of this tape is to acquaint milk handlers with the proper procedures for sampling and picking up milk at the farm and delivering it safely to the handling plant. This tape provides an excellent review for experienced milk haulers and shows step-by-step procedures for novice milk haulers. (Cornell University)

- **3-A Symbol Council**–(8 minute videotape). A video which was developed to make people in the dairy and food industries aware of the 3-A program and its objectives.

- **10 Points to Dairy Quality**–(10 minute videotape). Provides in-depth explanation of a critical control point in the residue prevention protocol. Illustrated with on-farm, packing plant, and milk-receiving plant scenes as well as interviews of producers, practicing veterinarians, regulatory officials and others. (Dairy Quality Assurance-1992)

FOOD

- **Close Encounters of the Bird Kind**–(18 minute videotape). A humorous but in-depth look at *Salmonella* bacteria, their sources, and their role in foodborne disease. A modern poultry processing plant is visited, and the primary processing steps and equipment are examined. Potential sources of *Salmonella* contamination are identified at the different stages of production along with the control techniques that are employed to insure safe poultry products. (Topek Products, Inc.)

- **Food Irradiation**–(30 minute videotape). Introduces viewers to food irradiation as a new preservation technique. Illustrates how food irradiation can be used to prevent spoilage by microorganisms, destruction by insects, overripening, and to reduce the need for chemical food additives. The food irradiation process is explained and benefits of the process are highlighted. (Turnelle Productions, Inc.)

- **Food Safe-Food Smart-HACCP and Its Application to the Food Industry**–(2-16 minute videotapes). (1)-Introduces the seven principles of HACCP and their application to the food industry. Viewers will learn about the HACCP system and how it is used in the food industry to provide a safe food supply. (2)-Provides guidance on how to design and implement a HACCP system. It is intended for individuals with the responsibility of setting up a HACCP system. (Alberta Agriculture, Food and Rural Development)

- **Food Safe-Series I**–(4-10 minute videotapes). (1) "Receiving & Storing Food Safely," details for food-service workers the procedures for performing sight inspections for the general conditions of food, including a discussion of food labeling and government approval stamps. (2) "Food-service Facilities and Equipment," outlines the requirements for the proper cleaning and sanitizing of equipment used in food preparation areas. Describes the type of materials, design, and proper maintenance of this equipment. (3) "Microbiology for Food-service Workers," provides a basic understanding of the microorganisms which cause food spoilage and foodborne illness. This program describes bacteria, viruses, protozoa, and parasites and the conditions which support their growth. (4) "Food-service Housekeeping and Pest Control," emphasizes cleanliness as the basis for all pest control. Viewers learn the habits and life cycles of flies, cockroaches, rats, and mice. (Perennial Education-1991)

- **Food Safe—Series II**–(4-10 minute videotapes). Presents case histories of foodborne disease involving (1) *Staphylococcus aureus,* (sauces) (2) *Salmonella,* (eggs) (3) *Campylobacter,* and (4) *Clostridium botulinum.* Each tape demonstrates errors in preparation, holding or serving food; describes the consequences of those actions; reviews the procedures to reveal the cause of the illness; and illustrates the correct practices in a step-by-step demonstration. These are excellent tapes to use in conjunction with hazard analysis critical control point training programs. (Perennial Education-1991)

- **Food Safe—Series III**–(4-10 minute videotapes). More case histories of foodborne disease. This set includes (1) Hepatitis "A", (2) *Staphylococcus aureus* (meats), (3) *Bacillus cereus*, and (4) *Salmonella* (meat). Viewers will learn typical errors in the preparation, holding and serving of food. Also included are examples of correct procedures which will reduce the risk of food contamination. (Perennial Education-1991)

- **Food Safety is No Mystery**–(34 minute videotape). This is an excellent training visual for food-service workers. It shows the proper ways to prepare, handle, serve and store food in actual restaurant, school and hospital situations. A policeman sick from food poisoning, a health department sanitarian, and a food-service worker with all the bad habits are featured. The latest recommendations on personal hygiene, temperatures, cross-contamination, and storage of foods are included. (USDA-1987). Also available in Spanish.

- **Food Safety: For Goodness Sake, Keep Food Safe**–(15 minute videotape). Teaches foodhandlers the fundamentals of safe food handling. The tape features the key elements of cleanliness and sanitation, including: good personal hygiene, maintaining proper food product temperature, preventing time abuse, and potential sources of food contamination. (Iowa State University Extension-1990)

- **Food Safety: You Make the Difference**–(28 minute videotape). Through five food workers from differing backgrounds, this engaging and inspirational documentary style video illustrates the four basic food safety concepts: handwashing, preventing cross-contamination, moving foods quickly through the danger zone, and hot/cold holding (Seattle-King County Health Department-1995)

- **GMP: Personal Hygiene and Practices in Food Manufacturing**–(14 minute videotape). This video focuses on the personal hygiene of food-manufacturing workers, and explores how poor hygiene habits can be responsible for the contamination of food in the manufacturing process. This is an instructional tool for new food-manufacturing line employees and supervisors. It was produced with "real" people in actual plant situations, with only one line of text included in the videotape. (Penn State-1993)-(Available in Spanish and Vietnamese)

- **GMP: Sources and Control of Contamination During Processing**–(20 minute videotape). This program, designed as an instructional tool for new employees and for refresher training for current or reassigned workers, focuses on the sources and control of contamination in the food-manufacturing process. It was produced in actual food plant situations. A concise description of microbial contamination and growth and cross-contamination, a demonstration of food storage, and a review of aerosol contaminants are also included. (Penn State-1995)

- **HACCP: Safe Food Handling Techniques**–(22 minute videotape). The video highlights the primary causes of food poisoning and emphasizes the importance of self-inspection. An explanation of potentially hazardous foods, cross-contamination, and temperature control is provided. The main focus is a detailed description of how to implement a Hazard Analysis Critical Control Point (HACCP) program in a food-service operation. A leader's guide is provided as an adjunct to the tape. (The Canadian Restaurant & Foodservices Association-1990)

- **Is What You Order What You Get? Seafood Integrity**–(18 minute videotape). Teaches seafood department employees about seafood safety and how they can help insure the integrity of seafood sold by retail food markets. Key points of interest are cross-contamination control, methods and criteria for receiving seafood and determining product quality, and knowing how to identify fish and seafood when unapproved substitutions have been made. (The Food Marketing Institute)

- **Northern Delight–From Canada to the World**–(13 minute videotape). A promotional video that explores the wide variety of foods and beverages produced by the Canadian food industry. General in nature, this tape presents an overview of Canada's food industry and its contribution to the world's food supply. (Ternelle Production, Ltd.)

- **Proper Handling of Peracidic Acid**–(15 minute videotape). Introduces paracidic acid as a chemical sanitizer and features the various precautions needed to use the product safely in the food industry.

- **Purely Coincidental**–(20 minute videotape). A parody that shows how foodborne illness can adversely affect the lives of families that are involved. The movie compares improper handling of dog food in a manufacturing plant that causes the death of a family pet with improper handling of human food in a manufacturing plant that causes a child to become ill. Both cases illustrate how handling errors in food production can produce devastating outcomes. (The Quaker Oats Company-1993.) Also available in Spanish.

- **On the Front Line**–(18 minute videotape). A training video pertaining to sanitation fundamentals for vending service personnel. Standard cleaning and serving procedures for cold food, hot beverage and cup drink vending machines are presented. The video emphasizes specific cleaning and serving practices which are important to food and beverage vending operations. (National Automatic Merchandising Association-1993)

- **On the Line**–(30 minute videotape). This was developed by the Food Processors Institute for training food processing plant employees. It creates an awareness of quality control and regulations. Emphasis is on personal hygiene, equipment cleanliness and good housekeeping in a food plant. It is recommended for showing to both new and experienced workers. (Available in Spanish)

- **100 Degrees of Doom... The Time and Temperature Caper**–(14 minute videotape). Video portraying a private eye tracking down the cause of a *Salmonella* poisoning. Temperature control is emphasized as a key factor in preventing foodborne illness. (Educational Communications, Inc.-1987)

- **Pest Control in Seafood Processing Plants**–(26 minute videotape). Videotape which covers procedures to control flies, roaches, mice, rats and other common pests associated with food processing operations. The tape will familiarize plant personnel with the basic characteristics of these pests and the potential hazards associated with their presence in food operations

- **Principles of Warehouse Sanitation**–(33 minute videotape). This videotape gives a clear, concise and complete illustration of the principles set down in the Food, Drug and Cosmetic Act and in the Good Manufacturing Practices, as well as supporting legislation by individual states. (American Institute of Baking-1993)

- **Product Safety and Shelf Life**—(40 minute videotape). Developed by Borden Inc., this videotape was done in three sections with opportunity for review. Emphasis is on providing consumers with good products. One section covers off-flavors, another product problems caused by plant conditions, and a third the need to keep products cold and fresh. Procedures to assure this are outlined, as shown in a plant. Well done and directed to plant workers and supervisors. (Borden-1987) – Reviewed 1997.

- **Safe Food: You Can Make a Difference**–(25 minute videotape). A training video for food-service workers which covers the fundamentals of food safety. An explanation of proper food temperature, food storage, cross-contamination control, cleaning and sanitizing, and handwashing as methods of foodborne illness control is provided. The video provides an orientation to food safety for professional foodhandlers. (Tacoma-Pierce County Health Department-1990)

- **Safe Handwashing**—(15 minute videotape). Twenty-five percent of all foodborne illnesses are traced to improper handwashing. The problem is not just that handwashing is not done, the problem is that it's not done properly. This training video demonstrates the "double wash" technique developed by Dr. O. Peter Snyder of the Hospitality Institute for Technology and Management. Dr. Snyder demonstrates the procedure while reinforcing the microbiological reasons for keeping hands clean. (Hospitality Institute for Technology and Management-1991)

- **Sanitation for Seafood Processing Personnel**—(20 minute videotape). A training video suited for professional foodhandlers working in any type of food manufacturing plant. The film highlights Good Manufacturing Practices and their role in assuring food safety. The professional foodhandler is introduced to a variety of sanitation topics including: 1) foodhandlers as a source of food contamination, 2) personal hygiene as a means of preventing food contamination, 3) approved food storage techniques including safe storage temperatures, 4) sources of cross-contamination, 5) contamination of food by insects and rodents, 6) garbage handling and pest control, and 7) design and location of equipment and physical facilities to facilitate cleaning.

- **Sanitizing for Safety**–(17 minute videotape). Provides an introduction to basic food safety for professional foodhandlers. A training pamphlet and quiz accompany the tape. Although produced by a chemical supplier, the tape contains minimal commercialism and may be a valuable tool for training new employees in the food industry. (Indiana-1990)

- **Seafood Q & A**—(20 minute videotape). Anyone who handles seafood, from processor to distributor to retail and food service, must be prepared to answer questions posed by customers. This tape features a renowned nutritionist and experts from the Food & Drug Administration, the National Marine Fisheries Service, and the National Fisheries Institute who answer a full range of questions about seafood safety. Excellent to educate and train employees about seafood safety & nutrition. (National Fisheries Institute)

- **SERVSAFE® Serving Safe Food**–(4-20 minute videotapes). This video series illustrates and reinforces important food safety practices in an informative and entertaining manner. The material is presented in an easy to understand format, making it simpler for employees to learn and remember this essential information. Each video includes a leader's guide that provides all the information managers need to direct a productive training session. (Educational Foundation of the National Restaurant Association-1993)

- **SERVSAFE® Serving Safe Food Second Edition**–(6-10 minute videotapes). The program still covers all the major areas of food safety training, but there is an added emphasis on training employees to follow HACCP procedures. The second edition program includes an Employee Guide, Leader's Guide and six instructional videos. (Educational Foundation of the National Restaurant Association-1993)

- **Supermarket Sanitation Program-"Cleaning and Sanitizing"**–(13 minute videotape). Contains a full range of cleaning and sanitizing information with minimal emphasis on product. Designed as a basic training program for supermarket managers and employees. (1989)

- **Supermarket Sanitation Program-"Food Safety"**–(11 minute videotape). Contains a full range of basic sanitation information with minimal emphasis on product. Filmed in a supermarket, the video is designed as a basic program for manager training and a program to be used by managers to train employees. (1989)

- **Take Aim at Sanitation**–(8 minute videotape). This video features tips on food safety and proper disposal of single service items. Also presented is an emphasis on food contact surfaces as well as the manufacture, storage and proper handling of these items. (Foodservice and Packaging Institute, Inc.-1995)

- **Wide World of Food-Service Brushes**—(18 minute videotape). Discusses the importance of cleaning and sanitizing as a means to prevent and control foodborne illness. Special emphasis is given to proper cleaning and sanitizing procedures and the importance of having properly designed and constructed equipment (brushes) for food preparation and equipment cleaning operations. (1989)

- **Your Health in Our Hands-Our Health in Yours**–(8 minute videotape). For professional foodhandlers, the tape covers the do's and don'ts of foodhandling as they relate to personal hygiene, temperature control, safe storage and proper sanitation. (Jupiter Video Production-1993)

ENVIRONMENTAL

- **The ABC's of Clean-A Handwashing & Cleanliness Program for Early Childhood Programs**—For early childhood program employees. This tape illustrates how proper handwashing and clean hands can contribute to the infection control program in daycare centers and other early childhood programs. (The Soap & Detergent Association-1991)

- **Acceptable Risks?**–(16 minute videotape). Accidents, deliberate misinformation, and the rapid proliferation of nuclear power plants have created increased fears of improper nuclear waste disposal, accidents during the transportation of waste, and the release of radioactive effluents from plants. The program shows the occurrence of statistically anomalous leukemia clusters; governmental testing of marine organisms and how they absorb radiation; charts the kinds and amounts of natural and man-made radiation to which man is subject; and suggests there is no easy solution to balancing our fears to nuclear power and our need for it. (Films for the Humanities & Sciences, Inc.–1993)

- **Air Pollution: Indoor**–(26 minute videotape). Indoor air pollution is in many ways a self-induced problem... which makes it no easier to solve. Painting and other home improvements have introduced pollutants, thermal insulation and other energy-saving and water-proofing devices have trapped the pollutants inside. The result is that air pollution inside a modern home can be worse than inside a chemical plant. (Films for the Humanities & Sciences, Inc.)

- **Asbestos Awareness**–(20 minute videotape). This videotape discusses the major types of asbestos and their current and past uses. Emphasis is given to the health risks associated with asbestos exposure and approved asbestos removal abatement techniques. (Industrial Training, Inc.–1988)

- **Down in the Dumps**–(26 minute videotape). Garbage is no laughing matter. The fact is that we are running out of space to dump the vast amounts of waste we create each day. Since many of the former methods of disposal are environmentally unacceptable, what are we to do? The program examines the technological approaches to the garbage dilemma, including composting, resource recovery, and high-tech incinerators, and public reaction to the creation of new waste treatment facilities. (Films for the Humanities & Sciences, Inc.)

- **EPA Test Methods for Freshwater Effluent Toxicity Tests (using Ceriodaphnia)**–(22 minute videotape). Demonstrates the Ceriodaphnia 7-Day Survival and Reproduction Toxicity Test and how it is used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. The tape covers the general procedures for the test including how it is set up, started, monitored, renewed and terminated. (1989)

- **EPA Test Methods for Freshwater Effluent Toxicity Tests (using Fathead Minnow Larva)**–(15 minute videotape). A training tape that teaches environmental professionals about the Fathead Minnow Larval Survival and Growth Toxicity Test. The method described is found in an EPA document entitled, "Short Term Methods for Estimating the Chronic Toxicity of Effluents & Receiving Waters to Freshwater Organisms." The tape demonstrates how fathead minnow toxicity tests can be used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. (1989)

- **Fit to Drink**–(20 minute videotape). This program traces the water cycle, beginning with the collection of rain-water in rivers and lakes, in great detail through a water treatment plant, to some of the places where water is used, and finally back into the atmosphere. Treatment of the water begins with the use of chlorine to destroy organisms; the water is then filtered through various sedimentation tanks to remove solid matter. Other treatments employ ozone, which oxidizes contaminants and makes them easier to remove; hydrated lime, which reduces the acidity of the water; sulfur dioxide, which removes any excess chlorine; and floculation, a process in which aluminum sulfate causes small particles to clump together and precipitate out. Throughout various stages of purification, the water is continuously tested for smell, taste, titration, and by fish. The treatment plant also monitors less common contaminants with the use of up-to-date techniques like flame spectrometers and gas liquefaction. (Films for the Humanities & Sciences, Inc.–1987)

- **Food-Service Disposables: Should I Feel Guilty?**–(12 minute videotape). The video, produced by the Food-service & Packaging Institute, Inc., national trade association of manufacturers and suppliers of single service articles for food service and packaging, examines such issues as litter, solid waste, recycling, composting and protection of the earth's ozone layer, makes for an excellent discussion opener on the theme of conservation of natural resources (trees, fresh water and energy) and the environmental trade-offs (convenience, sanitation and family health) that source reduction necessarily entails. (Foodservice & Packaging Institute, Inc.–1991)

- **Garbage: The Movie**–(25 minute videotape). A fascinating look at the solid waste problem and its impact on the environment. Viewers are introduced to landfills, incinerators, recycling plants and composting operations as solid waste management solutions. Problems associated with modern landfills are identified and low-impact alternatives such as recycling, reuse, and source reduction are examined. (Churchill Films)

- **Global Warming: Hot Times Ahead?**–(23 minute videotape). An informative video tape program that explores the global warming phenomenon and some of the devastating changes it may cause. This program identifies greenhouse gases and how they are produced by human activities. Considered are: energy use in transportation, industry and home; effects of deforestation, planting of trees and recycling as means of slowing the build-up of greenhouse gases. (Churchill Films–1995)

- **Kentucky Public Swimming Pool and Bathing Facilities**–(38 minute videotape). Developed by the Lincoln Trail District Health Department in Kentucky and includes all of their state regulations which may be different from other states, provinces and countries. This tape can be used to train those responsible for operating pools and waterfront bath facilities. All aspects are included of which we are aware, including checking water conditions and filtration methods. (1987)

- **Putting Aside Pesticides**–(26 minute videotape). This program probes the long-term effects of pesticides and explores alternative pest-control efforts; biological pesticides, genetically-engineered microbes that kill objectionable insects, the use of natural insect predators, and the cross-breeding and genetic engineering of new plant strains that produce their own anti-pest toxins. (Films for the Humanities & Sciences, Inc.)

- **Radon**–(26 minute videotape). This program looks at the possible health implications of radon pollution, methods homeowners can use to detect radon gas in their homes, and what can be done to minimize hazards once they are found.

- **RCRA–Hazardous Waste**–(19 minute videotape). This videotape explains the dangers associated with hazardous chemical handling and discusses the major hazardous waste handling requirements presented in the Resource Conservation and Recovery Act. (Industrial Training, Inc.)

- **The New Superfund: What It is & How It Works**–A six-hour national video conference sponsored by the EPA. Target audiences include the general public, private industry, emergency responders and public interest groups. The series features six videotapes that review and highlight the following issues:

  - **Tape 1–Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements**–(62 minute videotape). A general overview of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and the challenge of its implementation. The remedy process–long-term and permanent clean-up–is illustrated step-by-step, with emphasis on the new mandatory clean-up schedules, preliminary site assessment, petition procedures and the hazard ranking system/National Priority List revisions. The major role of state and local government involvement and responsibility is stressed.

  - **Tape 2–Changes in the Removal Process: Removal and Additional Program Requirments**–(48 minute videotape). The removal process is a short-term action and usually an immediate response to accidents, fires and illegall dumped hazardous substances. This program explains the changes that expand removal authority and require procedures consistent with the goals of remedial action.

  - **Tape 3–Enforcement and Federal Facilities**–(52 minute videotape). Who is responsible for SARA clean-up costs? Principles of responsible party liability; the difference between strict, joint and several liability; and the issue of the innocent landowner are discussed. Superfund enforcement tools-mixed funding, De Minimis settlements and the new nonbinding preliminary allocations of responsibility (NBARs) are explained.

  - **Tape 4–Emergency Preparedness and Community Right-to-Know**–(48 minute videotape). A major part of SARA is a free-standing act known as Title III: The Emergency Planning and Community Right-to-Know Act of 1986, requiring federal, state, and local governments and industry to work together in developing local emergency preparedness/response plans. This program discusses local emergency planning committee requirements, emergency notification procedures, and specifications on community right-to-know reporting requirements, such as using OSHA Material Safety Data Sheets, the emergency & hazardous chemical inventory and the toxic chemical release inventory.

  - **Tape 5–Underground Storage Tank Trust Fund and Response Program**–(21 minute videotape). Another addition to SARA is the Leaking Underground Storage Tank (LUST) Trust Fund. One half of the U.S. population depends on ground water for drinking–and EPA estimates that as many as 200,000 underground storage tanks are corroding and leaking into our ground water. This program discusses how the LUST Trust Fund will be used by EPA and the states in responding quickly to contain and clean-up LUST releases. Also covered is state enforcement and action requirements, and owner/operator responsibility.

  - **Tape 6–Research and Development/Closing Remarks**–(33 minute videotape). An important new mandate of the new Superfund is the technical provisions for research and development to create more permanent methods in handling and disposing of hazardous wastes and managing hazardous substances. This segment discusses the SITE (Superfund Innovative Technology Evaluation) program, the University Hazardous Substance Research Centers, hazardous substance health research and the DOD research, development and demonstration management of DOD wastes.

- **Sink A Germ**–(10 minute videotape). A presentation on the rationale and techniques for effective handwashing in health care institutions. Uses strong imagery to educate hospital personnel that handwashing is the single most important means of preventing the spread of infection. (The Brevis Corp.–1986)

- **Waste Not: Reducing Hazardous Waste**–(35 minute videotape). This tape looks at the progress and promise of efforts to reduce the generation of hazardous waste at the source. In a series of company profiles, it shows activities and programs within industry to minimize hazardous waste in the production process. Waste Not also looks at the obstacles to waste reduction, both within and outside of industry, and considers how society might further encourage the adoption of pollution prevention, rather than pollution control, as the primary approach to the problems posed by hazardous waste. (Umbrella films)

OTHER

- **Diet, Nutrition and Cancer**–(20 minute videotape). Investigates the relationship between a person's diet and the risk of developing cancer. The film describes the cancer development process and identifies various types of food believed to promote and/or inhibit cancer. The film also provides recommended dietary guidelines to prevent or greatly reduce the risk of certain types of cancer.

- **Eating Defensively: Food Safety Advice for Persons with Aids**–(15 minute videotape). While HIV infection and AIDS are not acquired by eating foods or drinking liquids, persons infected with the AIDS virus need to be concerned about what they eat. Foods can transmit bacteria and viruses capable of causing life-threatening illness to persons infected with AIDS. This video provides information for persons with AIDS on what foods to avoid and how to better handle and prepare foods. (FDA/CDC-1989)

- **Ice: The Forgotten Food**–(14 minute videotape). This training video describes how ice is made and where the critical control points are in its manufacture, both in ice plants and in on-premises locations (convenience stores, etc.); it documents the potential for illness from contaminated ice and calls on government to enforce good manufacturing practices, especially in on-premises operations where sanitation deficiencies are common. (Packaged Ice Association-1993)

- **Legal Aspects of the Tampering Case**–(25 minute videotape). This was presented by Mr. James T. O'Reilly, University of Cincinnati School of Law at the fall 1986 Central States Association of Food and Drug Officials Conference. He emphasizes three factors from his police and legal experience-know your case, nail your case on the perpetrator, and spread the word. He outlines specifics under each factor. This should be of the greatest interest to regulatory sanitarians, in federal, state and local agencies. (1987)

- **Personal Hygiene & Sanitation for Food Processing Employees**–(15 minute videotape). Illustrates and describes the importance of good personal hygiene and sanitary practices for people working in a food processing plant. (Iowa State-1993)

- **Psychiatric Aspects of Product Tampering**–(25 minute videotape). This was presented by Emanuel Tanay, M.D. from Detroit, at the fall 1986 conference of CSAFDA. He reviewed a few cases and then indicated that abnormal behavior is like a contagious disease. Media stories lead to up to 1,000 similar alleged cases, nearly all of which are false. Tamper-proof packaging and recalls are essential. Tampering and poisoning are characterized by variable motivation, fraud and greed. Law enforcement agencies have the final responsibilities. Tamper proof containers are not the ultimate answer. (1987)

- **Tampering: The Issue Examined**–(37 minute videotape). Developed by Culbro Machine Systems, this videotape is well done. It is directed to food processors and not regulatory sanitarians or consumers. A number of industry and regulatory agency management explain why food and drug containers should be made tamper evident. (Culbro-1987)

If you are interested in checking out any of our audio-visuals, please fill out this form with the box or boxes checked as to which presentations you wish to view. Mail or Fax to: IAMFES, Lending Library, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863. (Material from the Lending Library can be checked out for two weeks only so that others can benefit from its use.)

IAMFES MEMBERS ONLY Date Mailed: _____

Name: _____

Company: _____

Address: (For UPS Delivery) _____

City: _____ State/Province: _____ Zip Code: _____

Country: _____ Daytime Phone No.: _____

Fax No.: _____ Date Needed: _____

PLEASE LIMIT YOUR REQUEST TO FIVE VIDEOS.

Dairy, Food and Environmental Sanitation, Vol. 17, No. 9, Pages 605-612

3-A Sanitary Standards for Italian-Type Pasta Filata Style Cheese Cookers Number 70-00

Formulated by
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Italian-type pasta filata style cheese cooker specifications heretofore or hereafter developed which so differ in design, materials, and fabrication or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at any time.
NOTE: Use current revisions or editions of all referenced documents cited herein.

A **SCOPE**

A1 The equipment covered by these standards may include unitized sections that act as receiving reservoirs, pre-heat or cooking sections (direct or indirect), integral heating media systems, stretcher sections, discharge reservoir and discharge ports. The cheese equipment shall begin at the point where cheese curd is introduced and shall terminate at the point where cooked and stretched cheese is discharged. With regard to the use of steam, hot water, or other forms of heating media, the equipment shall begin and end at the manufacturer's supplied fittings. (Cheese dicers, mills, cyclones or similar appurtenances attached to the receiving reservoir are not covered by these standards.)

A2 In order to conform with these 3-A Sanitary Standards, Italian-type pasta filata style cheese cookers shall comply with the following design, material, and fabrication criteria.

B **DEFINITIONS**

B1 *Product:* Shall mean cheese or cheese curd, cheese mat derived from milk and milk products, and also whey/heating media which contacts the cheese, cheese curd, or cheese mat.

B2 *Italian-type Pasta Filata Style Cheese Cooker (referred to hereafter as a cooker):* Shall mean equipment in which products are elevated in temperature and physically manipulated to impart a stretch characteristic and finished texture common to Italian-type pasta filata style cheeses.

B2.1 This definition shall also cover: Italian-type cheese cooker/mixer, Italian cheese cooker/mixer/stretcher, Italian cheese stretcher/cooker and other common names for similar devices.

B3 *Solutions:* Shall mean water and/or those homogeneous mixtures of cleaning agents and/or sanitizers and water used for flushing, cleaning, rinsing, and sanitizing.

B4 **Surfaces**

B4.1 *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, diffuse or be drawn into the product.

B4.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B4.2.1 *Splash Contact Surfaces:* Shall mean other nonproduct contact surfaces that during normal use are subject to accumulation of soil and which require routine cleaning.

B5 **Cleaning**

B5.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment or systems specifically designed for this purpose.

B5.2 *Manual (COP) Cleaning:* Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

B6 **Surface Modification**[1]

B6.1 *Surface Treatments:* Shall mean a process whereby chemical compositions or mechanical properties of the existing surface are altered. There is no appreciable, typically less than 1 µm, build-up of new material or removal of existing material.

B6.1.1 Surface treatments include:

1. Mechanical (shot peening[2] glass beading, polishing)
2. Thermal (surface hardening laser, electron beam)
3. Diffusion (carburizing, nitriding)
4. Chemical (etching, oxidation)
5. Electropolishing

B6.2 *Coatings:* Shall mean the results of a process where a different material is deposited to create a new surface. There is appreciable, typically more than 1 µm, build-up of new material.

B6.2.1 Coating processes include:

1. Chemical (conversion coatings)
2. Spraying (pneumatic, flame, plasma, arc spray)

B7 *Soil:* Shall mean the presence of unwanted organic residue or inorganic matter, with or without microorganisms, including food residue, in or on the equipment.

B8 *Sanitizing or Sanitization:* Shall mean a process applied to a cleaned surface which is capable of reducing the numbers of the most resistant human pathogens by at least 5 log cycles (99.999%) by applying hot water or steam or by applying an EPA registered sanitizer according to label directions. Sanitizing may be effected by mechanical or manual methods.

B9 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.

B10 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by an employee from the floor, platform, or other permanent work area.

B11 *Inspectable:* Shall mean all product contact surfaces can be made available for close visual observation.

B12 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench or hammer.

B13 *Nontoxic Materials:* Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food, Drug and Cosmetic Act of 1938, as amended.

B14 *Corrosion Resistant:* Shall mean the surface has the property to maintain its original surface characteristics for its predicted service period when exposed to the conditions encountered in the environment of intended use including expected contact with product and cleaning or sanitizing compounds or solutions.

C **MATERIALS**

C1 **Metals**

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series[3] or corresponding Alloy Cast Institute[4] (ACI) types (See Appendix, Section E), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent, except that:

C1.1.1 Augers, auger troughs and auger components, hoppers, baffles, bodies and discharge ports made of the materials provided for in C1.1 or other structurally suitable metal(s) may have their product contact surfaces modified by surface treatment or coating(s).

C2 **Nonmetals**

C2.1 Rubber and rubber-like materials may be used for seals, gaskets, guide rails, discharge ports and parts having the same functional purposes.

C2.1.1 Rubber and rubber-like materials when used for the above specified application(s) shall conform with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-.

C2.2 Plastic materials may be used for baffles, bearings, caps, chutes, discharge ports, extrusion ports, gaskets, guide rails, knives, spray devices and spray device components, seals, sight and light openings, direct reading gauge tubes, and parts having the same functional purposes.

C2.2.1 Plastic materials may be used as coatings for hoppers, hopper components, augers and auger troughs, and cut-off devices and parts having the same functional purposes.

C2.2.2 Plastic materials when used for the above specified application(s) shall conform with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-.

C2.3 Rubber and rubber-like materials and plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformational characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2.4 The final bond and residual adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic[5].

C2.5 Where materials having certain inherent functional purposes are required for specific applications, such as shaft seals, carbon, and/or ceramic materials may be used. Carbon and/or ceramic materials shall be inert, nonporous, nontoxic, nonabsorbent, insoluble, resistant to scratching, scoring, and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C3 **Nonproduct Contact Surfaces**

C3.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating used shall adhere. All nonproduct contact surfaces shall be relatively nonabsorbent, durable, and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

D **FABRICATION**

D1 Surface Texture

D1.1 All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds and crevices in the final fabricated form (See Appendix, Section F), except that:

D2 **Permanent Joints**

D2.1 All permanent joints in metallic product contact surfaces shall be continuously welded, except that:

D2.1.1 In such cases where welding is impractical, press-fitting or shrink-fitting may be employed where necessary for essential functional reasons such as bearings. (See Appendix, Section G.)

D2.2 Product contact surfaces joined by welding, press-fitting and shrink-fitting shall have product contact surface texture which is in compliance with D1.1.

D3 **Bonding Materials**

D3.1 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be bonded in a manner that the bond is continuous and mechanically sound so that when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.

D4 **Coatings**

D4.1 Coatings, if used, shall be free from surface delamination, pitting, flaking, spalling, blistering and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

D4.2 Plastic materials, when used as a coating, shall be at least 0.0005 in. (0.0127 mm) thick.

D5 **Cleaning and Inspectability**

D5.1 Cookers that are to be mechanically cleaned shall be designed so that the product contact surfaces and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible and inspectable. Demountable parts shall be readily removable.

D5.2 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible and inspectable either when in an installed position or when removed. Demountable parts shall be readily removable.

D6 **Draining**

D6.1 All product contact surfaces shall be self-draining or drainable except for normal clingage.

D7 **Sanitary Fittings, Valves, Connections and Tubing**

D7.1 All sanitary fittings and connections shall conform with the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.

D7.2 All sanitary valves shall conform with the 3-A Sanitary Standards for Plug-Type Valves for Milk and Milk Products, Number 51-; 3-A Sanitary Standards for Compression-Type Valves for Milk and Milk Products, Number 53-; 3-A Sanitary Standards for Diaphragm-Type Valves for Milk and Milk Products, Number 55-; and 3-A Sanitary Standards for Vacuum Breakers and Check Valves for Milk and Milk Products, Number 58-.

D7.3 All instrument connections having product contact surfaces shall conform with the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections Used on Fluid Milk and Milk Products Equipment, Number 74-.

D7.4 All metal tubing shall conform with the 3-A Sanitary Standards for Polished Metal Tubing for Dairy Products, Number 33-.

D8 **Heating Methods**

D8.1 Steam injection heaters, if used, shall conform with the 3-A Sanitary Standards for Steam Injection Heaters for Milk and Milk Products, Number 61-.

D8.2 Equipment for producing culinary steam, if provided, shall conform with the 3-A Sanitary Practices for A Method of Producing Steam of Culinary Quality, Number 609-.

D8.3 Tubular heat exchangers, if provided, shall conform with the 3-A Sanitary Standards for Tubular Heat Exchangers for Milk and Milk Products, Number 12-.

D8.4 Plate heat exchangers, if provided, shall conform with the 3-A Sanitary Standards for Plate-Type Heat Exchangers for Milk and Milk Products, Number 11-.

D9 **Pumps**

D9.1 Positive rotary or centrifugal pumps, if provided, shall conform with the 3-A Sanitary Standards for Centrifugal and Positive Rotary Pumps for Milk and Milk Products, Number 02-.

D10 **Gaskets**

D10.1 Gaskets having a product contact surface shall be removable or bonded.

D10.2 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.

D10.3 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in Section D7.

D11 **Radii**

D11.1 All internal angles of less than 135° on product contact surfaces, shall have radii of not less than 1/4 in. (6.35 mm), except that:

D11.1.1 Smaller radii may be used when they are required for essential functional reasons, such as those in shaft seals. In no case shall such radii be less than 1/32 in. (0.794 mm).

D11.1.2 The radii in gasket retaining grooves or grooves in gaskets, shall be not less than 1/8 in. (3.18 mm) except for those for standard 1/4 in. (6.35 mm) and smaller O-rings and those provided for in Section D7.

D11.1.3 Radii in standard O-ring grooves shall be as specified in Appendix, Section J.

D11.1.4 When the thickness of one or both parts joined is less than 3/16 in. (4.76 mm), the minimum radii for fillets of welds on product contact surfaces shall be not less than 1/8 in. (3.18 mm).

D12 **Threads**

D12.1 There shall be no threads on product contact surfaces except where necessary for attaching the auger support.

D12.1.1 In such case(s) the threads shall be ACME type as specified in the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63- or the American Standard Stub Acme Thread. These threads shall conform with the drawing, Fig. (1), the American Stub Acme Thread. (See Appendix, Section I.) The thread angle shall be not less than 60° and with not more than 8 threads to the inch (25.4 mm), nor less than 5/8 in. (15.88 mm) major basic diameter. The length of the nut shall not exceed three-quarters of the basic thread diameter. The nut shall be of the open type. Equipment components with exposed threads as described above shall be designed for manual cleaning.

D13 **Shafts and Bearings**

D13.1 Shaft seals, when provided, shall be of a packless type and sanitary in design, and shall be readily accessible and inspectable. Bearings having a product contact surface shall be of a nonlubricated type.

D13.2 Lubricated bearings, including the permanent sealed type, shall be located outside the product contact surface with at least 1 in. (25.4 mm) clearance open for inspection between the bearing and any product contact surface.

D13.3 Where a shaft passes through a product contact surface without a shaft seal, the portion of the opening surrounding the shaft shall be protected to prevent the entrance of contaminants.

D14 **Openings and Covers**

D14.1 Openings through a fixed bridge and either hinged or removable covers, to which connections are not permanently attached, shall be flanged upward at least 3/8 in. (9.52 mm). All sanitary pipelines and other appurtenances entering through the cover shall be fitted with a sanitary umbrella deflector that overlaps the edges of the opening. Other openings, with the exception of agitator openings, shall have a removable cover, which shall be downwardly flanged to make close contact with the upper edges of the upwardly flanged opening in the covered surface.

D14.2 Covers and bridges shall pitch to an outside edge(s), so that liquid cannot accumulate.

D14.2.1 Permanent covers and bridges shall be integral with or continuously welded to the lining.

D15 **Agitators, Augers, Mixing Arms, or Stretching Devices**

D15.1 If provided, agitator or auger shaft openings through the bridge or top enclosure shall have a minimum diameter of 1 in. (25.4 mm) on cookers which require removal of the agitator shaft for cleaning, or be of a diameter that will provide a 1 in. (25.4 mm) minimum annular cleaning space between the appropriate shaft and the inside surface of the flanged opening on cookers which do not require removal of the agitator or auger for cleaning. Shielding shall be provided which effectively protects against the entrance of dust, oil, insects, and other contaminants into cookers through the annular space around the agitator shaft. Any product contact or splash contact surfaces on the shielding shall be readily accessible for inspection.

D15.2 The agitator, augers, mixing arms, or stretching devices driving mechanism, if provided, shall be securely mounted in a position that will provide a minimum distance of 4 in. (101.6 mm) measured from the driving mechanism housing, excluding bearing bosses and mounting bosses, to the nearest surface of the cooker; and in such a manner that all surfaces of cookers under or adjacent to the driving mechanism shall be readily accessible for cleaning and inspection.

D15.3 The agitating device shall be readily cleanable and shall be one of the following types:

D15.3.1 Top-entering nonremovable type agitators shall be readily accessible and cleanable. There shall be at least a 1/2 in. (12.70 mm) space between the nonremovable agitator and the bottom of the lining, unless the agitator is mounted on a hinged-type cover.

D15.3.2 The top-entering removable or demountable type agitator shall be provided with an easily accessible, readily demountable coupling of either a sanitary type located within the product contact area or a coupling located outside the product contact area provided that it is above the shield used to protect the annular space around the shaft. All product contact surfaces of the agitator shall be visible when the agitator is removed.

D15.3.3 The side or bottom-entering type agitator, augers, mixing arms, stretching devices and their shafts, including the complete seal, shall be demountable with simple hand tools for cleaning or inspection. Nonremovable parts having product surface shall be designed so that the product contact surfaces are readily cleanable from the inside of the Italian cheese cooker. Seals for the agitator, augers, mixing arms, stretching devices and their shafts, shall be of a packless type, sanitary in design, with all parts readily accessible for cleaning.

D15.3.4 Mixing arm(s) shall be sanitary in design and be demountable using simple hand tools. Any bearings or actuators located over exposed product or product contact surfaces shall be provided with adequate sanitary shields and/or deflectors.

D15.4 A bottom support or guide, if used, shall be welded to the lining and shall not interfere with drainage of the cooker and the inside angles shall have a minimum radii of 1/8 in. (3.18 mm). When the agitator shaft has a bearing cavity, the diameter of the cavity shall be greater than the depth. The agitator shall be easily demountable for cleaning of the bearing and any shaft cavity.

D16 **Fines Basket**

D16.1 Where a perforated basket is required for the collection of cheese fines, the basket shall be constructed so that perforations in product contact surfaces shall be readily accessible and inspectable. Perforations shall not be less than 1/32 in. (0.794 mm) in diameter. Slots shall be at least 1/32 in. (0.794 mm) wide. All perforations shall be free of burrs.

D17 **Supports**

D17.1 The means of supporting the cooker shall be one of the following:

D17.1.1 If legs are used they shall be smooth with rounded ends or with a flat, load bearing foot suitable for sealing to the floor, and have no exposed threads. Legs made of hollow stock shall be sealed. Legs shall provide a minimum clearance between the lowest part of the base and the floor of not less than 6 in. (152.4 mm).

D17.1.2 If casters are used they shall be of sufficient size to provide a clearance between the lowest part of the base and the floor of not less than 6 in. (152.4 mm). Casters, if provided, shall be easily cleanable, durable and of a size that will permit easy movement of the Italian cheese cooker.

D18 **Guards**

D18.1 Guards required by a safety standard that will not permit accessibility for cleaning and inspection shall be designed so that they can be removed with the use of simple hand tools.

D19 **Nonproduct Contact Surfaces**

D19.1 Nonproduct contact surfaces shall have a smooth finish, free of pockets and crevices, be readily cleanable and those surfaces to be coated shall be effectively prepared for coating.

D20 **Information Plate**

D20.1 Cheese cookers which have temperature limitations for operation or cleaning shall have appropriate cautionary wording on the machine name plate or on an information plate in juxtaposition to the name plate. (See Appendix H.)

D20.2 Cheese cookers which have plastic coated product contact surfaces shall display appropriate cautionary wording about cleaning materials or procedures on the machine name plate or on an information plate in juxtaposition to the name plate. (See Appendix H.)

D20.3 All identification or information plates shall be attached to the exterior of the cheese cooker in such a way as to be effectively sealed.

APPENDIX

E **STAINLESS STEEL MATERIALS**

Stainless steel conforming to the applicable composition ranges established by AISI for wrought products, or by ACI for cast products, should be considered in compliance with the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%. The first reference cited in C1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 Series. Cast grades of stainless steel corresponding to types 303, 304, and 316 are designated CF-16F, CF-8, and CF-8M, respectively. The chemical compositions of these cast grades are covered by ASTM specifications[6] A351/A351M, A743/A743M and A744/A744M.

F **PRODUCT CONTACT SURFACE FINISH**

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in compliance with the requirements of Section D1 herein. A maximum R_a of 32 µin. (0.80 µm), when measured according to the recommendations in American National Standards Institute (ANSI) / American Society of Mechanical Engineers (ASME)[7] B46.1 - *Surface Texture*, is considered to be equivalent to a No. 4 finish.

G **PRESS-FITS AND SHRINK-FITS**

Press-fits or shrink-fits may be used to produce crevice-free permanent joints in metallic product contact surfaces when welding is not practical. Joints of this type may only be used to assemble parts having circular cross sections, free of shoulders or relieved areas. For example: they may be used to assemble round pins or round bushings into round holes. In both types of fits, the outside diameter of the part being inserted is greater than the inside diameter of the hole. In the case of the press-fit the parts are forced together by applying pressure. The pressure required is primarily dependent upon the diameter of the parts, the amount of interference and the distance the inner member is forced into the outer member.

In shrink-fits, the diameter of the inner member is reduced by chilling it to a low temperature. Dry ice is commonly used to shrink the inner member. Heat may also be applied to the outer member of the press-fit. Less assembly force is required for this type of fit.

The design of these fits depends on a variety of factors. The designer should follow recommended practices to assure that a crevice-free joint is produced. A recognized authoritative reference is *Machinery's Handbook* published by Industrial Press Inc., 200 Madison Avenue, New York, NY 10157.

H **INFORMATION PLATE(S)**

Manufacturers should provide an information plate in juxtaposition to the name plate giving the following information or cautionary statement which may be required on some Italian cheese cookers as outlined in Section D20. The specific information displayed on the information plate will vary among manufacturers. The following example is for illustration purposes only and is not intended to specify precise wording of the statements:

H1 **CAUTION**

Do not operate or clean this machine at temperatures above {__°F (__°C)}. Exceeding this temperature may cause serious damage.

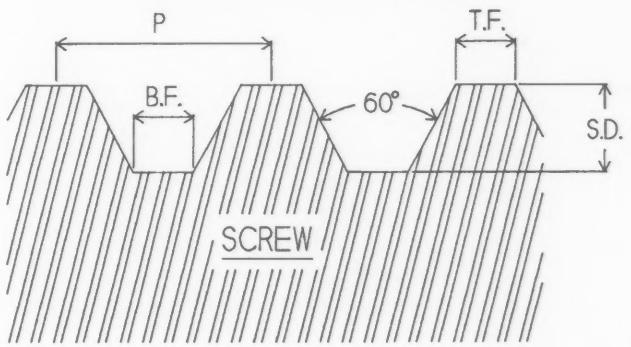
H2 **CAUTION**

During handling or cleaning of this machine, avoid abrasion or rubbing of the plastic coated surfaces. Do not use metal scrapers, brushes, or any abrasive scouring pads. Follow recommended cleaning instructions in your operator's manual.

I **THREADS**

I1 Figure 1 – American Standard Stub Acme Thread Specifications

AMERICAN STUB ACME THREAD



P = PITCH	P = 1/T.P.I.
S.D. = SINGLE DEPTH	S.D. = 0.433 x P
T.F. = TOP FLAT	T.F. = 0.250 x P
B.F. = BOTTOM FLAT	B.F. = 0.227 x P
T.P.I. = THREADS PER INCH	

J O-RING GROOVE RADII

TABLE 1 — Groove Radii Dimensions for Standard O-Rings

O-Ring Cross Section, Nominal (AS 568[8])	O-Ring Cross Section, Actual (AS 568)	O-Ring Cross Section, Actual (ISO 3601-1[9])	Minimum Groove Radius
1/16 in.	0.070 in.	1.80 mm	0.016 in. (0.406 mm)
3/32 in.	0.103 in.	2.65 mm	0.031 in. (0.787 mm)
1/8 in.	0.139 in.	3.55 mm	0.031 in. (0.787 mm)
3/16 in.	0.210 in.	5.30 mm	0.062 in. (1.575 mm)
1/4 in.	0.275 in.	7.00 mm	0.094 in. (2.388 mm)

[1]Additional information on surface modification is contained in *Advanced Materials and Processes*, Volume 137(1), January 1990; "Coatings and Coating Practices" by H. Herman, p. 59; "Surface Modification" by F. A. Smidt, p. 61. ASM International, Materials Park, OH 44073; 216.338.5151.

[2]MIL-S-13165C (1), November 1991, *Military Specification: Shot Peening of Metal Parts*. Available from Standardization, Document Order Desk (Department of Navy), 700 Robbins Avenue, Building 4, Section D, Philadelphia, PA 19111-5094; 215.697.2179.

[3]The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, November 1990, Table 2-1, pp. 17-20. Available from the Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086; 412.776.1535.

[4]Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016; 708.299.9160.

[5]Adhesives shall comply with 21 CFR 175 – Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402; 202.783.3238.

[6]Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959; 610.832.9500.

[7]Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392; 212.705.7722.

[8]The document establishing theses standard dimensions is Aerospace Standard (AS) 568, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086; 412.776.4970.

[9]The document establishing these standard dimensions is ISO 3601-1: 1988 (E), published by the International Organization for Standardization (ISO), 1 Rue de Varembe, Case Postale 58, CH 1 1211, Geneva, Switzerland (41-22-734-1240).

These standards are effective November 23, 1997.

Dairy, Food and Environmental Sanitation, Vol. 17, No. 9, Pages 613-619

3-A Sanitary Standards for Italian-Type Pasta Filata Style Cheese Moulders Number 71-00

Formulated by
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Italian-type pasta filata style cheese moulder specifications heretofore or hereafter developed which so differ in design, materials, and fabrication or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at any time. **NOTE:** Use current revisions or editions of all referenced documents cited herein.

A **SCOPE**

A1 These standards cover the sanitary aspects of Italian-type pasta filata style cheese moulders, including but not limited to mozzarella, string and provolone cheeses. The equipment shall begin at the point where the cooked and stretched cheese is introduced and shall terminate at the point where the cheese is discharged into transfer moulds, discharged from integral moulds, or discharged through an extruder. The equipment may include individual or combined equipment sections that act as receiving-transition units, salt application devices, receiving reservoirs, integral moulds or extruder pieces. These standards also cover Italian cheese moulders which cool moulded cheese by indirect methods.

A2 In order to conform with these 3-A Sanitary Standards, Italian-type pasta filata style cheese moulders shall comply with the following design, material, and fabrication criteria.

B **DEFINITIONS**

B1 *Product:* Shall mean cheese derived from milk and milk products.

B2 *Italian-Type Pasta Filata Style Cheese Moulders (referred to hereafter as a cheese moulder):* Shall mean a process unit or vessel in which heated Italian cheese is manipulated to impart dimensional characteristics to the product.

B3 *Solutions:* Shall mean water and/or those homogeneous mixtures of cleaning agents and/or sanitizers and water used for flushing, cleaning, rinsing, and sanitizing.

B4 **Surfaces**

B4.1 *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, diffuse or be drawn into the product.

B4.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B5 **Cleaning**

B5.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment or systems specifically designed for this purpose.

B5.2 *Manual (COP) Cleaning:* Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

B6 **Surface Modification**[1]

B6.1 *Surface Treatments:* Shall mean a process whereby chemical compositions or mechanical properties of the existing surface are altered. There is no appreciable, typically less than 1 µm, build-up of new material or removal of existing material.

B6.1.1 Surface treatments include:

1. Mechanical (shot peening[2] glass beading, polishing)
2. Thermal (surface hardening laser, electron beam)
3. Diffusion (carburizing, nitriding)
4. Chemical (etching, oxidation)
5. Electropolishing

B6.2 *Coatings:* Shall mean the results of a process where a different material is deposited to create a new surface. There is appreciable, typically more than 1 µm, build-up of new material.

B6.2.1 Coating processes include:

1. Chemical (conversion coatings)
2. Electrodeposition[3]
3. Spraying (pneumatic, flame, plasma, arc spray)

B7 *Soil:* Shall mean the presence of unwanted organic residue or inorganic matter, with or without microorganisms, including food residue, in or on the equipment.

B8 *Sanitizing or Sanitization:* Shall mean a process applied to a cleaned surface which is capable of reducing the numbers of the most resistant human pathogens by at least 5 log cycles (99.999%) by applying hot water or steam or by applying an EPA registered sanitizer according to label directions. Sanitizing may be effected by mechanical or manual methods.

B9 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.

B10 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by an employee from the floor, platform, or other permanent work area.

B11 *Inspectable:* Shall mean all product contact surfaces can be made available for close visual observation.

B12 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench or hammer.

B13 *Nontoxic Materials:* Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food, Drug and Cosmetic Act of 1938, as amended.

B14 *Corrosion Resistant:* Shall mean the surface has the property to maintain its original surface characteristics for its predicted service period when exposed to the conditions encountered in the environment of intended use including expected contact with product and cleaning, sanitizing or sterilizing compounds or solutions.

C **MATERIALS**

C1 **Metals**

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series[4] or corresponding Alloy Cast Institute[5] (ACI) types (See Appendix, Section E), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent, except that:

C1.1.1 Auger components, baffles, chutes, discharge ports, hoppers, integral mould components, knives, moulder bodies and shuttle plates made of the materials provided for in C1.1 may have their product contact surfaces modified by surface treatment or coating(s).

C1.1.2 Auger drive shafts and knives may also be made of stainless steel of the AISI 400 Series that is made as corrosion resistant as AISI 300 Series by surface treatment or coating(s) or made of nontoxic, nonabsorbent metal that is as corrosion resistant, under the conditions of intended use, as stainless steel of the AISI 300 Series.

C2 **Nonmetals**

C2.1 Rubber and rubber-like materials may be used for seals, gaskets, guide rails, extruder or discharge ports, curtains, plungers, plunger coatings, hoses, pneumatic discharge components, and parts having the same functional purposes.

C2.1.1 Rubber and rubber-like materials when used for the above specified application(s) shall conform with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-.

C2.2 Plastic materials may be used for baffles, caps, chutes, discharge ports, extruder ports, gaskets, guide rails, integral mould compo-

nents, knives, spray devices and spray device components, seals, curtains, bearings, bushings, conveyors, sprockets, plungers, hoses, pneumatic discharge components, slip sheets, and parts having the same functional purposes.

C2.2.1 Plastic materials also may be used as coatings for hoppers, hopper components, augers, auger troughs, moulds, mould components and cut-off devices and parts having the same functional purposes.

C2.2.2 Plastic materials when used for the above specified application(s) shall conform with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-.

C2.3 Rubber and rubber-like materials and plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformational characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2.4 The final bond and residual adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be non-toxic[6].

C3 **Nonproduct Contact Surfaces**

C3.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating used shall adhere. All nonproduct contact surfaces shall be relatively nonabsorbent, durable, and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

D **FABRICATION**

D1 **Surface Texture**

D1.1 All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds and crevices in the final fabricated form (See Appendix, Section F), except that:

D2 **Permanent Joints**

D2.1 All permanent joints in metallic product contact surfaces shall be continuously welded, except that:

D2.1.1 In such cases where welding is impractical, press-fitting or shrink-fitting may be employed where necessary for essential functional reasons such as bearings. (See Appendix, Section G.)

D2.2 Product contact surfaces joined by welding, press-fitting, and shrink-fitting shall have product contact surface texture which is in compliance with D1.1.

D3 **Coatings**

D3.1 Coatings, if used, shall be free from surface delamination, pitting, flaking, spalling, blistering and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

D3.2 The minimum thickness of electrodeposited coatings shall not be less than 0.0002 in. (0.005 mm) for all product contact surfaces when used on stainless steel. When these surfaces are other than stainless steel, the minimum thickness of electrodeposited coatings shall not be less than 0.002 in. (0.05 mm).

D3.3 Plastic materials, when used as a coating, shall be at least 0.0005 in. (0.0127 mm) thick.

D4 **Cleaning and Inspectability**

D4.1 Cheese moulders that are to be mechanically cleaned shall be designed so that the product contact surfaces of the cheese moulder's integral mould components and augers, if provided, and all nonremoved appurtenances thereto can be mechanically cleaned and are readily accessible and inspectable. Demountable parts shall be readily removable.

D4.2 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible and inspectable either when in an installed position or when removed. Demountable parts shall be readily removable. When parts having product contact surfaces are too large or heavy for manual handling, appropriate mechanical means for handling shall be provided.

D5 **Draining**

D5.1 All product contact surfaces shall be self-draining or drainable except for normal clingage.

D6 **Sanitary Fittings, Valves, Connections and Tubing**

D6.1 All sanitary fittings and connections shall conform with the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.

D6.2 All sanitary valves shall conform with the 3-A Sanitary Standards for Plug-Type Valves for Milk and Milk Products, Number 51-; 3-A Sanitary Standards for Compression-Type Valves for Milk and Milk Products, Number

53-; 3-A Sanitary Standards for Diaphragm-Type Valves for Milk and Milk Products, Number 55-; and 3-A Sanitary Standards for Vacuum Breakers and Check Valves for Milk and Milk Products, Number 58-.

D6.3 All instrument connections having product contact surfaces shall conform with the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections Used on Fluid Milk and Milk Products Equipment, Number 74-.

D6.4 All metal tubing shall conform with the applicable provisions of the 3-A Sanitary Standards for Polished Metal Tubing for Dairy Products, Number 33-.

D6.5 Product inlet and outlet connections shall be provided with welded stub ends, or bolted or clamp-type flanges. The face of a bolted or clamp-type flange shall be as close as practical to the outer shell of the moulder body.

D7 **Moulder Body**

D7.1 The distance between the nearest point on the outer shell of the moulder body to the face of a bolted or clamp-type flange on an inlet or outlet valve connection shall not exceed the smaller of (a) twice the nominal diameter of the connection or (b) 5 in. (127 mm).

D8 **Gaskets**

D8.1 Gaskets having a product contact surface shall be removable or bonded.

D8.2 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be bonded in a manner that the bond is continuous and mechanically sound so that when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.

D8.3 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.

D8.4 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in Section D6.1.

D9 **Radii**

D9.1 All internal angles of less than 135° on product contact surfaces, shall have radii of not less than 1/4 in. (6.35 mm), except that:

D9.1.1 Smaller radii may be used when they are required for essential functional reasons, such as those in shaft seals. In no case shall such radii be less than 1/32 in. (0.794 mm).

D9.1.2 The radii in grooves in gaskets or gasket retaining grooves shall be not less than 1/8 in. (3.18 mm) except for those for standard, 1/4 in. (6.35 mm) and smaller O-rings, and those provided for in Section D6.

D9.1.3 Radii in standard O-ring grooves shall be as specified in Appendix, Section J.

D9.1.4 When the thickness of one or both parts joined is less than 3/16 in. (4.76 mm), the minimum radii for fillets of welds on product contact surfaces shall be not less than 1/8 in. (3.18 mm).

D10 **Threads**

D10.1 There shall be no threads on product contact surfaces, except where necessary for attaching mould spindle mounting shafts, shuttle base mounting, and for weight, fill, or chute adjusting.

D10.1.1 In such case(s) the threads shall be ACME type as specified in the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63- or the American Standard Stub Acme Thread. (See Appendix, Section I.) These threads shall conform with the drawing, Fig. (1), the American Stub Acme Thread. (See Appendix, Section I.) The threaded angles shall be not less than 60° and with not more than 8 threads to the inch (25.4 mm), nor less than 5/8 in. (15.88 mm) major basic diameter. The length of the nut shall not exceed three-quarters of the basic thread diameter. The nut shall be of the open type. Equipment components with exposed threads as described above shall be designed for manual cleaning.

D11 **Perforated Product Contact Surfaces**

D11.1 Perforations in product contact surfaces may be round, square, or rectangular. If round, the holes shall be a minimum of 1/32 in. (0.794 mm) in diameter. If square or rectangular, the least dimension shall be no less than 0.020 in. (0.51 mm) with corner radii of no less than 0.0050 in. (0.13 mm). All perforations shall be free of burrs.

D12 **Springs**

D12.1 Any coil spring having product contact surfaces shall have at least 3/32 in. (2.38 mm) openings between coils, including the ends, when the spring is in the free position.

D13 **Shafts and Bearings**

D13.1 Shafts seals, when provided, shall be of a packless type and sanitary in design, and shall be readily accessible for cleaning and inspection. Bearings having a product contact surface shall be of a nonlubricated type.

D13.2 Lubricated bearings, including the permanent sealed type, shall be located outside the product contact surface with at least 1 in. (25.4 mm) clearance open for inspection between the bearing and any product contact surface.

D13.3 Where a shaft passes through a product contact surface without a shaft seal, the portion of the opening surrounding the shaft shall be protected to prevent the entrance of contaminants.

D14 **Openings and Covers**

D14.1 Openings through a fixed bridge and either hinged or removable covers, to which connections are not permanently attached, shall be flanged upward at least 3/8 in. (9.52 mm). All sanitary pipelines and other appurtenances entering through the cover shall be fitted with a sanitary umbrella deflector that overlaps the edges of the opening. Other openings, with the exception of agitator openings, shall have a removable cover, which shall be downwardly flanged to make close contact with the upper edges of the upwardly flanged opening in the cover surface.

D14.2 Covers and bridges shall pitch to an outside edge(s), so that liquid cannot accumulate.

D14.2.1 Permanent covers and bridges shall be integral with or continuously welded to the liner.

D15 **Supports**

D15.1 The means of supporting a cheese moulder shall be one of the following:

D15.1.1 If legs are used they shall be smooth with rounded ends or with flat, load bearing feet suitable for sealing to the floor, and have no exposed threads. Legs made of hollow stock shall be sealed. Legs shall provide a minimum clearance between the lowest part of the base and the floor of not less than 6 in. (152.4 mm).

D15.1.2 If casters are used they shall be of sufficient size to provide a clearance between the lowest part of the base and the floor of not less than 6 in. (152.4 mm). Casters, if provided, shall be easily cleanable, durable and of a size that will permit easy movement of the Italian cheese moulder.

D16 **Guards**

D16.1 Guards required by a safety standard that will not permit accessibility for cleaning and inspection shall be designed so that they can be removed with the use of simple hand tools.

D17 **Nonproduct Contact Surfaces**

D17.1 Nonproduct contact surfaces shall have a smooth finish, free of pockets and crevices, be readily cleanable and those surfaces to be coated shall be effectively prepared for coating.

D18 **Information Plate**

D18.1 Cheese moulders which have temperature limitations for operations or cleaning shall have appropriate cautionary wording on the machine name plate or on an information plate in juxtaposition to the name plate. (See Appendix H.)

D18.2 Cheese moulders which have plastic coated product contact surfaces shall display appropriate cautionary wording about cleaning materials or procedures on the machine name plate or on an information plate in juxtaposition to the name plate. (See Appendix H.)

D18.3 All identification or information plates shall be attached to the exterior of the cheese moulder in such a way as to be effectively sealed.

APPENDIX

E **STAINLESS STEEL MATERIALS**

Stainless steel conforming to the applicable composition ranges established by AISI for wrought products, or by ACI for cast products, should be considered in compliance with the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%. The first reference cited in C1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 Series. Cast grades of stainless steel corresponding to types 303, 304, and 316 are designated CF-16F, CF-8, and CF-8M, respectively. The chemical compositions of these cast grades are covered by ASTM specifications[7] A351/A351M, A743/A743M and A744/A744M.

F **PRODUCT CONTACT SURFACE FINISH**

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in compliance with the requirements of Section D1 herein. A maximum R_a of 32 µin. (0.80 µm), when measured according to the recommendations in American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)[8] B46.1 - *Surface Texture*, is considered to be equivalent to a No. 4 finish.

G **PRESS-FITS AND SHRINK-FITS**

Press-fits or shrink-fits may be used to produce crevice free permanent joints in metallic product contact surfaces when welding is not

practical. Joints of this type may only be used to assemble parts having circular cross sections, free of shoulders or relieved areas. For example: they may be used to assemble round pins or round bushings into round holes. In both types of fits, the outside diameter of the part being inserted is greater than the inside diameter of the hole. In the case of the press-fit the parts are forced together by applying pressure. The pressure required is primarily dependent upon the diameter of the parts, the amount of interference and the distance the inner member is forced into the outer member.

In shrink-fits, the diameter of the inner member is reduced by chilling it to a low temperature. Dry ice is commonly used to shrink the inner member. Heat may also be applied to the outer member of the press-fit. Less assembly force is required for this type of fit.

The design of these fits depends on a variety of factors. The designer should follow recommended practices to assure that a crevice-free joint is produced. A recognized authoritative reference is *Machinery's Handbook* published by Industrial Press Inc., 200 Madison Avenue, New York, NY 10157.

H **INFORMATION PLATE(S)**

Manufacturers should provide an information plate in juxtaposition to the name plate giving the following information or cautionary statement which may be required on some cheese moulders as outlined in Section D18. The specific information displayed on the information plate will vary among manufacturers. The following examples are for illustration purposes only and are not intended to specify precise wording of the statements:

H1 **CAUTION**

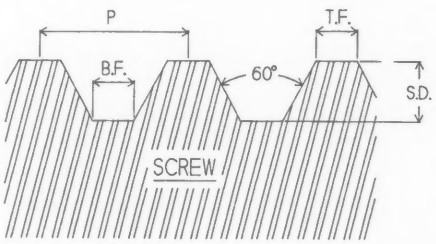
Do not operate or clean this machine at temperatures above {__°F (__°C)}. Exceeding this temperature may cause serious damage.

H2 **CAUTION**

During handling or cleaning of this machine, avoid abrasion or rubbing of the plastic coated surfaces. Do not use metal scrapers, brushes, or any abrasive scouring pads. Follow recommended cleaning instructions in your operators manual.

I **THREADS**

I1 Figure 1 – American Standard Stub Acme Thread Specifications



S.D. = SINGLE DEPTH	S.D = 0.433 x P
T.F. = TOP FLAT	T.F. = 0.250 x P
B.F. = BOTTOM FLAT	B.F. = 0.227 x P
T.P.I. = THREADS PER INCH	

J **O-RING GROOVE RADII**

TABLE 1 - Groove Radii Dimensions for Standard O-Rings

O-Ring Cross Section, Nominal (AS 568[9])	O-Ring Cross Section, Actual (AS 568)	O-Ring Cross Section, Actual (ISO 3601-1[10])	Minimum Groove Radius
1/16 in.	0.070 in.	1.80 mm	0.016 in. (0.406 mm)
3/32 in.	0.103 in.	2.65 mm	0.031 in. (0.787 mm)
1/8 in.	0.139 in.	3.55 mm	0.031 in. (0.787 mm)
3/16 in.	0.210 in.	5.30 mm	0.062 in. (1.575 mm)
1/4 in.	0.275 in.	7.00 mm	0.094 in. (2.388 mm)

[1]Additional information on surface modification is contained in *Advanced Materials and Processes,* Volume 137(1), January 1990; *"Coatings and Coating Practices"* by H. Herman, p. 59; "Surface Modification" by F. A. Smidt, p. 61. ASM International, Materials Park, OH 44073; 216.338.5151.

[2]MIL-5-13165C-7, June 1989, Military Specification: *Shot Peening of Metal Parts*. Available from Standardization, Document Order Desk (Department of Navy), 700 Robbins Avenue, Building 4, Section D, Philadelphia, PA 19111-5094; 215.697.2167.

[3]Federal Specification #QQ-C-320B for Chromium Plating (Electrodeposited), June 17, 1994 with Amendment 4 on April 10, 1987. Federal Specification #QQ-N-290A for Nickel Plating (Electrodeposited), November 12, 1971. Available from the General Services Administration, Federal Supply Services Bureau, Specification Section, 470 East L'Enfant Plaza, Suite 8100, Washington, D.C. 20407; 202.755.0325.

[4]The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, November 1990, Table 2-1, pp. 17-20. Available from the Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086; 412.776.1535.

[5]Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016; 708.299.9160.

[6]21 CFR 175 – Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402; 202.783.3238.

[7]Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959; 610.832.9500.

[8]Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392; 212.705.7722.

[9]The document establishing theses standard dimensions is Aerospace Standard (AS) 568, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086; 412.776.4970.

[10]The document establishing these standard dimensions is ISO 3601-1: 1988 (E), published by the International Organization for Standardization (ISO), 1 Rue de Varembe, Case Postale 58, CH 1 1211, Geneva, Switzerland (41-22-734-1240).

These standards are effective November 23, 1997.

In Memory of...

Martyn A. Ronge
Elgin, IL

James I. Kennedy
Russellville, MO

We extend our deepest sympathy to the families of the above IAMFES members who recently passed away.

IAMFES will always have sincere gratitude for their contribution to the Association and the profession.

ADVERTISING INDEX

ComingEvents

OCTOBER

·**5-9, Saudi Agriculture 97, 16th Agriculture, Water and Agri-Industry Show,** at the Riyadh Exhibition Centre. Further information can be obtained from Virginia Jensen, Kallman Associates, 20 Harrison Ave., Waldwick, NJ 07463.

·**6-10, Wisconsin Cheese Technology Short Course,** Madison, WI. Offered by the University of Wisconsin-Madison. This 5-day short course provides a technical approach to the discussion of the principles and practices of cheesemaking. Program Coordinator: Dr. Bill Wendorff, 608.263.2015. For additional information, contact the Program Coordinator or Department of Food Science, University of Wisconsin-Madison, Phone: 608.262.3046 or Fax: 608.262.6872.

·**8-10, Quality Management in the Food Industry,** Statler Hotel, Cornell University, Ithaca, NY. This 3-day introductory course is co-sponsored by the IFT Continuing Education Committee, IFT Food Quality Assurance Division, and Cornell University. For further information, contact Institute of Food Technologist's Professional Development Department at 312.782.8424.

·**12-16, American Association of Cereal Chemists 82nd Annual Meeting,** at the San Diego Convention Center, San Diego, CA. The Annual Meeting includes a technical program, technical and poster sessions, table-top exhibits, new product/services sessions, educational short courses and social events. For additional information, contact AACC Headquarters, 3340 Pilot Knob Road, St. Paul, MN 55121-2097, or Phone: 612.454.7250; Fax: 612.454.0766.

·**13-16, ASI Fall Workshop, HACCP Workshop for Food Processors,** in Atlanta, GA. For information, contact Vicki Bodrow, ASI Food Safety Consultants, Inc. 7625 Page Blvd., St. Louis, MO 63133; Phone: 800. 477. 0778.

·**13-16, Environmental Seminar Series for Asian Processors,** in Las Vegas, NV. For more information, contact Sacha Helfand at 703.684. 1080; E-mail: fpmsa@clark.net.

·**20-22, AIB Sanitation and QA Managers' Update Seminar,** Manhattan, KS. This seminar has been tailored to meet the needs of plant sanitarians, quality managers, plant managers, and production supervisors who need to stay informed to make the right choices in today's challenging work environment. For additional information, contact AIB Food Safety, 1213 Bakers Way, Manhattan, KS 66502; Phone: 785.537. 4750; Fax: 785.537.1493.

·**20-23, Packaging Basics for the Food Industry, School of Packaging,** Michigan State University, E. Lansing, MI. This 3-day introductory course is co-sponsored by the IFT Continuing Education Committee, IFT Food Quality Assurance Division, and Cornell University. For further information, contact Institute of Food Technologists Professional Development Department at 312.782. 8424.

·**21-22, Food Safety Conference,** in Saratoga, NY. Co-Sponsored by IAMFES. The two-day conference will feature nationally-recognized food science experts and will provide quality assurance, plant, and line managers, regulators, and others involved in food processing with invaluable information on food safety. For further information, contact Carol Miklos at 802.656.5808.

·**22-24, Food Microbiology Symposium and Workshop,** The University of Wisconsin – River Falls, River Falls, WI. The symposium title is "Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology." A Rapid Methods in Food Microbiology workshop designed to provide practical demonstrations and discussion of various tests and instruments available for rapid detection, isolation and characterization of foodborne pathogens and toxins as well as prediction of shelf life and checking hygiene and sanitation in food processing facilities is also scheduled. For additional information, contact Dr. Purnendu C. Vasavada, Animal and Food Science Dept., University of Wisconsin – River Falls, River Falls, WI 54022 or Phone: 715.425.3150; Fax: 715.425.3785; E-mail: purnenduc.vasavada@uwrf.edu.

·**27-29, International Whey Conference,** sponsored jointly by the American Dairy Products Institute (ADPI), the U.S. National Committee of IDF (USNAC), and the International Dairy Federation (IDF), at the Westin Hotel O'Hare, Rosemont, IL. For additional information, contact American Dairy Products Institute, 130 N. Franklin St., Chicago, IL 60606; Phone: 312.782.4888/5455; Fax: 312.782.5299.

·**27-30, Freezing and Freeze-Drying of Microorganisms Workshop,** sponsored by the American Type Culture Collection (ATCC). For more information, contact ATCC, Workshop Coordinator, 12301 Parklawn Dr., Rockville, MD 20852; Phone: 800.359.7370; Fax: 301.816. 4364; E-mail: workshops@atcc.org.

·**28-29, 46th Annual Meat Industry Research Conference,** at the Chicago Hyatt Regency, Chicago, IL. This year's conference will feature sessions on microbial testing and nationwide microbial baselines; meat grading in the 21st century; meat quality; standards of identity; and new technologies, such as advanced meat recovery, packaging and case ready

meats. For more information, contact AMI's Manager of Education Services, Lora Williams in the Convention and Education Services Dept. at 703.841.2400.

·**29-2, Nov., Worldwide Food Expo 97,** Chicago, IL. The Dairy and Food Industries Supply Association (DFISA), the International Dairy Foods Association (IDFA), and the National Food Processors Association (NFPA) will cosponsor Worldwide Food Expo 97 in Chicago's McCormick Place. To have Worldwide Food Expo 97 information faxed to you, call 503.402.1352.

·**30-2 Nov., American Meat Institute's (AMI) 1997 International Meat Industry Convention and Exposition,** held in Chicago, IL at McCormick Place. For more information, contact AMI's Convention Management Group at 703.876.0900.

NOVEMBER

·**3-4, International Dairy Federation Symposium on Standards and Trade,** at the Palmer House Hilton Hotel in Chicago, IL. The symposium will examine the role of Codex Alimentarius, its relationship with the World Trade Organization (WTO) and its impact on dairy product standards – both national and international. For further information, contact Anne Divjak at the International Dairy Foods Association, 1250 H Street N.W., Suite 900, Washington, D.C. 20005; Phone 202.737.4332; Fax: 202.331.7820; E-mail: adivjak@idfa.org.

·**5-7, The Dairy Practices Council 1997 Annual Conference,** at the Harrisburg East Holiday Inn, Harrisburg, PA. For further information, contact The Dairy Practices Council, P.O. Box 866, Barre, VT 05641-0866; Phone/Fax: 802.476.3092; E-mail: Dairypc@aol.com.

·**10-12, Drug Product Stability and Shelf Life,** New Brunswick, NJ. The intent of this course is to explore fundamentals of current principles and practices concerning the stability of pharmaceutical and cosmetic products, degradation of such products by chemical, physical and microbiological factors, and the development, validation and application of a stability indicating assay. For further information, contact Registrar, The Center for Professional Advancement, P.O. Box 1052, East Brunswick, NJ 08816; Phone: 908.613.4500; Fax: 908.238.9113.

·**12-13, Food and Drug Administration's Veterinary Medicine Advisory Committee Meeting.** The topic will be veterinary medical issues related to the quality standards for the manufacture of animal drugs, such as current good manufacturing practices (CGMPs). For further information, contact Ms. Jacquelyn Pace, FDA/Center for Veterinary Medicine (HFV-200), 7500 Standish Place, Rockville, MD 20855; Phone: 301.594.5920; Fax: 301.594.4512.

·**17-20, ASI Fall Workshop, Food Safety and Sanitation,** in Chicago, Il. For information, contact Vicki Bodrow, ASI Food Safety Consultants, 7625 Page Blvd., St. Louis, MO 63133; Phone: 800.477.0778.

DECEMBER

·**3-5, 3rd Annual SERDP Symposium,** at the Washington Hilton Hotel, Washington, D.C. For the first time, it will sponsored in cooperation with the Environmental Security Technology Certification Program (ESTCP). For further information, contact SERDP Program Office, 901 N. Stuart St., Suite 303, Arlington, VA 22203; Phone: 703.696.2117; Fax 703.696.2114.

·**3-5, Good Clinical Practices,** San Francisco Bay Area, CA. This course will emphasize the specific responsibilities of those involved in clinical research along with the requirements by the federal agency to approve research developed for an NDA submission. For further information, contact Registrar, The Center for Professional Advancement, P.O. Box 1052, East Brunswick, NJ 08816; Phone: 908.613.4500; Fax: 908.238.9113.

·**8-10, Current Good Manufacturing Practice (cGMP) for the Pharmaceutical and Allied Industries,** Boca Raton, FL. For further information, contact Registrar, The Center for Professional Advancement, P.O. Box 1052, East Brunswick, NJ 08816; Phone: 908.613.4500; Fax: 908.238.9113.

JANUARY 1988

·**5-9, Ice Cream Makers' Short Course,** Madison, WI. Offered by the University of Wisconsin-Madison. This 5-day short course is for those involved in or interested in the manufacture of frozen desserts or frozen novelties. Program Coordinator: Dr. Bob Bradley, 608.263.2007. For additional information, contact the Program Coordinators or Department of Food Science, University of Wisconsin-Madison, Phone: 608.262.3046 or Fax: 608.262.6872.

·**12-15, Milk Pasteurization and Process Control School,** Madison, WI. Offered by the University of Wisconsin-Madison. This 4-day short course provides in-depth training for those dairy industry personnel involved with thermal processing of milk and milk programs. Program Coordinator: Dr. Bob Bradley, 608.263.2007. For additional information, contact the Program Coordinator or Department of Food Science, University of Wisconsin-Madison, Phone: 608.262.3046 or Fax: 608.262.6872.

·**29, Feb. 2, INDPACK '98 International,** International Exhibition & Conference for the Packaging Industry, in Mumbai (Bombay), India. For further information, contact Dusseldorf Trade Shows, New York, 70 West 36th St., Suite 605, New York, NY 10018; Phone: 212.356.0400; Fax: 212.356.0404; Web Site: http://www.dtsusa.com/dts/.

The International Association of Milk, Food and Environmental Sanitarians, Inc.
6200 Aurora Avenue, Suite 200W • Des Moines, Iowa 50322-2863 • 515.276.3344 or 800.369.6337

SHIP TO: (Please print or type. All areas must be completed in order to process.)

Name _____

Job Title _____ Company Name _____

Address _____

City _____ State or Province _____

Country _____ Zip/Postal Code _____

Office Telephone # _____ FAX # _____

IAMFES Booklets

Quantity	Description	Member or Gov't. Price	Non-Member Price	Total
	Procedures to Investigate Waterborne Illness–2nd Edition	$8.00	$16.00	
	Procedures to Investigate Foodborne Illness–4th Edition	6.00	12.00	
	Procedures to Investigate Arthropod-borne and Rodent-borne Illness	6.00	12.00	
	Procedures to Implement the Hazard Analysis Critical Control Point System	6.00	12.00	
	*Pocket Guide to Dairy Sanitation (minimum order of 10)	.50	.75	
	*A Guide to Food Safety in the Home (minimum order of 10)	.50	.75	
			Shipping/Handling (See Below)	
	Multiple copies available at reduced prices. Phone our order desk for pricing information on quantities of 25 or more.		Booklet Total	

3-A Sanitary Standards

Quantity	Description	Member or Gov't. Price	Non-Member Price	Total
	Complete Set 3-A Dairy & Egg Standards	$70.00	$140.00	
	Five-year Update Service on 3-A Dairy & Egg Standards	95.00	190.00	
			Shipping/Handling (See Below)	

Mail order to the IAMFES address listed above, or
call 515.276.3344, 800.369.6337 (U.S. and Canada);
or **fax** your order to 515.276.8655.

Method of Payment

❑ CHECK OR MONEY ORDER ENCLOSED

❑ MASTERCARD ❑ VISA ❑ AMERICAN EXPRESS

Exp. Date _____

SIGNATURE _____

PAYMENT MUST BE ENCLOSED FOR ORDER TO BE PROCESSED

★ U.S. FUNDS ON U.S. BANK ★

Shipping and Handling

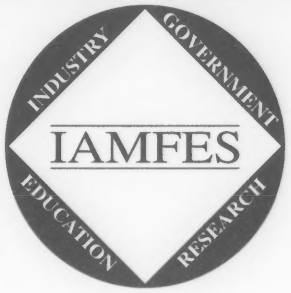
IAMFES booklets

Within U.S.
First booklet $2.00
Each additional booklet $1.00
*Guide Booklets–per 10 ..... $2.50

Outside U.S.
First booklet $4.00
Each additional booklet $1.00
*Guide Booklets–per 10 ..... $3.50

3-A Sanitary Standards
Within U.S. (each item) $6.25
Outside U.S. (each item) $10.25

Prices effective through August 31, 1998



Your Invitation to Join

The International Association of Milk, Food and Environmental Sanitarians, founded in 1911, is a non-profit educational association of food safety professionals with a mission *"to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."*

* Who are IAMFES Members?

The Association is comprised of a diverse membership of more than 2,800 people from 50 nations. IAMFES Members belong to all facets of the food protection arena including: Industry, Government and Academia.

* What are your Benefits as an IAMFES Member?

Dairy, Food and Environmental Sanitation — A reviewed monthly publication that provides practical and applied research articles and association news, updates, and other related information for food safety professionals. All IAMFES Members receive this publication as part of their membership.

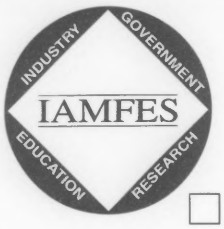
Journal of Food Protection — An international, refereed scientific journal of research and review papers on topics in food science and food aspects of animal and plant sciences. This journal is available to all individuals who request it with their membership.

The IAMFES Lending Library — Provides quality training videos dealing with various food safety issues. IAMFES Members are allowed free use of these videos.

The IAMFES Annual Meeting — Is a unique educational event; three days of technical sessions, symposia and exhibits provide attendees with over 200 presentations on current topics in food protection. IAMFES Members receive a substantially reduced registration fee.

* To Find Out More...

To learn more about IAMFES and the **many** other benefits and opportunities available to you as a Member, please call 515.276.3344 or 800.369.6337; Fax: 515.276.8655; E-mail: iamfes@iamfes.org.



International Association of Milk, Food and Environmental Sanitarians

MEMBERSHIP APPLICATION

MEMBERSHIP

☐ Membership with JFP and DFES $120.00
(12 issues of the *Journal of Food Protection* **and** *Dairy, Food and Environmental Sanitation*)

◀ **BEST VALUE**

☐ Membership with DFES $75.00
(12 issues of *Dairy, Food and Environmental Sanitation*)

☐ Check here if you are interested in information on joining your state/province chapter of IAMFES

SUSTAINING MEMBERSHIP

☐ Membership with BOTH journals $525.00
(Includes exhibit discount, Annual Meeting issue advertising discount, company monthly listing in both journals and more)

STUDENT MEMBERSHIP*

☐ Membership with JFP and DFES $60.00

☐ Membership with *Journal of Food Protection* $37.50

☐ Membership with *Dairy, Food and Environmental Sanitation* $37.50

***FULL-TIME** STUDENT VERIFICATION MUST ACCOMPANY THIS FORM

Shipping Charges: Outside U.S. _____ Surface ($22.50 per journal) _____ AIRMAIL ($95.00 per journal)

PLEASE TYPE...ALL AREAS MUST BE COMPLETED FOR ORDER TO BE PROCESSED

Name _____ _____ _____
First Name M.I. Last Name

Company Name _____ Job Title _____

Address _____

City _____ State or Province _____

Country _____ Postal/Zip +4 _____

Office Telephone # _____ Fax # _____

E-mail # _____

Membership: ___ New ___ Renewal

Mail Entire Form to:
IAMFES
6200 Aurora Ave, Suite 200W
Des Moines, IA 50322-2863

OR Use Your Charge Cord:
800.369.6337 (U.S. & Canada)
515.276.3344
515.276.8655 Fax

U.S. FUNDS on U.S. BANK

Method of Payment

☐ CHECK OR MONEY ORDER ENCLOSED

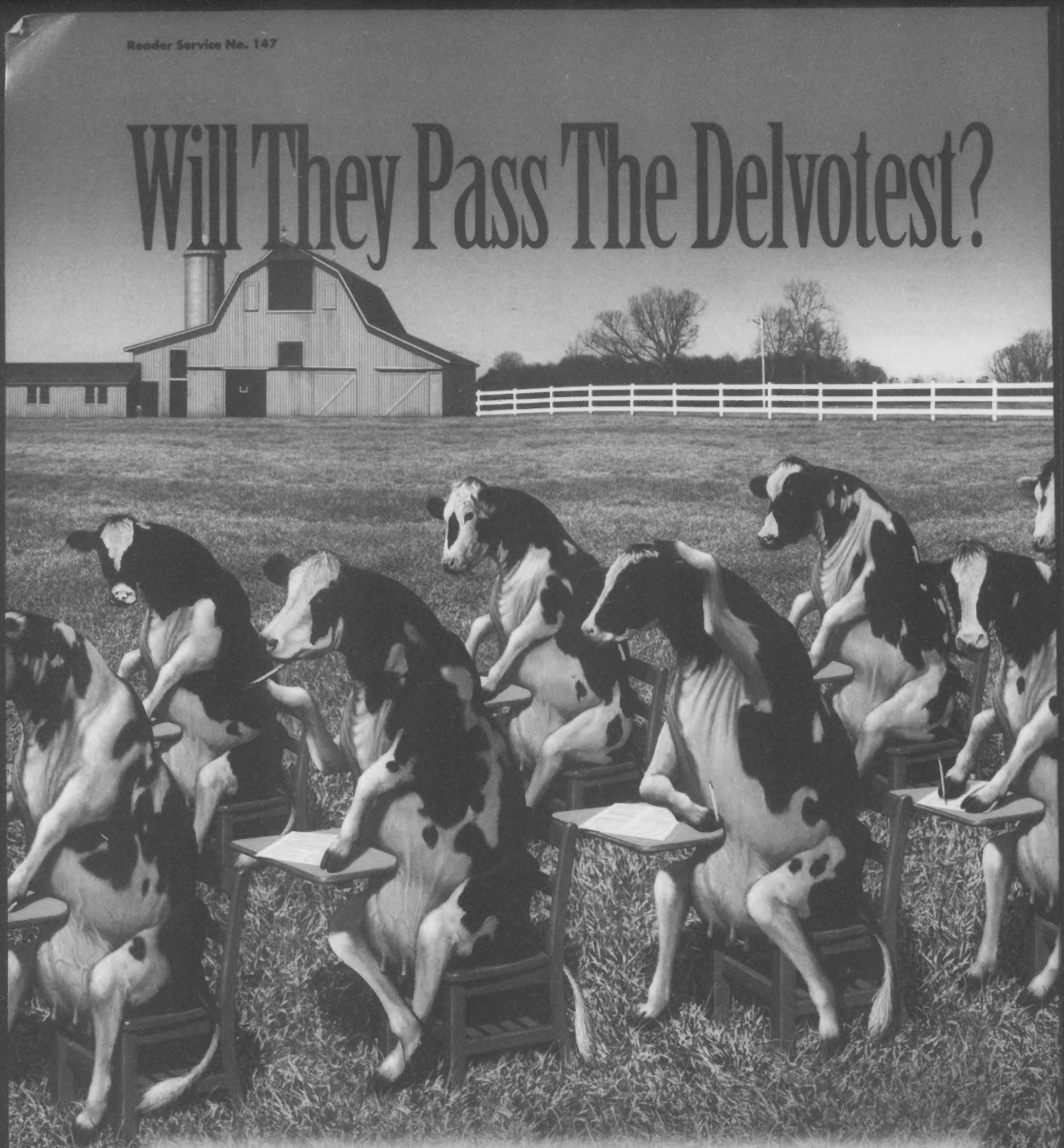
☐ MASTERCARD ☐ VISA ☐ AMERICAN EXPRESS

Exp. Date _____

SIGNATURE _____

Prices effective through August 31, 1998

Will They Pass The Delvotest?



Losing milk to antibiotic contamination can be just as costly to your operation as to that of the farmers who supply you. That's why we developed Delvotest, a simple, reliable test to detect antibiotic residues in milk before they can contaminate your dairy farmers' bulk tanks. Standardized and self-contained, Delvotest quickly and accurately detects the presence of Beta Lactam and most other veterinary antibiotics. Delvotest is easy to use and, at about a dollar a test, extremely economical for large- and small-scale operations. So encourage your dairy farmers to take the Delvotest. They'll pass a safer product on to you.

Gist-brocades

N93 WI14560 WHITTAKER WAY, MENOMONEE FALLS, WI 53051, 800-423-7906, FAX 414-255-7732