ISSN: 1043-3546

September • 1991

502 E. Lincoln Way • An

Vol • 11 • No. 9 • Pages 481-552

DAIRY, FOOD AND ENVIRONMENTAL

SANITATION

SEPTEMBER 1991

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

The Best Defense is a Good Offense

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

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

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

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

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

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

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

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

SB
SmithKline Beecham
Animal Health

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

See Us at Food & Dairy Expo '91, Booth #733

Please circle No. 218 on your Reader Service Card

Penzyme® is licensed from UCB Bioproducts

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

IAMFES

International Association of Milk, Food and Environmental Sanitarians Inc

JFP
DFES
9/91

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

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

Name _____ Title _____

Company _____

Address _____

City _____ State/Prov. _____

Country _____ Zip _____

Phone Number _____

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

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

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

IAMFES

International Association of Milk, Food and Environmental Sanitarians Inc

JFP
DFES
9/91

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

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

Name _____ Title _____

Company _____

Address _____

City _____ State/Prov. _____

Country _____ Zip _____

Phone Number _____

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

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

Place
Stamp
Here

IAMFES

502 E. Lincoln Way
Ames, Iowa 50010

Place
Stamp
Here

IAMFES

502 E. Lincoln Way
Ames, Iowa 50010

IAMFES

Announcement
Developing Scientists Awards

(Supported by Sustaining Members)

Awards

Five (5) awards will be presented: 1st place, $500 and a plaque; 2nd place, $200 and a certificate; 3rd place, $100 and a certificate; 4th place, $50 and a certificate; 5th place, $50 and a certificate. All of the winners will receive a 1 year membership including both *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection.*

Purpose

1. To encourage graduate students to present their original research at the IAMFES annual meeting.
2. To foster professionalism in graduate students through contact with peers and professional members of IAMFES.
3. To encourage participation by graduate students in IAMFES and the annual meeting.

Who Is Eligible

Graduate students enrolled in M.S. or Ph.D. programs at accredited universities or colleges whose research deals with problems related to environmental, food and/or dairy sanitation, protection and safety. Candidates cannot have graduated more than one (1) year prior to the deadline for submitting abstracts.

Criteria

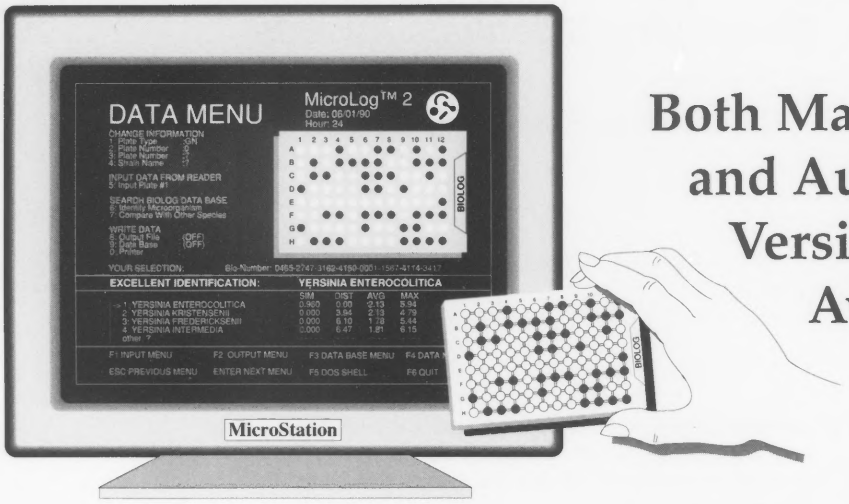
1. A short abstract of the paper must be submitted to the IAMFES office by December 16, 1991. (Use the blue abstract forms from the September issue, if possible).
2. The author must indicate on the abstract form the desire to be considered for the competition.
3. The paper and the student must be recommended and approved for the competition by the major professor or department head.
4. The paper must represent original research done by the student and must be presented by the student.
5. An extended abstract form will be sent to all who enter the competition, and must be completed and returned by the deadline date on that form.
6. Each student may enter only one (1) paper in the competition.
7. Papers are to be presented as oral papers and should be approximately fifteen (15) minutes in length with an additional five (5) minutes allowed for questions, for a total of twenty (20) minutes.
8. The use of slides or other visual aids is encouraged.
9. **All students with accepted abstracts entered in the competition will receive a complimentary membership which includes their choice of *Dairy, Food and Environmental Sanitation* or the *Journal of Food Protection.***
10. The papers will be judged by an independent panel of judges.
11. Winners are presented and honored at the annual Awards Banquet. All entrants will receive complimentary tickets and are expected to be present at the Banquet.

Publishers of the *Journal of Food Protection* and *Dairy, Food and Environmental Sanitation*

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

502 E. Lincoln Way, Ames, Iowa 50010 - (515)232-6699 - (800)-369-6337 (US) - (800)284-6336 (Canada) - FAX (515)232-4736

Biolog's Bacteria Identification System Now - For Food Microbiologists



Both Manual and Automated Versions Available

The GN MicroPlate™ Identifies over 500 Gram-negatives

Salmonella, Shigella, Escherichia, Yersinia, Vibrio, and many more

The GP MicroPlate™ Identifies over 200 Gram-positives

Listeria, Lactococcus, Streptococcus, Staphylococcus, Bacillus, and many more

Biolog's MicroPlate™ test panels are 96 well microplates preloaded with a versatile set of 95 different carbon utilization tests. The panels can identify over 700 species/groups of pathogenic and environmental bacteria currently in the data base. To identify an isolate you simply 1) culture the bacterium on an agar plate, 2) prepare a cell suspension in normal saline, 3) inoculate the panel with the cell suspension, and 4) incubate for 4 or 24 hours. The panels use Biolog's patented redox chemistry to detect utilization of carbon sources. If a carbon source in a well is utilized, the cells increase their respiration, reduce the tetrazolium dye, and the well turns purple.The panels cost as little as $3.99 each.

Biolog's MicroLog™ Software is used to identify the bacterium from the pattern that results. The software will run on any IBM - compatible PC. With MicroLog 1 the reactions are read by eye and entered by keyboard onto the screen display. With MicroLog 2 reactions can be entered directly from a microplate reader. Biolog's MicroStation™ Reader can read a plate and transfer the data to the computer in only 5 seconds. The same instrumentation can also be used for enzyme assays, chemical assays, and ELISA testing. For further details contact us by phone, fax, or mail.

Biolog, Inc. 3447 Investment Blvd., Suite 2, Hayward, CA 94545
Sales 800-284-4949 • Phone 510-785-2585 • Fax 510-782-4639

BIOLOG
One Universal Chemistry for Microbiology

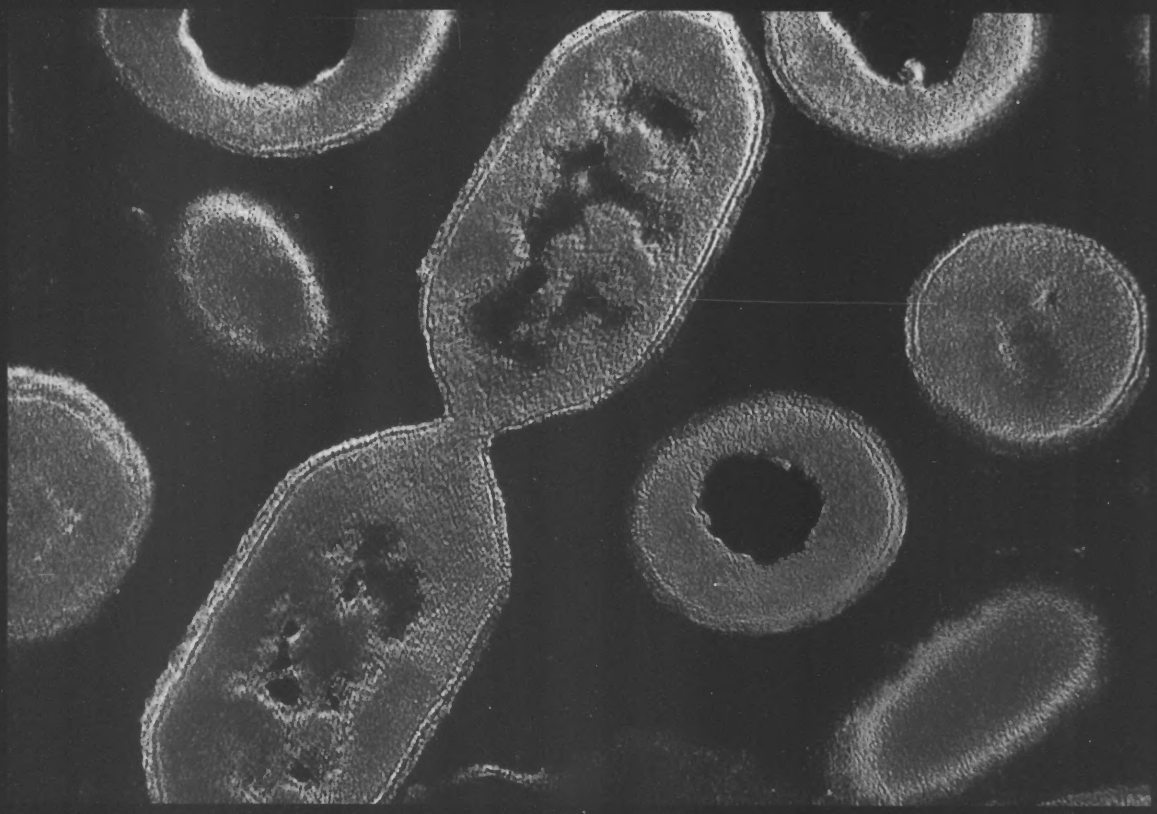
I am interested in Biolog's technology for:

Name | Organization

Address | City

Country | Phone ( )

Please circle No. 137 on your Reader Service Card



Wherever Listeria Remains A Threat, Rio Linda Can Be Your Best Defense.

False-color transmission electron micrograph of a colony of *Listeria Monocytogenes*.

Rio Linda chlorine dioxide products are setting a new standard of excellence for in-plant sanitation. Our patented Chlorine Dioxide Foam System provides the proven superior environmental protection necessary to meet today's higher standards. It is biodegradable and environmentally safe. DuraKlor is our proprietary microbiocide for in-plant fogging and misting, with controlled and sustained release of chlorine dioxide. And Orenco 4300 is our chlorine dioxide stable lubricant for conveyor chains and belts. Our CIP cleaning and descaling system for enclosed processing lines combines surfactants with descalers and chlorine dioxide in a single unit. A real in-plant advantage.

The quintessence of patented technology is found in the broad range of Rio Linda custom generation systems (more than 75 different types) to produce aqueous solutions of chlorine dioxide. It will pay you to consider this as you weigh the advantages of chlorine dioxide itself. A broad-spectrum microbiocide that requires minimum contact time—a few seconds to a few minutes. Effective over a wide ph range and works at lower concentrations than most antimicrobials. Does not react with water to produce hypochlorous and hydrochloric acids. Is not a chlorinating agent. Does not react with ammonia to form chloramines. Does not impart off-tastes and odors to foods or water. And is a powerful deodorizer.

Today you will find more Rio Linda products, systems and technical service representatives than ever working in the food, milk, dairy and beverage industries. Wherever viruses, fungi, mold and bacteria like *Listeria Monocytogenes* pose a threat, Rio Linda could be your best defense. Put us to the test. Your test. Call Don English or Linda Hanna at 916-443-4939 or 1-800-877-5022 for information on our chlorine dioxide products and technical services for innovative problem solving.

RIO LINDA

RIO LINDA CHEMICAL COMPANY, INC.
410 N. 10th Street, Sacramento, CA 95814

TENNECO A Tenneco Company

Please circle No. 176 on your Reader Service Card

See us at Food & Dairy Expo '91, Booth #2146

IAMFES Sustaining Members

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

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

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

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

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

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

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

Analytical Luminescence Laboratory, Inc., 11760 E. Sorrento Valley Road, San Diego, CA 92121; (619)455-9283

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DBK, Incorporated, 517 S. Romona, #208, Corona, CA 91719; (714)279-5883

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Meritech, Inc., 8250 S. Akron Street, Englewood, CO 80112; (303)790-4670

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Vol. 11 No. 9 SEPTEMBER 1991

Dairy, Food and Environmental Sanitation CONTENTS

Articles:

Association News:

ABOUT THE COVER . . . *Photo courtesy of the North Dakota Tourism Promotion, Logging Camp Ranch, Bismarck, ND.*

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

Manuscripts: Correspondence regarding manuscripts and othar raading materials should be addressed to Margaret Marble, 502 E. Lincoln Way, Ames, IA 50010-6666. 515-232-6699.
"Instructions to Contributors" can be obtained from the editor.
Orders for Reprints: All orders should be sant to DAIRY, FOOD AND ENVIRONMENTAL SANITATION, IAMFES, Inc., 502 E. Lincoln Way, Ames, IA 50010-6666. Note: Single copies of reprints are not available from this address; address reprint requests to principal author.
Business Matters: Corrasponcence regarding business matters should be addressed to Steven K. Halstead, IAMFES, 502 E. Lincoln Way, Ames, IA 50010-6666.
Subscription Rates: $100.00 per year. Singla copies $10.00 aach. No cancellations accepted. U.S. FUNDS ONLY.
Sustaining Membership: A sustaining membership in IAMFES is available to companies at a rata of $475 per year, which includes $100 credit toward an ad in tha "annual meeting issua" of the Journal, the July issua. For more information, contact IAMFES, 502 E. Lincoln Way, Ames, IA 50010-6666, 515-232-6699.
Membership Dues: Membership in the Association is availabla to individuals only. Direct dues are $50 per year and include a subscription to **Dairy, Food and Environmental Sanitation**. Direct dues and the **Journal of Food Protection** are $80.00. Affiliate and International Membership include both journals for $80, plus affiliate duas. Studant mambership is $25.00 per year, with verification of student status, and includes **Dairy, Food and Environmental Sanitation** or **Journal of Food Protection**. No cancellations accepted.
Claims: Notice of failure to receive copies must be reported within 30 days domestic, 90 days foreign. All correspondence regarding changes of address and dues must be sent to IAMFES, Inc., 502 E. Lincoln Way, Ames, IA 50010-6666, 515-232-6699
Postage: Canada and foreign add $15 PER journal subscription. U.S. FUNDS ONLY-ON U.S. BANK. Single copies add $7.00.

Thoughts From The President . . .

By
Damien A. Gabis
IAMFES President

For those who were not able to attend, I want to report that the IAMFES Annual Meeting in Louisville was a success story for our Association. I want to thank all those who worked to make it happen. The teamwork, enthusiasm, and dedication resulted in an excellent meeting for all who attended. The Annual Meeting is the embodiment of the Objectives of IAMFES found in our Constitution and Bylaws. From the beginning, with the keynote Ivan Parkin Lecture by Gary Hanman (CEO, Mid-America Dairymen) to the last session on Wednesday afternoon, the meeting was a constant experience of high quality inspiration and information.

Thanks to the Kentucky Association of Milk, Food and Environmental Sanitarians for graciously hosting us at The Galt House in Louisville. Dale Marcum, the local arrangements chairperson, and his colleagues worked very hard to make our social program a pleasant experience.

The Program Advisory Committee (PAC) under Professor John Bruhn's leadership organized a very high quality technical program. Technical program development through the work of the PAC continues to improve the Annual Meeting. Many new attendees voiced their approval of the technical content of the program, and said they would be back next year. Some people indicated that the IAMFES meeting's focus on food protection issues is the most important reason for their attending. I know for me, that the chance to talk with my old friends to catch up on the news is a major reason for attending the meeting. At the same time, many new friends are made each year. The moderate size of our meeting permits greater chances for sharing among the participants.

The speakers in the eleven symposia provided plenty of opportunities for the attendees to find out the latest information and ideas in the different subject areas covered. While all of the symposia were outstanding, I believe that the "Computers in Food Protection" session of Charles Otto generated quite a high level of interest not only because of the technical content alone, but also because of the demonstrations of the software. In the technical sessions, new and useful data were shared with attendees by those who reported on their research findings and field experiences.

Interactions with colleagues from other associations that work in food protection allowed attendees to learn more about the food protection activities of these other groups. There was much sharing of information and ideas in the informal meetings and friendly conversations going on in the hallways and exhibit area.

The "Workshop on Procedures to Investigate Foodborne Illness" conducted by Dr. Frank Bryan was attended by 39 participants. I heard many favorable comments from participants about the good value of the workshop. The experimental success with this first offering is great encouragement for future workshops at the Annual Meeting. Many thanks to Dr. Bryan for putting the workshop together and presenting it.

Another "great experiment" at this year's meeting was the Poster Session. This too was a great success. Bruce Langlois marshalled the event. The Program Committee for next year's meeting in Toronto has committed to making the Poster Session a permanent feature of our meeting.

The IAMFES Video Theater was yet another new introduction on this year's agenda. Dr. Dave McSwane coordinated the programs. The theater was well-attended at all times during the showings. This is a great opportunity to showcase IAMFES' video lending library. The video theater will be included in next year's program.

The excellent work of the entire Ames staff in putting the meeting together, coordinating all the different facets including registration, allowed the meeting to flow as smoothly as it did. All the staff contributed to the success of the meeting, but I would like to especially recognize the leadership of Steve Halstead, Margie Marble, Scott Wells, Julie Heim, Dee Buske and Chris Ricke for their individual contributions.

I want to thank the exhibitors for their continuing moral and financial support of our Association. The exhibits provide yet another opportunity for the attendees to learn about new products and services that can help carry out the work of our profession. The support of the exhibitors in recognizing that the IAMFES Annual Meeting has a long tradition as an educational meeting is particularly appreciated.

Unfortunately, attendance was lower this year than last. Many attendees said that budgetary restrictions at all levels of government, academia, and industry prevented quite a few regulars from attending this year's meeting. Nevertheless, there were some members who attended the meeting at their personal expense.

Congratulations to all the award winners! Your recognition for outstanding contributions and achievements in food protection is well-deserved.

Special congratulations go to Andrea Baloga who placed first in the Developing Scientist Competition with her paper titled "Comparison of Methods for Molecular Epidemiology of *Listeria monocytogenes*." Dr. Jim Marshall coordinated this year's competition.

I want to welcome Dee Clingman, our new Secretary, and bid adieu to Ron Case who is leaving the Board as Past President. Ron has served IAMFES for five productive years as a member of the Executive Board. I want to thank Bob Sanders for his hard work and the contributions he has made to IAMFES over the years, and I want to especially recognize his leadership this past year as President. I personally want to thank Ron Case along with Bob Sanders, and Bob Gravani, our President in 1988-89, for having been my mentors in teaching me the "ropes" of the duties at each position in which I have served on the Board.

The Program and Local Arrangements Committees are already hard at work preparing for next year's meeting in Toronto. Start making *your* plans *now* to attend. The IAMFES Annual Meeting is very worthwhile for anyone working in food protection.

On My Mind . . .

By
Steven K. Halstead
IAMFES
Executive Manager

In going over the evaluations of the annual meeting, I came across one that I would like to share with you. The evaluator was taking us to task for including the price of the Awards Banquet in the registration fee.

This was the first year that we had done it. Our thinking was that this would encourage people to attend. The Banquet is the premiere event for a voluntary association as it is at the Banquet that those who have demonstrated outstanding service to the association can be recognized by their peers for their good deeds. In other words, it is an association's way of saying "Thanks".

One reason why some people don't attend the Awards Banquet is because their employer won't pay for it. By including the Banquet ticket in the Registration fee theoretically gets around that problem and allows more people to attend. Also, it stands to reason that if people have already paid for the activity, they will be more likely to attend.

The down side of this arrangement is that some people resent having to pay for an activity whether they attend or not.

A lesser point in favor of continuing the practice at least a second year is that in the first year we educated the registrants to what we were doing, and to change from that again, would only serve to further the confusion.

Both sides have pretty powerful arguments. It remains for the Executive Board to determine what we will do next year.

The evaluator also made the point that we should be ashamed of ourselves for wasting all that food. To quote: "Wasting food is not ethical when many people are starving all over the world."

I couldn't agree more.

In planning conventions, hotels force us to guarantee a certain number of meals forty-eight hours in advance. This means that we pay for that number or more. For example, if we guarantee 300 for a function and only 250 show up, we still have to pay for 300. However, if 325 show up, we pay for 325.

"Wasting food is not ethical when many people are starving all over the world."

Realizing that we were going to have to estimate the number of meals we would need, we made arrangements with the Family Shelter in Louisville to have all extra food delivered there. Had we guaranteed more meals than we needed, the extras would have been donated to the Shelter. As it ends up, we underestimated each time, so there was no extra food. No food was wasted.

Nearly all associations that I know of are now donating their overages to food pantries, shelters, etc. You might want to check what your local group is doing. Also, what about the extra food at your company's cafeteria? If it is just being thrown out, perhaps it could be put to good use locally.

"Wasting food is not ethical when many people are starving all over the world."

They've been spotted at 20,000 feet.

In the 95°C hot springs of Yellowstone.

They can survive at -10°C.

But not on a Macroseptic® floor.

STUDIES SHOW BACTERIA CAN FLOURISH IN VIRTUALLY ANY ENVIRONMENT. EXCEPT ONE.

The environment that offers you the most protection from bacteria could be right beneath your feet. It's the new Macroseptic® Flooring System from General Polymers, the only biostatic seamless floor available today.

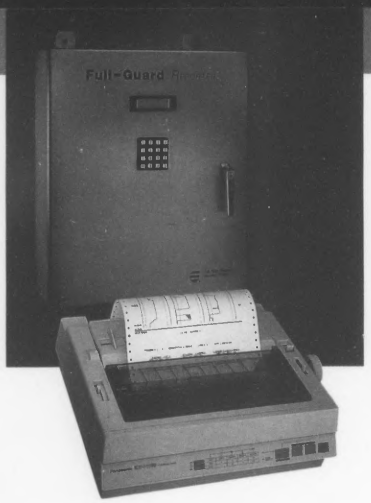
Studies show Macroseptic floors can reduce Gram-positive and Gram-negative bacteria growth by more than 90%, yet are safe for both humans and animals.*

Macroseptic is a permanent solution to bacterial control because the patented antimicrobial agent, Intersept,® is built right into the floor. E.P.A. registered, it won't wash off or wear off. It's also available for hardsurface walls.

If you're concerned about the bacteria in your working environment, call 1-800-543-7694 (513-761-0011 in Ohio) for information or an on-site survey. Or if you prefer, you can write to us at General Polymers, 145 Caldwell Drive, Cincinnati, Ohio 45216. We'll go anywhere you find bacteria. Well, almost anywhere.

General Polymers

*Data on file. ©1991 General Polymers Corporation. All rights reserved. Macroseptic and Intersept are registered trademarks of Interface Research Corporation. Macroseptic with Intersept is protected under U.S. Patent Registration No. 4647601. Intersept antimicrobial is E.P.A. registered under No. 43670-1.



Introducing Monarch's

Full-Guard Reporter™

The Full-Guard Reporter is engineered to monitor your food processing equipment's cleaning and rinsing cycles more accurately and more thoroughly than conventional monitoring systems.

The Full-Guard Reporter gives you graphic information on cleaning cycle flow, temperature and conductivity...an accurate identification of precisely what's being cleaned...an alarm system that instantly alerts operators of malfunctions.

For more information, call the Monarch Division of H.B. Fuller Company: 1(800) 328-4594.

FULL-GUARD SECURITY

H.B. Fuller Company
Monarch Division

Please circle No. 131 on your Reader Service Card

See us at Food & Dairy Expo '91, Booth #1565

Dairy, Food and Environmental Sanitation, Vol. 11, No. 9, Pages 491-493 (September 1991)

3-A Update

Thomas M. Gilmore,
3-A Secretary,
DFISA, 6245 Executive Boulevard, Rockville, MD 20852

Summary

The 3-A Sanitary Standards Committees met twice in the previous nine months. There were 28 tentative 3-A documents (two tentative practices and 26 tentative standards) reviewed by the 3-A Committees. At these two meetings, 13 tentative 3-A Standards and two tentative 3-A Practices were approved by the 3-A Committees. The new, revised or amended 3-A documents will be published in the first six to nine 1992 issues of *Dairy, Food and Environmental Sanitation* . Pre-prints are available from the 3-A Secretary.

Tentative 3-A Standards or Practices Approved for Publication

3-A Sanitary Standards for Hose Assemblies for Milk and Milk Products, Number 08-17L.

3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Vacuum Breakers and Check Valves), Parts I and II Number 08-17M.

3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Fittings and Plug-Type Valves), Parts I and II, Number 08-20.

Amendments to Parts I & II of the 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Diaphragm-Type Valves), Number 08-20B.

Revisions to 3-A Sanitary Standards for Silo-Type Storage Tanks for Milk and Milk Products, Number 22-05.

Amendments to 3-A Sanitary Standards for Sifters for Dry Milk and Dry Milk Products, Number 26-02.

Amendments to 3-A Sanitary Standards for Flow Meters for Milk and Liquid Milk Products, Number 28-02.

Revisions to 3-A Sanitary Standards for Air Eliminators for Milk and Fluid Milk Products, Number 29-01.

Revisions to 3-A Sanitary Standards for Scraped Surface Heat Exchangers, Number 31-01.

Amendments to 3-A Sanitary Standards for Portable Bins for Dry Milk and Dry Milk Products, Number 34-02.

3-A Sanitary Standards for Refractometers and Energy Absorbing Optical Sensors for Milk and Milk Products, Number 46-00.

3-A Sanitary Standards for Sonic Horns, Number 49-00.

3-A Sanitary Standards for Level Sensing Devices for Dry Milk and Dry Milk Products, Number 50-00.

Revisions to 3-A Accepted Practices for the Sanitary Construction, Installation, Testing and Operation of HTST and HHST Pasteurizer Systems, Number 603-06.

Amendments to 3-A Accepted Practices for Permanently Installed Product and Solution Pipelines and Cleaning Systems Used in Milk and Milk Product Processing Plants, Number 605-04.

The serial numbers above are those of the revised or amended 3-A documents.

Further Revision by Task Committees Necessary

There were six tentative 3-A documents reviewed by the 3-A Committees in November or May or both which were returned to the appropriate equipment task committees for further revision.

Tentative Amendments to 3-A Sanitary Standards Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Pressure Reducing and Back Pressure Valves), Parts I & II, Number T-08-17N, First Revision, February 1991. The User-Committee returned this tentative document back to the Fittings Task Committee for preparation of a second revision. The User-Committee and the Sanitarian Committee recommended numerous substantive changes to be included in the second revision. The revision will include criteria for pneumatic self-acting valves and heat sterilization for air and pneumatic type valves. The second revision will be reviewed in joint User/Task Committee session during the May 1992 3-A Sanitary Standards Committees meeting.

Tentative Revisions to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Automatic Positive Displacement Samplers), Parts I and II, Number 08-17D, Proposal, February, 1991 was returned to the task committee with a request for a first revision to be resubmitted to the User Committee for a second joint discussion. The User Committee questioned the limits of product contact surfaces and whether, thread surfaces are or are not in the product contact zone. There was also an unresolved issue of a non-smooth finish on certain non-

product areas. The task committee is also to reconsider the scope of these standards.

Tentative Amendments to 3-A Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Fittings and Plug-Type Valves), Number 08-17 as amended, Proposal, February 1991. This document was returned to the task committee because of 3-A Steering Committee action on a request to separate fittings and plug valves into two standards. Recommendations to the task committee made by the User Committee when preparing the new standards are to include provisions for glass and plastic fittings, define a CIP fitting, rewrite the scope for both new standards, include mechanical cleaning criteria in both, include necessary criteria for clamp-type fittings, review all sections for currently used verbiage and to move the drawings in Part II to the appropriate lettered 08 standard. The task committee shall also review the number system for this series. This will require a task committee meeting and re-submission to the User Committee for a second joint discussion during the May 1992 3-A Sanitary Standards Committees meeting.

Tentative Amendments to 3-A Sanitary Standards for Instrument Fittings and Connections Used on Milk and Milk Products Equipment, Number 09-08, Proposal, September 1990. This document was returned to the task committee for a title and scope change, additional definitions for pressure and temperature sensors, and other items agreed to by most committee members. Expanded detail on the drawings was also requested. The User Committee will review and ballot on the first revision by letter.

Tentative Revisions to 3-A Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13-08, Fourth Revisions, May 1990. The SSS and task committee agreed to most of the requested changes. The cooling requirements need further revising by the task committee. The User Committee will review and ballot a fifth revision by letter.

Tentative Amendments to 3-A Sanitary Standards for Formers, Fillers and Sealers of Single Service Containers for Milk and Fluid Milk Products, Number 17-07, Second Revision, November 1990. The Sanitarians referred this tentative document back to the task committee for a major rewrite. The Sanitarian Committee offered a proposed scope and outline form for the Fillers and Sealers Task Committee to consider. The scope is intended to cover all types of liquid filling equipment such as that used to (l) form fill and seal paper containers, (2) fill and cap plastic preformed containers, (3) to fill and close bag-in-box containers, (4) form, fill and seal aseptic hermetically sealed containers, and (5) form-fill-seal containers. The Sanitarians also recommended that work be continued on tentative revisions to 3-A Sanitary Standards for Equipment for Packaging Frozen Desserts, Cottage Cheese and Similar Milk Products, Number 23-01. A meeting of the Fillers and Sealers, and Ice Cream-Cottage Cheese Fillers Task Committees is required to consider these requests. Both documents will have to be resubmitted to the User Committee for consideration at the May 1992 3-A Committees meeting.

Tentative Revisions to 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-14 as amended, Third Revision, November 1990. Most of the changes discussed were agreeable to both User and task committees. The Plastic Committee chair has supplied the necessary changes. The User Committee will review and ballot by letter.

Minor Revisions Only

There were three review documents considered by the User Committee and moved directly to the Sanitarian Committee without any intervening review by the task committees or User Committee. They are:

(l) Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, (Inlet and Outlet Leak Protector Type Valves), Number 08-19E, Proposal, February 1991.

(2) Tentative Amendments to 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-14 as amended, Proposal, September 1990.

(3) Tentative Revisions to 3-A Sanitary Standards for Uninsulated Tanks for Milk and Milk Products, Number 32-01, Third Revision, May 1990.

Further Development Ceased

Tentative 3-A Sanitary Standards for Fittings Use on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Butterfly Valves), Number T-08-17K, First Revision, February 1991. The User Committee raised concerns about mechanical cleaning, and the ability to easily disassemble this style of valve for manual cleaning and inspection.

Tentative Amendments to 3-A Sanitary Standards Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Compression-Type Valves), Parts I & II, Number T-08-20A First Revision, November 1990. The Sanitarians Committee recommendation was to refer this tentative document back to the Fittings Task Committee and to incorporate appropriate portions of T-08-20A into tentative 3-A Standards T-08-17N - Pressure Reducing and Back Pressure Valves and cancel T-08-20A. (Task Committee and User Committee members agreed with these recommendations.) Task Committee members are preparing a second revision to 3-A T-08-17N accordingly.

Tentative 3-A Sanitary Standards for Formers, Fillers and Sealers and Other Packaging Equipment for Milk and Milk Products in Single Service Containers and Packages, Number T-51-00, Second Revision, November 1990. The Sanitarian Committee recommended that the task committees discontinue any further work on the document. The scope is too broad and these proposed standards would cover too many types of equipment, rendering this an unusable document.

Steering Committee Highlights

The Steering Committee is the policy setting group for

the 3-A program, and reviews requests for new standards activities.

There were five requests for new 3-A standards activity which included revisions to 17 existing 3-A documents plus a request for new standards for quick disconnect valves. The 3-A Steering Committee referred requests for revisions or amendments to 3-A 08-17, 3-A 27-01 and 3-A 44-00 to appropriate equipment task committees and requested more information before proceeding with others.

The 3-A Steering Committee approved a request to establish a Spray Drier Task Committee. Anyone interested in being a member of this new committee, please contact the 3-A Secretary.

The 3-A Steering Committee discussed what documentation is necessary before a plastic material is listed in the "Partial List of Plastics..."

(l) Plastics must meet FD&C Act criteria for food contact.

(2) All plastics for listing must be tested according to and meet the criteria for acceptance in 3-A Standards 20-14 as amended, or most current revision thereof. (Note: items 1 and 2 are now and have been the policy).

(3) Re-testing a plastic material already meeting (l) and (2) above, by a fabricator of plastic parts, need not be done provided:

(a) The fabricated part was made from the same resin as was used for preparing samples used for previous testing i.e. no change in chemical composition of the final fabricated part is allowed without further testing.

(b) The manufacturing processes used for manufacturing the final fabricated parts are substantially the same as those used in preparing the test samples.

(c) Certification of (1), (2) and (3), (a) and (b) must be made in writing to the 3-A Secretary.

Following a general discussion on 3-A SOP, the 3-A Steering Committee recommended the following:

(l) All request for revisions or new 3-A document must contain the following:

(a) Proposed Scope (mandatory for new documents and for revisions of 3-A documents if the proposed revisions require a change in scope),

(b) Brief but understandable description of the proposed project,

(c) Justification and, if any, the public health significance, and

(d) Descriptive literature or photographs and line drawings.

(2) The SOP will be changed to include representation from Sanitarians, United States Public Health Service and the User Committee during 3-A task committee meetings to assist in preparing proposals for new or revised 3-A documents.

3-A Steering Committee members reviewed data on measuring surfaces using stylus profilometers, and a portable stylus-type profilometer was demonstrated. The Committee recommended an Ra of 35 micro-inch be included as an Appendix section of new and revised standards for consideration by the 3-A Committees as a numerical measurement of a number 4 finish on stainless steel sheets. Procedures and terms shall be according to American National Standard, ASME/ANSI B46.1 1985, Surface Texture, (Surface Roughness, Waviness, and Lay) or ISO Standard, ISO 4287/1, Surface Roughness - Terminology - Part I: Surface and Its Parameters.

Future 3-A Sanitary Standards Committee meetings through 1997 will be the third full week in May and held in Milwaukee, Wisconsin at The Grand Hotel.

The tentative dates are: May 18 - 22, 1992; May 17 to 21, 1993; May 10 to 20, 1994; May 22 to 26, 1995; May 20 to 24, 1996 and May 19 to 23, 1997. The length of any one meeting may be shortened as the work load dictates.

Dairy, Food and Environmental Sanitation, Vol. 11, No. 9, Pages 494-496 (September 1991)

Plant Effluents Dairy Waste Streams Recovery

Bruce D. Blanchard
Sales Engineer - Manufactured Milk Products
APV Crepaco, Inc.

The Problem

The typical dairy plant effluent problem originates from one or a combination of the two following areas.

The Cause

Hydraulics

Tremendous amounts of water are used in virtually every dairy product manufacturing process. In the manufactured milk products business, effluent volumes often exceed process volumes severalfold. This is especially true in the various sectors of the industry dealing with volumetric reduction functions like condensing and drying. These industries and processes can be thought of as water producers rather than water users.

The Effect

These process waste streams are diverted to biological treatment systems where flow rates and consequently residence / detention times are critical to successful operation. Whether this is a municipal system or one that is owned and operated for a single commercial facility, large deviations in influent flow from design capacity will give significant reductions in operating efficiency. Consequently waste treatment plant effluent can fall outside allowable discharge levels.

The Solution

Segregation and re-use of used water streams that are free of contaminants is a simple and often very inexpensive way of initiating water conservation efforts and decreasing discharge volumes. Streams with low level BOD_5 contaminants can also be reclaimed and treated for re-use in various applications.

The Cause

Organic Concentrations

The second contributor to plant effluent problems is the concentration of organic material within the process waste water streams. These concentrations, often quantified in terms of BOD_5, define the microbiological load on the waste treatment facility.

The Effect

BOD_5 loadings which exceed treatment plant influent design capacities require extended detention times within the system in order to allow microbiological reduction of organics. Sporadic over-loadings adversely effect microbial health by rapidly depleting dissolved oxygen content in the system. If hydraulics limitations of the plant do not allow proper detention, the discharged effluent will not be within regulatory compliance limits.

The Solution

Product and product rinse recovery for re-use in ingredient formulations offers significant return on investment because it boosts yields and reduces waste treatment costs. In facilities where product recovery is already done or is not possible due to the nature of the products, segregation and treatment of streams which contribute highly to effluent BOD_5 concentrations is an alternative. Treatment and recovery of lost product for human or animal nutrients can be economically justifiable and often lucrative.

Solving the Problem

Identifying the Problem

Obviously recognizing that there is a problem is the first step toward solving a waste water problem. Once it has been recognized, a great deal of work needs to be done to define or exactly identify what the source of the problem is. As previously discussed, the cause of the waste water problem may be one of hydraulics, organic concentration, or some combination of both. The bulk of the problem may be attributable to a single process stream or it may be the result of several major contributors. Isolating the streams which make significant contributions to the total hydraulic or organic effluent load takes advantage of the diminishing returns of waste streams pretreatment.

Selecting the Treatments

Once the streams in question have been identified and analyzed the process of selecting the most appropriate treatment takes place. This selection procedure is based on many different comparisons and constraints of the various treatment options available and will vary from case to case. Some of the considerations are the efficiency of the treatment on the particular stream, space constraints, plant location, construction constraints, aesthetics, technological requirements, personnel requirements, and capital requirements.

Initiating the Pretreatment Program

Starting a pretreatment program in a plant is a complex and often far reaching project. It involves every aspect of the daily operation of a plant including production, quality assurance, mechanical services, personnel training, and financial operations. Strict attention must be given both physically and psychologically to separate recovery as a process and waste water treatment as a plant service.

Evaluating the Results

Success of a process waste recovery project will depend greatly on the attention the project received during the development phases. Involvement of plant personnel in the planning and implementation phases of the project is essential. An understanding by plant staff of the intention of process waste pretreatment, the principle of operation of pretreatment, the principle of operation of down-stream biological waste treatment, and the effects of inadequate recovery from both a financial and physical perspective will enhance the degree of success of the project. As waste water treatment costs continue to rise and the availability of water becomes more finite, the amount of recovery yielding greater than marginal return will increase.

Table 3.1 Defining Various Waste Streams

High BOD_5 Streams	☞ Initial Rinse Water ☞ Product Spillage ☞ Centrifugal Separator Ejection
Medium BOD_5 Streams	☞ Cleaning System Water ☞ Product Wash Water ☞ Wet Scrubber Overflow
Low BOD_5 Streams	☞ Evaporator Condensate ☞ Reverse Osmosis Permeate ☞ Intermediate Rinse Water
Used Water Streams	☞ Process Transport Water ☞ Condensing Cooling Water ☞ Final Rinse Water

Table 3.2 Separation Methods and Categories

	Biological	Chemical	Physical
Aerobic Digestion	✔		
Air Floatation			✔
Anaerobic Digestion	✔		
Centrifugation			✔
Conventional Filtration			✔
Distillation			✔
Evaporation			✔
Flocculation		✔	
Membrane Filtration			✔

Figure 4.5 Waste Pretreatment and Water Recovery Scheme

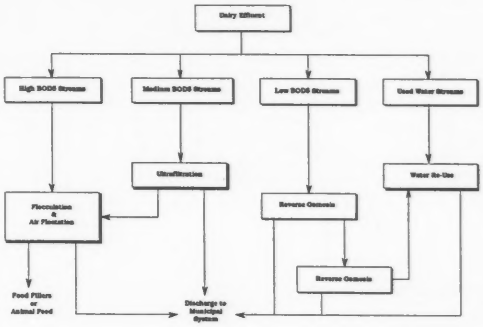
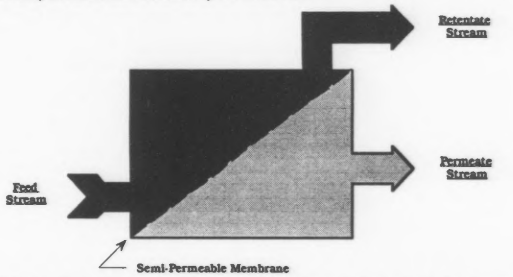


Figure 4.5 demonstrates, in block diagram format, how the various process waste streams can be treated for recovery of dairy solids and water prior to final discharge. Type of treatment and sequence of treatment procedures will vary based on the type of effluent streams to be treated, the concentration of organics and other foulants or constraining components found in each of the streams, and the various economic constraints.

Figure 5.0 Membrane Filtration

Ultrafiltration can be used for selectively separating fats and proteins from a process waste stream for direct recovery or as a concentrating step to reduce volumes for further processing. Greater than 90% of the total protein and virtually all of the fat is retained by the membrane.



Reverse Osmosis can be used to recover water for re-use from low BOD_5 process streams. Recovery of up to 90% of the volume can be realized while producing a recovered water stream with a greater than 90% BOD_5 reduction.

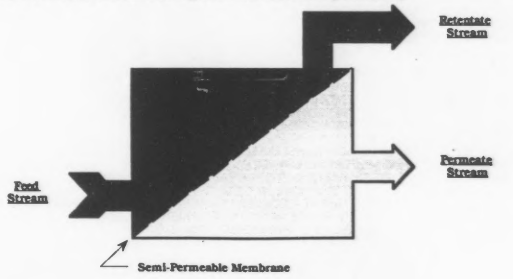
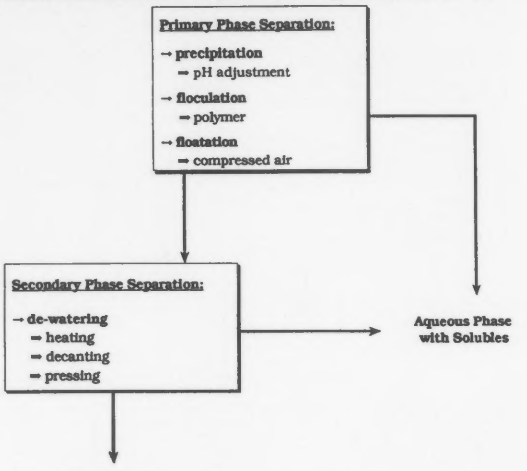


Figure 5.4 Flocculation and Air Floatation

Chemical flocculation and dissolved air floatation is a process well suited to the recovery of proteins and fats from dairy effluent streams. The process relies on pH adjustment and polymer chemistry to precipitate and coagulate colloidal material within the effluent. The protein and fats agglomerate and form flocs.



Water with a high dissolved oxygen content is injected under pressure. The air is released as tiny bubbles which rise through the solution and carry the flocs to the surface where they further agglomerate. After a period of time, a complete phase separation has occurred between the insoluble protein and fat flocs and the soluhles within the discharge effluent. The agglomerated solids phase can he de-watered to a slurry or completely dried for ease of handling.

Figure 6.3 Flocculation & Air Floatation Solids Recovery Rates

Potential Fats Recovery

The tendency for fats to rise in an aqueous solution due to their lower specific gravity is enhanced by the dispersion of fine air bubbles in the solution during the pretreatment process. Recovery of greater than 90% of the fats in the waste stream can he achieved.

Potential Protein Recovery

Proteins are forced out of colloidal suspension and dispersion hy adding acid to reduce the pH. Proteins then agglomerate into a relatively tight pin floc by use of flocculating agent. This increases the surface area of the proteins to facilitate air floatation. Approximately 60% of the proteins can he recovered using this method.

Potential Carbohydrate Recovery

Removal of solubles such as lactose from the waste stream by the flocculation and floatation process is limited to small quantities which become entrained in the agglomerated protein and fat mass. This results in recovery of less than 1%.

Table 7.7 Economics of Various Waste Treatment Methods

Separation Method	Capital Expense	Operating Expense
Aerobic Digestion	$$$	$$ ↔ $$$
Air Floatation	$	¢
Anaerobic Digestion	$$$	$$ ↔ $$$
Centrifugation	$$	$
Conventional Filtration	¢	¢
Distillation	$$$	$$ ↔ $$$
Evaporation	$$ ↔ $$$	¢ ↔ $$
Flocculation	$	¢
Membrane Filtration	$ ↔ $$	¢ ↔ $$

¢= relatively inexpensive
$ = moderately expensive
$$ = expensive
$$$ = very expensive

Conclusions

There are several commercially available methods of dairy waste pretreatment for solids and water recovery. As biological treatment becomes more expensive and municipal systems become more selective in their acceptance of ever increasing organic and hydraulic loads, the industry will be forced to take a more active participation in the treatment of the various process waste streams. It will no longer be an acceptable practice to continue expanding plant capacity with no contingency for plant effluent discharge levels and handling schemes. The financial responsibility for treatment will be imposed on industry as the major contributors. This in turn will make selective waste stream segregation and pretreatment an increasingly profitable enterprise. Streams that would yield marginal gains in today's economic scenario will be seen as excessive losses in the near future.

Limitations on water consumption and waste discharge will become a reality that forces a greater environmental awareness and responsibility. The public perception of our industry as well as true economic gains will be the driving forces behind ever increasing scrutiny of what we allow to go down the drain. By implementing preventative practices to control water consumption and waste discharge levels now, we can avoid an image problem with the public that could severely tarnish and economically damage the industry.

The practical implementation of internal waste control and water consumption is no longer an issue deterred by marginal gain. Recovery of waste solids and water for reuse forces management as well as plant staff to physically quantify and defend losses. This is a preliminary exercise in identifying current practices that may be improved upon to reduce initial loss. Awareness then, is attained for both the environmental and the financial responsibility of plant operations.

DFISA's Food & Dairy Expo '91 Offers over 500 Displays, Food MegaTrends Conference, U.S. Small Business Administration's Export Expo '91 and More

Use this form to register Today!

Food & Dairy EXPO '91
ADVANCE REGISTRATION FORM
DEADLINE OCTOBER 1, 1991

FOOD & DAIRY EXPO 91

October 26-30
McCormick Place North, Chicago

Register by *October 1* and your badge will be mailed to you. *After October 1*, use this form to register on-site at EXPO. Photocopy this form for additional registrants.

Space on badge is limited to the boxes provided below. Please print or type. ABBREVIATE where necessary. Leave open box between words.

First Name (or initial) | Last Name

Company (or Organization)

Business Mailing Address

City | State | Zip

Business Phone

MAIL TO: DFISA, 6245 Executive Blvd.
Rockville, MD 20852. U.S.A.

Food MegaTrends Conference
New Foods • New Technology • New Markets

☐ Please send information on this FREE Conference program sponsored by the DFISA Foundation.

INDUSTRY GROUP (check one)
If registration fee is applicable, enclose check, payable to DFISA. Registration *will not* be processed without check.

- ☐ Processor/ Manufacturer — FREE
- ☐ Distributor — FREE
- ☐ Education/ Government — FREE
- ☐ Non-exhibitor, non-member, Supplier of Ingredients, Equipment, Services or Products — $250
- ☐ Consultants — $250
- ☐ Brokers/Agents — $250
- ☐ Other (specify) _____

PRINCIPAL PRODUCTS MANUFACTURED (check one)

- ☐ Bakery
- ☐ Beverage
- ☐ Canning/Cured
- ☐ Confectionery
- ☐ Dairy
- ☐ Fats and Oils
- ☐ Frozen Food
- ☐ Meat/Poultry
- ☐ Pharmaceuticals
- ☐ Other (specify) _____

PRINCIPAL FUNCTION (check one)

- ☐ Chief Executive/Owner
- ☐ Corporate Manager
- ☐ Plant Operations
- ☐ Sales/Marketing
- ☐ Engineering
- ☐ Technical/Research
- ☐ Purchasing
- ☐ Transportation
- ☐ Packaging
- ☐ Sanitarian
- ☐ Family Member (not in business)

No one under 12 years of age admitted.

Food & Dairy EXPO '91
October 26-30, 1991
McCormick Place North, Chicago

SHOW HOURS
SAT., 10/26 thru TUES., 10/29-10:30 AM-5:00 PM
WED., 10/30 10:00 AM-3:00 PM

Dairy, Food and Environmental Sanitation, Vol. 11, No. 9, Pages 499-502 (September 1991)

Industry Perspective on the BST Issue

How the food industry is learning about the development of a widely discussed dairy production aid.

Donald W. Hecht,
Director, Dairy Marketing Development
Elanco Animal Health, A Division of Eli Lilly and Company
Lilly Corporate Center, Indianapolis, IN 46285 USA

This is intended to provide a broad understanding of the field of biotechnology and to describe the very positive implications of this new field for the world of milk and dairy products.

The end goal of technology, when applied to agriculture, is to improve the efficiency of food production or to enhance the quality of our food. That is the goal of one of the first major products of biotechnology being developed for the food business. I will discuss how this product came into being and how we expect this product to enhance the food industry. I will also address some of the regulatory and consumer perception implications of this product: bovine somatotropin, or BST.

What is BST?

First, it is important to recognize that our understanding of the use of BST in milk production is not new. The new knowledge centers on how to manage the use of BST effectively. That promises to be one of the first major success stories coming out of the biotechnology laboratory and onto the farm.

Scientists discovered in the 1930's that an extract of a cow's pituitary gland, known today as BST, increased the volume of milk produced when injected into the cow. Unfortunately, at that time the pituitaries of many cows were needed to yield enough BST to make one injection. That meant there was no practical way to apply this knowledge until the advent of recombinant DNA technology during the 1970's.

Now, by isolating the gene responsible for BST production, we can splice that gene into a nonpathogenic bacteria routinely used in pharmaceutical fermentation systems and produce large quantities of BST—enough BST to supplement thousands of cows.

This basic technology is not really new. It has been used at Eli Lilly and Company since the early 1980's to produce human insulin for diabetics. In more recent years, Lilly has used this technology to produce human somatotropin to treat children with growth deficiencies.

Until Lilly developed this technology, people with diabetes had to rely on insulin extracted from the pancreas glands of cattle and pigs. That animal-based insulin was limited in supply and was more difficult to purify than recombinant human insulin.

Using that same technology, today we can mass-produce BST which is biologically identical to the BST produced by a cow. The implications of that breakthrough are immense for the dairy industry. It means that dairy farmers can produce milk more efficiently, regardless of the size or location of their individual dairy operation. With BST, farmers can produce more milk on proportionately less feed, which holds the potential to provide more profit for the farmer.

BST also provides options for dairy management that can lead to further profit improvement. For the American farmer, who has seen his feeding costs skyrocket, BST provides an opportunity to produce the same amount of milk with fewer animals, thereby lowering his overhead. In times of milk shortage, such as we experienced during recent droughts over parts of the United States, BST could allow farmers in a region with adequate feedstuffs to boost their production and make up the shortfall being experienced elsewhere in the country.

On a global scale, BST will help boost milk production in underdeveloped nations and will help feed the undernourished people of many nations. As evidence of this potential, we have BST development projects under way in Eastern Europe, Pakistan, India and Mexico, as well as several other countries.[1]

Is BST safe?

We can drink milk from BST supplemented cows with confidence because giving BST to the cow does not change the milk. The safety of BST for people was verified by the Food and Drug Administration as long ago as 1985, and after five more years of research, the FDA—along with other health authorities—have reaffirmed that using BST on cows is safe for humans.

Medical science has known for many years that BST is inactive in humans. BST is a protein and is broken down in the digestive tract like other proteins. It has no effect when eaten. Even if BST is injected into humans, as was done under research conditions, the BST injections have no effect.

The human metabolic system simply does not have the capability to react to somatotropin from a cow. The structure of human somatotropin is substantially different from bovine somatotropin—BST.

BST is one of over 20 proteins found naturally in milk, but BST is in minuscule quantities compared to other proteins like casein and lactalbumin. The level of BST in the milk remains normal regardless of whether or not the cow has received supplemental BST.

This long-standing knowledge about the human safety of BST prompted the Food and Drug Administration to allow marketing of meat and milk from BST-supplemented cows in research studies beginning in 1985. FDA approval for commercial use is anticipated after the FDA completes its review of animal testing data to assure that BST can be used effectively and safely in dairy cows.

At present, hundreds of scientific reports have been submitted for review by the FDA. This large amount of research data is expected to support a decision by the FDA for the use of supplemental BST as a safe and effective management tool for use in dairy cows.

Each of the four companies developing BST (Elanco, Monsanto, Upjohn and American Cyanamid) must submit a separate package of research data for its individual product. Since this research is being repeated by four separate companies, BST has been said to be the most thoroughly tested and reviewed animal product ever to be developed for animal agriculture.

BST research has included over 300 studies on over 22,000 dairy cows. This unprecedented volume helps to explain the confidence expressed by Dr. Gerald Guest, Director of FDA's Center for Veterinary Medicine, who said, "Milk from BST treated cows is safe for human consumption. This I can say unequivocally."

Once the FDA approvals for commercial use are received, Eli Lilly and three other companies will be prepared to market BST to dairy farmers.

During the week of August 20, 1990, headlines across the country told consumers that BST is safe. The media reported that the FDA, in an unprecedented action, published a special report on the human safety of BST in *Science*, the highly respected peer-reviewed journal of the American Association for the Advancement of Science.[2] This journal article confirmed that:

1. "...the protein based hormone BST is biologically inactive in humans."
2. "...and is broken down in the digestive tract when orally consumed."
3. "...bovine growth hormone and recombinant bovine growth hormone are biologically indistinguishable"
4. "...use of recombinant bovine growth hormone in dairy cattle presents no increased health risk to humans."

The same week other headlines alerted consumers to another article on BST safety, this one in *The Journal of the American Medical Association*. This article by William H. Daughaday, M.D., and David M. Barbano, Ph.D., concluded, "Based on the scientific evidence, comments from the health professionals can now play an important role in reassuring the public about the safety of milk and refuting misconceptions about BST."[3]

Why do some people oppose BST?

If BST has been so thoroughly proven safe for consumers, and if BST holds such promise for improving the efficiency of dairy farm operations, then why would anyone oppose BST's introduction? The reason is that there are groups who believe BST would be detrimental to those groups' special interests. So, despite what is usually a lack of basic scientific knowledge on their part, these people are working to prevent society from benefiting from new technologies.

These special interest groups have attempted to mount a campaign based on fear and distortions of fact. They are attempting to capitalize on what is, unfortunately, a very limited understanding of science among many consumers.

For instance, they have charged at various times either that BST is harmful to humans or that its effects on the human body are unknown.[4] This ignores the overwhelming scientific evidence. It ignores the human safety conclusions of the FDA and it argues against the recent information in *Science* magazine, in *The Journal of the American Medical Association* and conclusions of the National Institutes of Health. The special interest groups ignore the fact that every responsible authority agrees that milk and meat from BST-supplemented cows is safe for human consumption.

The opponents of BST often describe it as something that is added to milk.[5] BST is never added to the milk, it is given to the cow. The special interest groups do not want to recognize that BST simply supplements the cow's natural milk-production regulator. Milk quality and composition remain the same.

People who understand the facts about BST do not accept the tactics of the special-interest groups. For example, an editorial in the August 22/29, 1990 *Journal of the American Medical Association* says, "Because milk produced from cows treated with bovine somatotropin is no different from milk from untreated cows, it is both inappropriate and wrong for special interest groups to play on health and safety fears of the public to further their own ends."[6]

The statements of the anti-BST groups do not center on the facts, because if they did, the critics would have to admit that BST is not only natural and safe, it is environmentally friendly. As a protein, if BST is left in the environment, it quickly degrades like any other protein.

What is the real issue?

The real issue of BST is the survival of the scientific and regulatory processes and the right for everyone to benefit from advances made in the laboratory. This not only affects BST, it involves many other applications of biotechnology currently in the laboratories that hold great promise for enhanced food production and health care.

cont. on p. 502

Please circle No. 134 on your Reader Service Card
See us at Food & Dairy Expo '91, Booth #1165

Made in Florida, U.S.A., by Atkins

NEW HIGHEST-ACCURACY TEMPERATURE STANDARD CONTROLS FOODBORNE ILLNESS & PRODUCT QUALITY

ATKINS Series 330
with fast reacting needle probe takes hot or cold penetration, immersion or air temperatures.

- Water Resistant
- Hold Feature
- Lighted Display
- 1 Year Warranty

Range: —100°F to 450°F
Accuracy: ±1F° of reading including thermocouple error calibrated out at 0°C and 100°C.

Thermometer with Needle/Immersion Probe
 # 33033-F $98

Thermometer with Fast-Response Needle/Immersion Probe
 # 33032-F $119

Thermometer with Surface Probe
 # 33035-F $135

FAST ACTION! To order, to request catalog, or for nearest distributor,
Call ATKINS! 1-800-284-2842, Ext. 130
904-378-5555 • Atkins Technical Inc., Dept. 130
3401 SW 40th Blvd., Gainesville, FL 32608-2399

Please circle No. 179 on your Reader Service Card

Request for Preproposals for Research Related to *Listeria monocytogenes*

The Committee on Food Microbiology of the International Life Sciences Institute-Nutrition Foundation (ILSI-NF) is offering financial support for research on ***Listeria monocytogenes***. Funding is available for projects in the following areas:

1) Development and verification of a sensitive (0.2 CFU/g) and rapid **quantitative procedure** for enumerating *L. monocytogenes* in food. Preferably, the procedure should detect injured listeriae in a wide variety of foods, including raw, transformed foods.

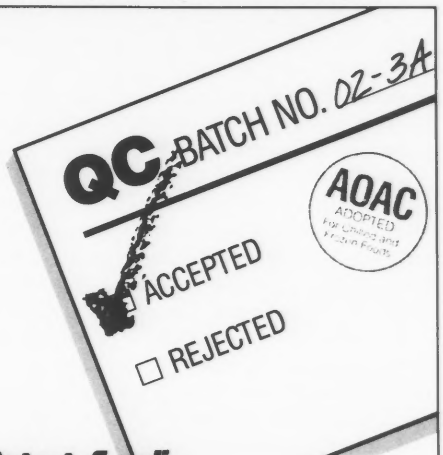
2) Development of novel methods for the identification of **unique markers** or differentiating characteristics of strains of *L. monocytogenes*. It is not necessary to study virulence factors.

3) Development of novel **secondary barriers** to control the growth of *L. monocytogenes* in foods. Studies using traditional approaches such as pH, a_w or temperature as barriers will not be funded.

The deadline for submission of preproposals is **October 15, 1991**.

Preproposal application forms may be obtained from:
Ms. Catherine Nnoka, ILSI-NF, 1126 16th Street, N.W., Washington, DC 20036, Telephone: 202/659-0074.

Please circle No. 203 on your Reader Service Card



Detect *E. coli* before you can say 4-Methylumbelliferyl-β-D-glucuronide

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

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

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

marcor
DEVELOPMENT CORPORATION

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

If the foes of new technology can keep one product out of the marketplace, then they can keep other scientific breakthroughs off the market as well. They can oppose biotechnology without a reason, continuing their arguments that science itself is evil, regardless of the facts and the importance of a scientific breakthrough for mankind.

The implications of BST are broad. They may affect millions of people who are waiting for cures for cancer, for AIDS, and for a variety of other fatal diseases. Biotechnology holds the best hope for conquering these monumental human afflictions. If the progress of biotechnology were slowed or stopped, many people would never have the chance to benefit from the efforts of our scientists. Consider the consequences if, in the 1940's, we had allowed special interests to prevent the development of the polio vaccine.

The food industry depends on technological progress. Today the public benefits from pasteurization, freeze-drying, vitamin and mineral fortification, protein engineering and many other processes that improve the quality and safety of our food. Without technological progress, in the future we would not benefit from dozens of new agricultural and food technologies now being developed.

It is important that we consider the implications of this crusade against technology because consumers will have questions about BST and other biotechnology products used in food production, and they are likely to turn to the providers of the items on grocery shelves. It is critical that the food industry fully understand both this technology and the vital role that science as a whole plays—and must continue to play—in the food industry.

Through credible sources of reliable information, consumers can come to appreciate more fully both the merits of biotechnology and the need to maintain support for the scientific process.

What is the public benefit?

Thanks to scientific advancement, Americans enjoy the highest-quality food supply in the world. Over the years, researchers have worked diligently to find new and better tools and methods to produce and process our food. Farmers and food processors have put these tools and methods to work and we all have reaped the benefits.

The benefits of technology are evident in the economical price of milk. Because of improvements in milk production technology, consumers have spent progressively less of their food budget on dairy products without diminishing the profitability of the family dairy farm. American consumers now pay about $2 per gallon for milk, thanks to new technologies such as artificial insemination, improved feeding practices and computerized record keeping. Without these new technologies, consumers would pay approximately $4 per gallon for milk. This is twice as much as we would pay if the dairy industry were still dependent solely on 1950's technology. In 1988, these technologies saved consumers about $12 billion on their purchases of dairy products.[7]

Compared to all food, retail dairy product prices have increased at a slow pace since 1983. Dairy product prices have increased 2.2% per year on the average, while all food prices have increased an average of 3.8% per year.[8]

BST is just one more potential management tool in keeping with this trend toward more efficient production of high-quality, economical dairy products.

A comment by Barbara Keating-Edh, president of a very prominent consumer organization, Consumer Alert, describes our interests as consumers. Speaking at the annual meeting of the American Dairy Science Association in August, 1989, she said, "Consumers have no great desire to understand how cows produce milk; but they do care to know that it's safe...in that, they look to experts in the dairy industry.

"Surely the public would wonder about the dairy industry's judgment if it were known that it rejected a promising new and safe technology that could have enhanced productivity, increased efficiency and lowered milk prices."[9]

Conclusion

In summary, it is critical that those of us involved in developing new technologies support three important goals:

1. That we protect the nation's scientifically based regulatory process from manipulation by special interest groups.
2. That our free markets continue as the sole arbiters of the success of new products deemed safe and effective by the regulators.
3. That we remain committed to innovation which has provided Americans with an array of safe, nutritious and affordable food products.

The American consumer has come to expect this from the food industry. It is up to the food industry to see that our consumer expectations are met.

References

1. Dickrell, Jim. "BST goes to Mexico." *Farm Journal*. Dec, 1990:16N.
2. Juskevich, Judith C. and Guyer, C. Greg. "Bovine Growth Hormone: Human Food Safety Evaluation." *Science*. Vol. 264, No. 8 (1990):875-884.
3. Daughaday, W. H. and Barbano, David M. "Bovine Somatotropin Supplementation of Dairy Cows." *The Journal of the American Medical Association*. Vol. 264, No. 8 (1990):1003-1005.
4. "Consumer Group Questions Milk Hormone's Safety." *New York Times*. Dec 4 1990:A29.
5. "Where's the beef?" *Washington Times*. Nov 26,1990:G2
6. Grossman, Charles J. "Genetic Engineering and the Use of Bovine Somatotropin." *The Journal of the American Medical Association*. Vol. 264, No. 8 (1990):1028.
7. Elam, Thomas E. Unpublished data. March, 1990.
8. *Ibid*.
9. Keating-Edh. Presentation to American Dairy Science Association, August 3, 1989.

CALL US!
Your Old Blender Is Worth $

Please circle No. 216 on your Reader Service Card

KEEP IT CLEAN... with the Stomacher® Lab Blender

Exclusively From Tekmar

Tekmar gives you rapid, clean, and safe blending of samples in the Stomacher Lab Blender. With this unique blender, the sample never directly contacts the machine. Mixing is done inside a sturdy, disposable plastic bag.

The Stomacher Lab Blender is widely used in the food industry and is ideal for preparing samples containing pathogens or contaminating microbes. Workers in clinical diagnostic and quality control labs will find it useful, as well as biochemical researchers.

Stomacher Lab Blender 400 Mark II

The tried and proven Stomacher Lab Blender 400 has been updated with several new features making it even more invaluable for QC/QA microbiology:

- Microprocessor controlled
- Three preset speeds
- Four preset time settings - 30, 60, & 120 seconds and continuous
- Safety interlock on door
- Newly styled design for convenience and easy maintenance

Advantages

- Clean
- Safe
- Time Saving

Applications

- Dairy
- Frozen Foods
- Canned & Processed Foods
- Meat, Poultry & Fish
- Flour Products
- Frozen Foods
- Fruits & Vegetables

Also available are the Stomacher Lab Blender Model 80 for up to 80ml, and the Model 3500 for up to 3500ml.

1. Insert bag into machine. Close door firmly to secure bag.

2. Switch on machine. Reciprocating paddles repeatedly pound bag, mixing contents.

3. Switch off machine, open door and remove bag. Blended sample is now ready for analysis.

Stomacher® Lab Blender is a Registered Trademark of Seward Medical, Ltd.

Tekmar®

P.O. Box 429576
Cincinnati, OH 45242-9576
Sales (800) 543-4461
Service (800) 874-2004
Fax (513) 247-7050
Telex 21-4221

Dairy, Food and Environmental Sanitation, Vol. 11, No. 9, Pages 505-509 (September 1991)

Anaerobic-Aerobic Pretreatment of a Dairy Waste A Case History

A. A. Cocci, B. F. Burke, R. C. Landine and D. L. Blickenstaff

Abstract

In 1987, High's Dairies Inc. undertook a waste characterization and pilot study to assess anaerobic treatability of the wash water and whey from its Frederick, MD, operations using the ADI-BVFR® low-rate reactor. The data from the study was to be used to establish criteria for design of a full-scale treatment system.

The pilot reactor was operated at 32°C and an average organic loading of 1.17 kg COD/m^3.d; it achieved average COD, BOD, SS and FOG removals of 90.5, 94.9, 71.0 and 74.2 percent, respectively, under steady-state conditions. The biogas quality averaged approximately 65 percent CH_4, 0.3 percent H_2S and 35 percent CO_2.

On the basis of the pilot study and a comparative analysis of alternative anaerobic systems with aerobic polishing, it was determined that the low-rate BVF™ reactor, followed by an extended aeration plant, would be the most suitable and cost-effective system to meet the treatment requirements. Of significant importance in the economic analysis for the low-rate reactor was its ability to digest high levels of raw influent SS, FOG and waste aerobic solids from aerobic polishing and the fact that no pretreatment was needed.

In the fall of 1988, High's began construction of a 2.5 MG BVF reactor followed by an activated sludge plant. Details of the system are provided in the text.

The BVF reactor began start-up in April 1989 and was through start-up in July 1989. Since July, the anaerobic reactor has typically achieved BOD/COD/SS removals of approximately 97, 95 and 85 percent, respectively. The overall system removals have been typically 99, 99 and 95 percent COD, BOD and SS, respectively.

All the biogas from the reactor is collected, with the majority of the gas burned in a triple-fuel boiler for the production of process steam; excess biogas is flared. The biogas supplies from 40 to 80 percent of the fuel requirements for process steam, depending on the season. Details of the biogas/boiler system are provided in the text.

Keywords

Dairy wastewater pretreatment, whey disposal, ADI-BVFR®, low-rate anaerobic reactor, anaerobic-aerobic pretreatment, extended-aeration activated sludge, biogas.

Introduction

High's Dairy of Frederick, Maryland, manufactures a variety of dairy products (cottage cheese, sour cream, yogurt, ice cream mix, etc.) for domestic markets. Prior to 1989, process wastewater, whey, clean-up, and sanitary wastewater were treated on-site in an activated sludge system prior to discharge to the City sewer.

Wastewater from High's existing treatment facilities was contributing significant pollution loads to the municipal sewage treatment plant. The City, under pressure from the Maryland EPA to reduce its pollution discharges, asked High's to develop a plan to reduce its pollution load to the City sewer. The initial plan involved in-plant process modifications and the elimination of whey treatment in High's existing treatment works. Whey was stored on-site and trucked to area farms at considerable cost to High's.

In addition to the above plan, in 1987 ADI International Inc. was commissioned by High's Dairy to carry out a pilot-scale anaerobic treatability study on the wastewater generated at its Frederick operation. The purpose of the pilot study was to investigate the anaerobic treatability of the wastewater, including whey, as well as to address concerns with operation and performance of the proposed low-rate anaerobic reactor. In addition to the pilot study, a wastewater flow and characterization study was also undertaken.

On the basis of the successful pilot results and together with the results of the flow and characterization study, it was concluded that ADI-BVF anaerobic pretreatment followed by aerobic polishing would satisfy discharge requirements.

Various anaerobic systems were considered, and the low-rate ADI-BVF system with biogas recovery and utilization, followed by an extended-aeration system, was judged by High's to best meet their treatment plant needs. Subsequently, High's signed a contract to have the above facility designed and constructed.

The following sections highlight the results of the pilot study, present operating data and details of the full-scale treatment system, including biogas handling.

Pilot Study

Objectives

The primary objectives of the pilot study were to:

1. Verify anaerobic treatability of the raw process wastewater including whey.
2. Verify proposed design criteria for the full-scale system.
3. Evaluate the system performance in terms of BOD/COD/SS/FOG removal.
4. Determine chemical requirements for nutrients and pH control.

Apparatus

The system consisted of a feed storage container and mixer; timer-controlled variable-speed pumps to feed the reactor and recirculate sludge; a 7.0-1iter ADI-BVF reactor with heating tape for temperature control; biogas flow meter; and biogas collection and analysis equipment (see Figure 1).

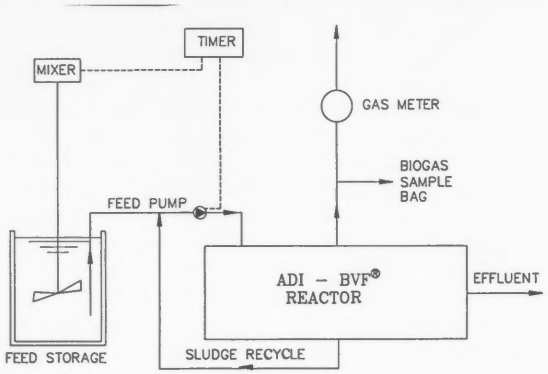


FIGURE 1: Pilot Treatment System Schematic

Operation

The reactor was seeded with municipal anaerobic sludge and fed daily (7 days/week) with a composite sample consisting of process water and whey. The reactor was operated at a hydraulic retention time of 13 days, a 1:1 sludge recycle ratio and a temperature of 32°C.

The pilot study consisted of two phases: Phase 1 (day 1-56) was start-up, where the feed strength was gradually increased to full strength; Phase 2 (day 57-113) involved steady-state operations in terms of feed strength (i.e., 100 percent full strength).

Chemical additions for both nutrient and pH control were adjusted as required throughout the term of the study. Table I presents the sampling and testing schedule used throughout the study; Table II is a summary of the average characteristics of the raw wastewater used as influent.

Pilot Study Discussion

The overall results indicated that the low-rate BVF reactor was well-suited for treating the process wastewater including whey generated at High's. Average COD, BOD, SS and FOG removals during steady-state operations (Phase 2), were 90.5, 94.9, 71.0 and 74.2 percent, respectively. The average loading rate and temperature for the same period was 1.17 kg COD/m^3.d and 32°C, respectively.

Overall, both COD and BOD removal efficiencies exceeded 90 percent after an initial two-week acclimation period (approximately one HRT); SS removals during the same period were lower, averaging 71 percent.

Table I. Sampling and Testing Schedule

Test	Sample: Reactor Influent	Sample: Reactor Effluent	Sample: Biogas
Temp.	D	D	
pH	D (G)	D (G)	
BOD	W (C)	W (C)	
COD	W (C)	W (C)	
SS	W (C)	W (C)	
VSS	W (C)	W (C)	
FOG	TW (G)	TW (G)	
Alk.	TW (G)	TW (G)	
VA	TW (G)	TW (G)	
NH_3-N	W (C)	W (C)	
TKN	W (C)	W (C)	
TOT-P	W (C)	W (C)	
CO_2+H_2S (CH_4 by difference)			W (G)
H_2S			W (G)

Note: D = daily
W = weekly
TW = twice weekly
G = grab
C = composite (produced from daily grabs)

Table II. Average Raw Wastewater Characteristics

COD, mg/L	13 200
BOD, mg/L	8 975
SS, mg/L	1 100
VSS, mg/L	950
TKN, mg/L	260
NH_3-N, mg/L	15
Total P, mg/L	139
FOG, mg/L	405

Sodium bicarbonate ($NaHCO_3$) was added to the reactor influent to increase the buffering capacity and alkalinity. Through days 1 to 47, $NaHCO_3$ addition was 2 g/L. Through days 48 to 113, $NaHCO_3$ addition was gradually reduced from 2 g/L to 0.25 g/L. It was felt that because of the high influent TKN no chemical for pH control would be needed in full-scale. The final effluent pH consistently stayed slightly above the neutral value—a desirable pH for stable operation.

During start-up, nitrogen and phosphorus supplements were added to the feed to ensure adequate nutrient availability for the anaerobic microorganisms. These nutrient supplements were subsequently eliminated as of day 43, as N and P testing indicated these nutrients were available in large excess.

Biogas analysis indicated that the average gas composition was approximately 65 percent CH_4, 35 percent CO_2 and 0.3 percent H_2S. The biogas was therefore of good quality and suitable as an alternative fuel.

Full-Scale System

Design Data and Criteria

Design data for the raw waste influent to the treatment system are as follows:

Average flow	= 681 m^3/d (weekly average)
Peak flow	= 908 m^3/d (daily peak)
COD	= 12 000 mg/L, 8 170 kg/d weekly average)
	= 18 000 mg/L, 16 340 kg/d (daily peak)
BOD	= 4 800 mg/L, 3 270 kg/d (weekly average)
	= 7 200 mg/L, 6 540 kg/d (daily peak)
SS	= 400 mg/L, 300 kg/d (weekly average)
	= 660 mg/L, 600 kg/d (daily peak)
pH	= 4-12
Temperature	= 21°C

The final effluent limits are:

BOD	= 250 mg/L
SS	= 160 mg/L

The anaerobic-aerobic system consists of a 2.5 MG ADI-BVF reactor followed by a Davis Water and Waste Industries packaged, extended-aeration activated sludge system. The average COD loading, calculated on the basis of the average raw wastewater characteristics and a reactive volume of 2.5 MG, is 0.9 kg/m^3.d in the BVF reactor. The HRT of the anaerobic reactor is 13.9 days. The projected BVF performance is 85 percent BOD removal.

The Davis extended-aeration plant is sized for an average HRT of 1.3 days and an F/M of 0.15.

System Description

Figure 2 is a process schematic of the wastewater treatment facilities. The wastewater treatment facility is a supply-and-install system by ADI International Inc. and Davis Water and Waste Industries, Inc. In addition to the wastewater treatability study and the wastewater flow and characterization study, the scope of supply included:

1. overall site plan of the total treatment system (ADI);
2. design, drawings and specifications for a pile-supported, reinforced concrete foundation for the BVF reactor and the aeration system (ADI);
3. design, drawings and specifications for anaerobic and biogas yard piping (ADI);
4. design of control building (ADI);
5. supply and installation of the heat exchanger, biogas handling equipment, internal equipment for the BVF reactor, floating membrane cover system, boiler, electrical and controls systems (ADI);
6. BVF reactor start-up, commissioning and training services including preparation of process operating manuals for process start-up and biogas utilization system (ADI);
7. extended-aeration activated sludge system (Davis);
8. raw waste pumping station (Davis);
9. whey pump and whey storage (Davis);
10. influent and effluent piping (Davis);
11. liquid flow measurement and sampling (Davis); and
12. WAS pumps and piping (Davis).

Construction of the wastewater treatment facility commenced in October 1988 and was completed in April 1989.

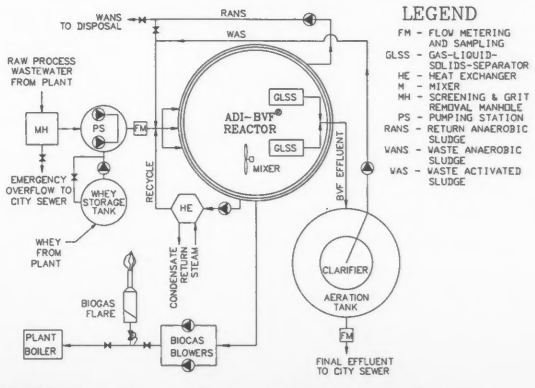


FIGURE 2: Process Layout of Pretreatment System

Anaerobic Reactor

The BVF reactor is a field-erected, welded steel tank 137 ft diam by 25 ft high. The reactor is covered by a floating, insulated, flexible geomembrane cover which is designed to maintain reactor temperature, collect biogas and prevent escape of odors.

Control of odor was a prime consideration because of complaints High's had received while operating the former treatment facilities. Cover material is arranged in folds designed to allow rainwater collection in controlled locations and subsequent removal from the cover. The cover also incorporates access hatches and sampling ports to allow easy access for inspection and monitoring.

The low-rate reactor is complete with all internals including influent/sludge recycle headers; submersible, low-speed mixer; sludge wasting system; and two gas/liquid/solids separators (GLSSs) to further aid in the control of solids leaving the reactor.

Anaerobic effluent passes out of the BVF reactor through the GLSSs. The effluent system is designed to minimize reactor short-circuiting, retain sludge and improve effluent quality. Anaerobic system effluent flows by gravity to the aerobic system for polishing. Final effluent from the treatment plant flows by gravity to the City sewer.

Biogas Equipment

Biogas is generated in the BVF reactor on a continuous basis and collects as it rises to the surface beneath the reactor cover. The cover is constructed to allow biogas to flow to the perimeter collection system. Biogas produced in the reactor is drawn off under vacuum by the PLC-controlled, variable-speed duplex blower system. The biogas blowers compress the biogas for delivery to the boiler and/or flare. Biogas is burned in a multi-fuel boiler to produce steam; excess biogas is flared. In addition to the blower system and new boiler (including boiler control system), the biogas handling facilities include moisture removal equipment (sediment trap and drip traps), safety equipment (ambient gas monitors, biogas analyzer), biogas monitoring equipment (pressure and temperature switches/gauges, flow meter) and other accessories to ensure safe delivery of the biogas to the boiler and/or flare.

The biogas blowers are driven by AC induction motors controlled by variable-frequency drives (VFDs) so that the rate of biogas removal is identical to the gas production rate. In automatic operation only one blower is used at a time; the alternate unit is designated as a standby unit. The duty and standby designations are changed daily (automatically by the PLC) to balance wear on the blowers, motors and drives.

In normal operation, the starting, stopping and speed control of the VFDs is performed by the PLC. The control panel also has a complete set of manual controls for operating each blower. A standby generator set is provided to supply emergency power. This power is limited to supplying the wastewater treatment plant PLC (which in turn supplies the flare control panel) and one of the blowers.

In addition to the wastewater treatment plant control system, a boiler control system is provided with the new 350 hp, high-pressure steam boiler. The boiler control system is

designed to automatically burn as much biogas as is available while maintaining proper boiler control and steam production. The control system is devised to permit the simultaneous burning of biogas and natural gas or oil in the boiler.

The controls can be reduced to two basic systems: 1. burner management and flame safeguards and, 2. combustion controls. These systems have been implemented through a combination of a Fireye flame safeguard system and a PLC. All control functions except those of the flame safeguard system are executed by the PLC.

The burner management system utilizes a combination of the Fireye controller and the PLC. Ignition and post-combustion sequences are initiated by the Fireye. The Fireye control sequence is received by the PLC which responds by starting up and shutting down the burner in an orderly and safe manner.

Once the burner system has been started by the burner management system, air and fuel controls are transferred to the combustion control system. The combustion controls ensure that the correct quantities of air and fuel are being delivered to the burner system for a safe and efficient flame.

Aerobic System

The aerobic system is a packaged, extended-aeration, activated sludge system. The unit consists of an outer steel tank 51.5 ft diam by 24 ft high and an inner steel tank (clarifier) 32 ft diam by 20.5 ft high.

The aeration tank is located in the annular ring between the outer wall and the clarifier wall. Wastewater from the anaerobic reactor enters the aeration basin through a submerged distribution system. Mixed liquor leaves the aeration basin via a trough around the outer perimeter of the clarifier and enters the clarifier section through a pipe at the center.

In the clarifier, activated sludge settles to the bottom of the clarifier where it is scraped to a center collection sump. A sludge return system pumps sludge from the clarifier sump back to mix with the aeration tank influent. A waste sludge pump and piping system is used to waste aerobic sludge (WAS) to the BVF; WAS is only wasted to the BVF reactor. A surface skimmer is used to move floating material and scum to the scum collection box. The collected scum is returned to the aeration basin.

Final effluent flows through a flow box mounted on the side of the aeration tank. A V-notch weir, flowmeter and sampling system are provided for monitoring final effluent prior to discharge to the City sewer by gravity.

BVF Reactor Start-Up

The BVF reactor was initially filled with water from the City water supply system. The basin contents were then heated to 30°C using an in-line shell-and-tube heat exchanger. Approximately 40 m^3 of whey were added to the reactor to provide an initial "food" source for the seed sludge. Sodium carbonate (Na_2CO_3) was added to the reactor contents to adjust the pH to 7 prior to seed sludge addition. Seed sludge was obtained from the Frederick municipal wastewater treatment plant anaerobic digesters. Approximately 1900 m^3 of sludge (1-2 percent SS) were added to the reactor. The seed sludge was trucked to the site, screened (12 mm bar screen) and pumped to the BVF reactor. Once the BVF received the sludge, raw wastewater feeding began.

The start-up lasted approximately 16 weeks. During the first several weeks of operation, only plant process wastewater (whey excluded) was added to the reactor. Over the remainder of the start-up period whey was gradually introduced until all plant process water and whey was being treated in the reactor. Soda ash and lime were added manually and daily to the influent pumping station to maintain reactor pH of approximately 7; heating of the reactor was done to maintain a temperature of approximately 30°C.

Physical Control of Reactor and Aerobic System

Operation of the BVF reactor is a relatively simple and uncomplicated process. Under normal operating conditions a minimum of operating attention is required.

Plant process wastewater flows by gravity into a wet well for screening and grit removal and then into the raw waste influent pumping station. Whey from the plant flows to the whey storage tank where it is metered to the influent pumping station. The raw waste pumps deliver wastewater to the reactor automatically, via a float control system. The run time of the whey pump is controlled by the PLC. The anaerobic sludge recycle pump and low-speed mixer are automatically controlled by the PLC. The recycle rate and the amount of mixing is adjusted in the field to achieve maximum reactor performance.

In order to maintain the BVF reactor at 30°C (system is presently operating at 26°C), a heat exchanger is utilized. Reactor supernatant is pumped through the heat exchanger. In the heat exchanger, steam is used to raise the temperature of the supernatant. The heated supernatant is then pumped to the influent header where it mixes with raw wastewater and recycled sludge. The supernatant pump is controlled by the PLC; the temperature rise through the heat exchanger is manually controlled.

Anaerobic reactor effluent flows by gravity to the aeration basin and clarifier and then to the City sewer. During normal operations, the aeration blowers (2 @ 75 hp, one is standby) are controlled automatically by the PLC. All aerobic sludge is wasted to the BVF reactor for anaerobic digestion. In normal operation, the starting and stopping of the WAS pump is done by the PLC.

The wastewater treatment plant control system is composed of the following components:

1. Programmable Logic Controller (PLC).
2. Reactor Monitor (RM).
3. Operating Control Devices (OCD).

These components interact as follows:

1. The operating control devices (i.e., START/STOP, HAND/OFF/AUTO switches, push buttons and meters for operating the biogas blowers, mixer, pump, etc.) determine whether equipment is to be manually or automatically controlled.
2. The PLC determines when equipment should be operated in the automatic mode, monitors analog signals, and provides alarm detection and safety interlocking.

3. The RM monitors the PLC, giving the operator a visual display of the process, and allows the operator to modify operating parameters.

Although the system is highly automated, operation is simple and straightforward and, should the need arise, the entire system can be operated and controlled manually.

An operator was on duty 8 hours per day, 5 days per week; since the reactor has reached maturity (after approximately 12 months), the operator is now only needed for 4-6 hours per day. The operator's daily routine includes analytical testing, daily sample collection, and minor maintenance.

Performance

Monthly operating data is given in Table III, and a monthly performance summary is presented in Table IV. Since start-up was completed (August 1989), the COD, BOD and SS removals in the BVF reactor have averaged approximately 95, 97 and 85 percent, respectively. Overall average removal of COD, BOD, and SS have typically been 99, 99 and 95 percent, respectively. The average BVF reactor unit loading has been approximately 0.6 kg/m^3.d, COD basis. Both the flow and the BOD/COD concentrations are below design values at the time of writing. However, the SS concentrations in the raw wastewater are running 4-5 times above design values.

TABLE III. High's Dairy Waste Treatment System - Monthly Data Summary

Month	Flow m^3/d	COD (mg/L)			BOD (mg/L)			SS (mg/L)			COD Loading (kg/m^3.d)
		BVF INF	BVF EFF	Final EFF	BVF INF	BVF EFF	Final EFF	BVF INF	BVF EFF	Final EFF	
Design	681	12 000	3 000	--	4 800	720	250	440	--	160	--
Apr. 89	304	19 647	1 260	367	--	--	--	1 214	245	98	0.63
May 89	530	7 438	630	246	4 792	272	118	1 730	180	103	0.42
June 89	517	11 613	1 530	141	9 780	1 083	67	1 902	357	51	0.64
July 89	482	10 185	820	150	7 017	299	28	1 958	349	77	0.52
Aug. 89	529	10 911	488	105	6 370	99	8	2 109	224	43	0.61
Sept. 89	474	10 423	621	90	7 833	148	11	2 494	275	32	0.52
Oct. 89	445	12 900	550	71	7 950	115	8	2 112	315	24	0.61
Nov. 89	401	14 693	394	92	7 735	54	12	1 761	234	48	0.62
Dec. 89	340	14 858	503	320	7 378	52	63	1 610	371	139	0.53
Jan. 90	329	15 093	418	327	8 120	58	141	1 787	273	139	0.53
Feb. 90	356	14 539	361	235	7 817	49	112	2 047	225	67	0.55
Mar. 90	348	15 065	330	229	6 644	37	43	2 029	187	65	0.55
Apr. 90	360	14 270	296	199	6 367	35	42	1 916	163	67	0.54
May 90	382	12 906	305	247	7 037	37	70	2 140	177	62	0.52
June 90	356	11 605	439	270	6 012	81	55	1 969	322	75	0.44
Average	410	13 076	596	205	7 204	173	56	1 919	260	73	0.55

The reactor pH is maintained at 6.7 or above; the total alkalinity normally ranges from 1600 to 1800 mg/L, and the volatile acids level is normally in the 400 to 500 mg/L range. Soda ash and lime were added manually at the influent pumping station for pH control; as of February 1990, no chemicals are being used to adjust pH. As well, no chemicals have been added for macro and micro nutrient supplementations.

The operation of the treatment plant has been entirely free of any odor nuisance. Control of odor was a major concern because of odor complaints High's had received while operating the former treatment plant. All biogas is collected and burned in the boiler or flared without odor. To date, the monthly average biogas production is approximately 3540 m^3/d; the mean biogas composition is 65 percent methane. The volume of biogas used daily is a function of season (demand in the plant). In the summer months, biogas is displacing approximately 40 percent of the fuel required for process steam and 80 percent in the winter.

TABLE IV. High's Dairy Waste Treatment Plant - Monthly Performance Summary

Month	COD Removal (%)		BOD Removal (%)		SS Removal (%)	
	BVF	Overall	BVF	Overall	BVF	Overall
Apr. 89	93.6	98.1	-	-	79.8	91.9
May 89	91.5	96.7	94.3	97.5	90.0	94.1
Jun. 89	86.8	98.8	88.9	99.3	81.2	97.3
Jul. 89	92.0	98.5	95.7	99.6	82.2	96.1
Aug. 89	95.5	99.0	98.5	99.9	89.4	98.0
Sept. 89	94.0	99.1	98.1	99.9	89.0	98.7
Oct. 89	95.7	99.5	98.6	99.9	85.1	98.7
Nov. 89	97.3	99.4	99.3	99.9	86.7	98.0
Dec. 89	96.6	97.9	99.3	99.2	77.0	91.4
Jan. 90	97.2	97.8	99.3	98.3	84.7	92.2
Feb. 90	97.5	98.4	99.4	98.6	89.0	96.7
Mar. 90	97.8	98.5	99.4	99.4	90.8	96.8
Apr. 90	97.9	98.6	99.5	99.4	91.5	96.5
May 90	97.6	98.1	99.5	99.0	91.7	97.1
Jun. 90	96.2	97.7	98.7	99.1	83.7	96.2
Average	95.2	98.4	97.8	99.2	86.1	96.0

Acknowledgements

A.A. Cocci, B.F. Burke, and R.C. Landine are employed by ADI International Inc., Salem, New Hampshire, and Fredericton, New Brunswick, Canada. D.L. Blickenstaff is employed by High Dairies Inc., Frederick, Maryland.

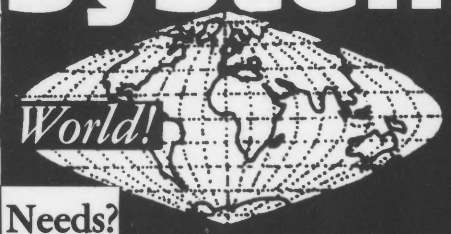
Please circle No. 111 on your Reader Service Card

See us at Food & Dairy Expo '91, Booth #1283

We Design and Build

Custom Machinery and Systems

Successful Installations All Over the World!



May We Discuss Your Needs?

SSF

Two Generations of Excellence

Stainless Steel Fabricating, Inc
202 Industrial Drive
P.O. Box 500
Columbus, WI 53925
414-623-3003

Please circle No. 114 on your Reader Service Card

MOJONNIER SAMPLE BAGS

Since 1959 -Quality and Value for over 30 Years.
The Original Sterilized Sample Bag.

A most complete line of sterilized bags for all kinds of samples and for use in Stomacher® Lab Blenders.

12 standard sizes in stock for immediate delivery
Choice of closure type - round wire or flat wire - (same price)
Plain or with stripes for sample identification
3 mil & 4-1/2 mil thickness standard - other thicknesses available
Many special sizes now available to meet your needs
In Bulk Packages or in Sanitary Pouch Packages
We can design and print bags to your specifications

BUY FROM THE PEOPLE WHO INVENTED THE STERILIZED SAMPLE BAG
WE HAVE NOT RAISED OUR PRICES SINCE 1983

****CALL TODAY****
FOR INFORMATION AND PRICES
CHUCK COOK - 1-800-333-3086
Manufactured in Eaton, Indiana

Plastic Packaging Concepts, Inc.
Albert Mojonnier, Inc.

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

Please circle No. 115 on your Reader Service Card

The **ART** of **microbial identification**

has given way to the **SCIENCE** of microbial identification at **ACCULAB**

Finally, rapid, reliable identification of a wide variety of organisms is possible using the latest fatty acid analysis technology and powerful computer programs that also "track" strains and maintain **confidential** client records.

accu | lab

700 Barksdale Road, Newark, DE 19711
Phone (302) 292-8888 Fax (302) 292-8468

Dairy, Food and Environmental Sanitation, Vol. 11, No. 9, Pages 511-512 (September 1991)

Quality Standards for Goat Milk

L. S. Hinckley,
Microbiologist, Director Mastitis Laboratory, Department of Pathobiology
The University of Connecticut, Storrs, CT 06269-3089

Abstract

Regulation of milk quality is based on a single set of milk standards which apply regardless of the source of the milk. During the last decade comparison studies have been done on cow and goat milk. Milk compositional differences were found in factors including somatic cell count, lipid type and content, phosphatase level, freezing point and natural bacterial inhibitor levels. Data from these studies preclude the continued use of a cow milk standard on goat milk. A separate standard for goat milk is essential to recognize the normal composition of this milk and not judge it by bovine normal values. This would assure the continued production of a supply of goat milk which is both legal and safe from a public health standpoint. The need for these separate standards has been recognized by the National Conference on Interstate Milk Shipments (NCIMS) and by the National Mastitis Council (NMC).

Species differences preclude continued reference of a single set of legal milk quality standards for milk from both cows and goats. Species differences create compositional differences in the milk. Goat milk has a different short chain fatty acid ratio and different vitamin content; a lower alkaline phosphatase content, a lower freezing point; and lacks A_s-l casein which is the major casein in cow's milk.[1] Goats are seasonal breeders, cows are not under present management practices. Seasonal breeding results in seasonal fluctuations in milk qualities such as somatic cell count and fat content. The goat secretory system is apocrine, the cow system is merocrine. Apocrine secretion results in the presence of cytoplasmic particles not present in cow milk which necessitates a different confirmatory somatic cell counting method for goat milk.[2]

Natural components of goat milk interfere with the accuracy of the Antibiotic Residue Test. Several states report 12-15 mm zones common when goat milk is tested by the official *Bacillus stearothermophilus* test. These are less than action level zones for regulatory agencies however some milk plants have rejected goat milk if any clear zone is present.[3]

The literature suggests the zones are the result of antagonistic action by short chain fatty acids. The short chain fatty acid butyric to lauric fraction constitutes 24.3% of goat milk and 11.7% of cow milk. Lipase activity is more pronounced in that fraction.[4] Goat milk contains considerably elevated levels of C_{10} fatty acids (comparison in weight by per cent in cow milk 1.88 vs. goat milk 10.0). C_{10} fatty acids exhibit bactericidal properties which would effect *B. stearothermophilis*.[1,4,5,6] Use of the residue confirmation test does not effect the zones of inhibition in the majority of cases since heating to 82°C for 2 minutes does not break down the fatty acid triglycerol complex in milk.

A study done by the Dairy Branch of the Ministry of Agriculture in British Columbia, tested duplicate samples using *B. stearothermophilus* and *B. subtilus* on all routine samples for 1 1/2 years. *B. subtilus* was consistently negative, while *B. stearothermophilus* was often positive. The conclusion was that the *B. subtilus* allowed more latitude for the lypolysis factor.[4]

Zones of 16 mm or less in goat milk with the *B. stearothermophilis* test can be caused by factors inherent in goat milk which can not be controlled. Zones of 16 mm or less should not be considered actionable (cause for rejection) levels in goat milk. Delegates of the NCIMS, at the May 1991 meeting, recognized this problem and voted to allow the Standard Plate Count to be run on goat milk samples with a 14-16 mm zone of other inhibitor (0I).

Goat milk bulk tank somatic cell counts show a distinct seasonal variation with the lowest in April and the highest in September through October, reflecting the number of fresh to mid and late lactation does. Counts begin to increase approximately four months after freshening and with the onset of the estrus cycle. Samples from 51 bulk tanks taken in late fall and tested by the Mastitis Laboratory at the University of Connecticut showed 31% in violation of the 1 million standard and 64% in excess of 750,000 cells per ml.[7]

A leucocyte standard of less than 1 million would result in the closure of most goat dairies. The NMC acknowledged this fact in a resolution to NCIMS. At the request of the NCIMS Goat Milk Committee, delegates of the NCIMS meeting voted to allow the somatic cell count in goat milk to remain at 1.0 million. The 1.0 million standard allows more latitude for seasonal variation.

There is a segment of the population which relies solely upon goat milk products for their dairy needs. Public health safety therefore dictates that quality standards be defined which provide a safe product, but at the same time the standards need to be adjusted for the unique composition of goat milk.

Goat milk products must be regulated for safety but must not be regulated out of existence.

References

1. Holsinger, V.H. 1982. The Chemistry and Processing of Goat's Milk. U.S. Department of Agriculture Publication. Philadelphia Pennsylvania.
2. Hinckley, L.S. 1990. Revision of the Somatic Cell Count Standard for Goat Milk. Dairy, Food and Environmental Sanitation. Vol. 10. No. 9. pp. 548-549.
3. Atherton, H. 1989. Report of NCIMS Goat Milk Committee, at National Conference on Interstate Milk Shipments.
4. Jenstad, E. 1981, A Report on Inhibitors on Goat's Milk Using the *Bacillus stearothermophilus* Test. Ministry of Agriculture and Food, Providence of British Columbia. Report of NCIMS Goat Milk Committee.
5. Negishi, T. and Hayatsu, H. 1984. Inhibitory effect of saturated fatty acids on the mutagenicity of N-nitrosodimethylamine. Mutation Research 135. pp. 87-96.
6. Oram, J.D. and Reiter, B. 1968. Biochemistry and Biophysics. Acta 170. pp. 351-365.
7. Kapture, J. 1989. Cascade Dairies report to NCIMS Goat Milk Committee. pp. 13.

Dairy, Food and Environmental Sanitation, Vol. 11, No. 9, Pages 513-514 (September 1991)

The Yogurt Story - Past, Present and Future Part VI

Ebenezer R. Vedamuthu, Ph.D.
Quest International Bioproducts Group, 1833 57th Street, Sarasota, FL 34243

Yogurt Quality

Shelf-Life or Keeping Quality of Yogurt

As discussed in the last article, keeping quality is an important attribute in the marketing of a food product. Keeping quality, as mentioned before, is a microbiological problem; in other words, it is related to the level of sanitation in the plant. If good manufacturing practices are followed, the product will have reasonable shelf-life. Generally, yogurt is expected to have at least 3 - 4 weeks of shelf-life. The microorganisms active in the spoilage of yogurt are different from most other dairy products. Their control, however, is relatively simple. It is so because yogurt as a product has in-built "preservative principles." Yogurt is a relatively stable product because of its high acidity. High lactic acid content inhibits most Gram-negative psychrotrophic microorganisms. Unless there is gross contamination with psychrotrophs, they do not pose serious spoilage problems.

Yogurt is indeed a high acid food. The pH of most market yogurt samples range from a low of 3.6 to a high of 4.2. The titratable acidity is usually between 1.1 - 1.3%. Microorganisms that are generally involved in the spoilage of high acid foods are yeasts and molds. Yeasts are more acid-tolerant than bacteria and molds are even more acid-tolerant than yeasts. Molds can use lactic acid as a source of carbon and energy in their metabolism. When in addition to being quite acid tolerant, yeasts and molds are also psychrotrophic. Hence, their relatively rapid growth and metabolism during refrigerated storage of yogurt affects the keeping quality. So, preventive and control measures should be taken to avoid yeast - mold - related problems.

Sources of Fungal Contamination of Yogurt

The major sources of fungal contamination of yogurt are:

1. Contaminated starters
2. Poorly cleaned fillers
3. Contaminated cups and lids
4. Overall lack of sanitation
5. Contaminated sugar syrups, honey, fruit preparations
6. Air and environment in filler rooms

The foregoing list primarily relates to sanitation and quality control practices in the plant. For this reason, yeast and mold count on finished yogurt is an excellent indicator of sanitation and care exercised in its manufacture - more so than coliform count.

How can one control fungal contamination of yogurt? Some of the basic preventive measures as applicable to the six sources listed above could be discussed here.

Molds grow and use up lactic acid, the pH of acidic foods gradually increases towards neutral side. At near neutral pH, other bacterial contaminants, especially psychrotrophic Gram-negative rods and *Bacillus* species that were suppressed by the high acidity, grow and predominate. These bacteria have relatively strong protein- and fat-splitting enzymes which bring about a rapid deterioration of the food.

Common defects in yogurt contaminated with yeasts are yeasty and/or fermented (alcoholic) odor and taste and a slight frothing caused by entrapped carbon dioxide. Sometimes pink or off-white colored colonies of yeasts can be seen on the surface of the yogurt in the cup or on the underside of the lid. Yeasts also can grow within the curd mass and cause splitting of the curd or fissures through gas generation.

Unlike yeasts, molds grow only on the surface of yogurt, i.e. in the head-space of the filled cup, because they need air or oxygen for growth. Fuzzy mold colonies are common on the surface and on the underside of the lid. Mold colonies may be white, gray, black or green in color. Yogurt contaminated with mold may show discoloration or liquefaction around the colonies and may have a musty smell and bitter taste. Although mold colonies develop only on the surface of yogurt, their powerful fat- and protein-splitting enzymes seep through the yogurt and cause deteriorative changes.

A. *Starters*: Check starters for yeasts and molds by:

a. Organoleptic (taste-smell) evaluation. A musty or yeasty smell is indicative of contamination.
b. Examining a microscopic smear of the starter for large oval, sometimes budding yeast cells or long filaments of mold mycelia.
c. Direct plating of 1.0 ml of culture with a suitable agar such as acidified Potato dextrose agar and checking for

fuzzy surface colonies of molds or shiny off-white or pigmented colonies which should be checked microscopically to confirm for the presence of yeasts.

If the starters are contaminated, a new batch should be made. Held-over starters should not be used. Starters designed for direct-setting bulk starters or product vats from a reputable starter house should be introduced.

B. *Over-all Sanitation*: Special care should be exercised in washing and sanitizing all post-fermentation contact surfaces. If CIP is used, apply proper detergent-temperature-time cycles to get the most effective cleaning. Just before running the product through, use an efficient sanitizer like hypochlorite at the proper strength. Rubber parts should be soaked in 5% lye solution to dissolve fat and protein residues, and rinsed in clean water to remove lye residue. Fillers which have intricate parts need special attention.

The choice of a proper sanitizer or an ordered sequential application of different sanitizers has been found to be useful in fungal control. Hypochlorites are excellent sanitizers with a wide spectrum of activity. They are, however, quite corrosive at higher concentrations. Relatively higher concentrations of hypochlorites are required for destroying fungi. Research at Oregon State University showed that iodophors are more germicidal against fungi at lower concentrations than hypochlorites. Additionally, they not very corrosive. An initial iodophor rinse followed by a chlorine rinse at low concentrations was found to be extremely effective against fungi and bacteria (2).

C. *Quality Control Checks on Flavoring Materials*: Proper quality control checks for fungal contamination on sugars, syrups, fruits, fruit preserves, nut meats, frozen fruits, honey and any other flavoring used, should be instituted. Proper storage of opened and unopened containers of these substances is also important. Refrigerated storage is helpful. Sanitation of fruit-feeders, mixers and other accessory equipment should also be carefully watched.

D. *Cups and Lids*: Store and handle cups and lids carefully. Do not use lids that were dropped on the floor. Do not use lids or cups that were stored without proper covering to keep out dust. Dust particles carry mold spores. Cups and lids should be protected against dampness. Moist surfaces allow mold growth. It is advisable to dip any questionable containers and their lids in 50 ppm chlorine solution, drain well and then use them.

E. *Quality Control Checks on Contact Surfaces*: Check sanitation of contact surfaces by agar contact plate method or swab method or any other suitable method. The same is applicable to cups and lids. In this case, buffer rinse method will be more suitable. For excellent description of these methods, the reader is referred to the *Compendium of Methods for the Microbiological Examination of Foods* (1).

F. *Air and Environment in the Filling Area*: Air in the packing room could be a major source of yeasts and molds. To avoid fungal contamination of yogurt in large operations, it may be worthwhile to install filtered laminar air flow systems (HEPA filter systems) in packaging rooms.

In small and medium sized operations, where investment on filtered laminar air flow systems could be considered prohibitive, other practical measures are necessary. Positive air pressure in the packaging room should be ensured so that when doors are opened air flows out but not inwards. The same directional sweep of air should occur through any openings in the walls of the filler room, for example, openings for conveyer belts or pipes leading into or out of the room. Air vents and filters should be periodically disassembled cleaned or replaced.

The walls in the packaging room should be free of cracks, holes or rough surfaces where yeasts and molds can lodge and grow in the moist atmosphere. The walls should be smooth and painted over with a glossy, non-toxic, waterproof industrial grade paint containing an approved mildew inhibitor allowed for use in food plants. Ceramic tiled walls lend themselves to easy cleaning, sanitizing and maintenance. Fogging the filler room with chlorine at the end of every workday also helps. Periodically check yeast and mold count of the environment by exposing poured agar plates at various vantage points for specific time intervals and incubating at appropriate temperature. The use of an Anderson Air Sampler with acidified Potato Dextrose Agar plates will give valuable data on fungal content of air (1).

G. *Other Options for Controlling Fungi:* Certain antifungal agents are approved for addition to yogurt. The most commonly used agents are salts of sorbic acid. Salts of benzoic acid are also useful in controlling fungi. Because molds are quite aerobic, a tight seal with a plastic film directly in contact with the surface of the product will retard mold growth. A carbon dioxide or nitrogen gas flush of the head-space in the cup also helps to suppress the molds. These measures, however, do not have any effect on yeasts.

A recent paper on the factors affecting keeping quality of yogurt was published by researchers from Canada, and the paper discusses various possibilities available for extending the shelf-life of yogurt (3).

References

1. Favero, M.S., D.A. Gabis and D. Vesley. 1984. Environmental monitoring procedures. In: Compendium of Methods for the Microbiological Examination of Foods. Chapter 3. 2nd. ed. (ed. M.L. Speck), American Public Health Association, Washington D.C.
2. Hays, Helen, P.R. Elliker and W.E. Sandine. 1967. Microbial destruction by low concentrations of hypochlorite and iodophor germicides in alkaline and acidified water. Appl. Microbiol. 15:575-581.
3. Lacroix, C. and O. Lachance. 1990. Effect of various humectants and a_w on proteolysis, yeast and mold growth and shelf-life during cold storage of yogurt. Can. Inst. Food Sci. Technol. 23:101-108.

CALL FOR PAPERS

IAMFES 79th Annual Meeting

July 26-29, 1992
Toronto, Ontario

Instructions to Prepare Abstracts

Procedure

- ☐ Use the printed Abstract form that appears on the other side of this page.
- ☐ 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 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 graduate student entered in The Developing Scientist Award Competition, check the box to indicate this and have the form signed by your major professor or department head.
- ☐ Check the most appropriate box to indicate the general subject area of the paper. Indicate subject if checking other.

Type the abstract *double-spaced*, in the space provided on the abstract form.

Mail *two* copies of the abstract before December 16, 1991 to:

Steven K. Halstead
Executive Manager, IAMFES
502 E. Lincoln Way
Ames, IA 50010-6666

Enclose *two* stamped, self-addressed post cards. Two cards must be included with *each* abstract that is submitted. One will be returned to acknowledge receipt of the abstract and the other to notify the presenter of the time the paper is to be presented.

Content of the Abstract

The abstract should describe briefly: *(a)* the problem studied, *(b)* methods applied, *(c)* essential results, and *(d)* conclusions.

Presentations Format:

Papers may be presented orally or by poster format at the discretion of the Program Committee. Oral presentations will be scheduled so a speaker has a maximum of 15 minutes, including a 2-4 minute discussion. Carousel projectors for 35 mm slides will be available. **Overhead projectors are not to be used and none will be available.**

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.

Developing Scientist Award Competition

Open to students enrolled in M.S. or Ph.D. programs at accredited universities or colleges who will present their own original research. Candidates will have graduated no more than one year prior to the deadline for submission of abstracts. The abstract form must be signed by the student's major professor or department head. Entrants are required to complete an extended abstract. Such forms are available upon request from Mr. Halstead at the above address.

Winners are presented and honored at the annual Awards Banquet. All entrants will receive complimentary tickets and are expected to be present at the Banquet.

Additional Abstract Forms

Extra copies of the abstract forms may be obtained from Steven K. Halstead, Executive Manager, or you may photo copy this one.

Membership in IAMFES

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

(OVER)

IAMFES Abstract Form
DEADLINE: DECEMBER 16, 1991

Title of Paper _____

_____

Authors _____

_____

Name and Title of Presenter _____

_____

Institution and Address of Presenter _____

_____

Office Phone Number (____)____-_____

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
- ☐ Other _____

Check the presentation format you prefer.

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

Developing Scientist Award Competition ☐ Yes ☐ No An Extended Abstract Form will be sent.

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

Please type abstract, double-spaced, in the space provided here.

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

I authorize IAMFES to record my presentation.

Signature _____ Date: _____

I do not wish to be recorded.

Signature _____ Date: _____

CALL FOR PAPERS

IAMFES 79th Annual Meeting

July 26-29, 1992
Toronto, Ontario

Instructions to Prepare Abstracts

Procedure

- ☐ Use the printed Abstract form that appears on the other side of this page.
- ☐ 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 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 graduate student entered in The Developing Scientist Award Competition, check the box to indicate this and have the form signed by your major professor or department head.
- ☐ Check the most appropriate box to indicate the general subject area of the paper. Indicate subject if checking other.

Type the abstract *double-spaced*, in the space provided on the abstract form.

Mail *two* copies of the abstract before December 16, 1991 to:

Steven K. Halstead
Executive Manager, IAMFES
502 E. Lincoln Way
Ames, IA 50010-6666

Enclose *two* stamped, self-addressed post cards. Two cards must be included with *each* abstract that is submitted. One will be returned to acknowledge receipt of the abstract and the other to notify the presenter of the time the paper is to be presented.

Content of the Abstract

The abstract should describe briefly: *(a)* the problem studied, *(b)* methods applied, *(c)* essential results, and *(d)* conclusions.

Presentations Format:

Papers may be presented orally or by poster format at the discretion of the Program Committee. Oral presentations will be scheduled so a speaker has a maximum of 15 minutes, including a 2-4 minute discussion. Carousel projectors for 35 mm slides will be available. **Overhead projectors are not to be used and none will be available.**

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.

Developing Scientist Award Competition

Open to students enrolled in M.S. or Ph.D. programs at accredited universities or colleges who will present their own original research. Candidates will have graduated no more than one year prior to the deadline for submission of abstracts. The abstract form must be signed by the student's major professor or department head. Entrants are required to complete an extended abstract. Such forms are available upon request from Mr. Halstead at the above address.

Winners are presented and honored at the annual Awards Banquet. All entrants will receive complimentary tickets and are expected to be present at the Banquet.

Additional Abstract Forms

Extra copies of the abstract forms may be obtained from Steven K. Halstead, Executive Manager, or you may photo copy this one.

Membership in IAMFES

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

(OVER)

IAMFES Abstract Form
DEADLINE: DECEMBER 16, 1991

Title of Paper _____

_____

Authors _____

_____

Name and Title of Presenter _____

_____

Institution and Address of Presenter _____

_____

Office Phone Number (____)____-_____

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
- ☐ Other _____

Check the presentation format you prefer.

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

Developing Scientist Award Competition ☐ Yes ☐ No An Extended Abstract Form will be sent.

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

Please type abstract, double-spaced, in the space provided here.

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

I authorize IAMFES to record my presentation.

Signature _____ Date: _____

I do not wish to be recorded.

Signature _____ Date: _____

News

Conference for Food Protection

The sixth Conference for Food Protection will be held April 25-29, 1992, at the Tremont Plaza Hotel, Baltimore, Maryland.

The objectives of the Conference are to promote food safety and consumer protection and provide a forum for:

- Identifying and addressing problems in the production, processing, packaging, distribution, sale and service of food.
- Focusing on the food protection programs governing food service, retail food stores and the vending segments of the food industry.
- Adopting sound, uniform procedures which will be accepted by food regulatory agencies and industry and promoting these procedures among states, territories and the District of Columbia.
- Establishing a working liaison among governmental agencies, industry, academic institutions, professional associations and consumer groups concerned with food safety.
- Coordinating with the USPHS/FDA and USDA to disseminate information regarding food safety issues that fall under their jurisdiction.

The Conference for Food Protection is a non-profit organization that originated in 1971. The structure of the Conference provides a representative and equitable partnership among regulators, industry, academia, professional organizations and consumers to not merely identify problems and formulate recommendations, but also to develop and implement practices which ensure food safety. New, rapidly developing food technologies and marketing innovations challenge all groups involved in food production and monitoring to work together to enhance the quality of our food supply.

The organization is managed by an Executive Board composed of twenty-two (22) voting members representing Federal, State and local food regulatory agencies, the food industry, academia and consumers.

Issues submitted to the Conference for deliberation are assigned to one of three Councils. Councils are composed of twenty-two (22) members balanced between government and industry interests.

Additionally, various committees are appointed to study particular issues and offer suggestions to the Councils. Councils recommend actions to the Assembly of Delegates.

Delegates are appointed by each state, territory and the District of Columbia food regulatory agencies responsible for the enforcement of food laws and regulations for food processing, food service, vending and retail food stores.

A mailing will be made to all 1990 Conference registrants and members in the next few months. Anyone not attending the 1990 Conference or who is not a member may request to be added to the mailing list.

Persons interested in promoting the objectives of the Conference are welcome and encouraged to attend.

For further information contact: Leon Townsend, Executive Secretary, Conference for Food Protection, 110 Tecumseh Trail, Frankfort, KY 40601, telephone (502)695-0253.

Irradiation of Food has the Potential to Improve Human Health

The Council for Agricultural Science and Technology (CAST), a consortium of 29 scientific societies that provides scientific information on agricultural and food science issues, strongly supports the use of irradiation to prevent microbiological contamination of foods.

Activist groups led by the New York-based Food and Water, Inc. are opposing startup of the nation's first commercial food irradiation plant. These groups plan to wage an all out media campaign against Tampa, Florida businessman Sam Whitney and his company, Vindicator of Florida, Inc. *The Wall Street Journal* (June 26, 1991) reported that Food and Water has "budgeted $30,000 for the Florida campaign and $300,00 for the national campaign," and that Walter Burnstein, head of Food and Water, "acknowledges that the ad campaign is extreme." "We do this stuff because we're desperate," he says. "We have to use every means we have to stop this technology." CAST believes that consumers should be provided accurate, scientific information concerning irradiation of food and be allowed the option of choosing for themselves.

These arguments against irradiation are based solely on emotion as there is no known scientific evidence indicating that food irradiation, as allowed under current regulations by the Food and Drug Administration, is in any way hazardous to human health. CAST scientists say that there is no confirmed evidence of toxicity, carcinogenicity, mutagenicity, or teratogenicity caused by irradiation of food at prescribed levels of treatment, and the nutritional and taste qualities are not significantly altered. The treated foods do not become radioactive, and no new, hazardous chemical compounds have been found in them. Also, no microbiological hazards in food have been identified as having been introduced by irradiation. These conclusions are embodied in two CAST publications, released in 1986 and 1989, which review the available scientific data. When irradiation is used at substerilizing doses for processing perishable foods such as meat, poultry and seafoods, these foods must be under appropriate refrigeration until ready for consumption, as with any minimally processed food.

The results of more than 35 years of research indicate that the risk associated with proceeding with U.S. Department of Agriculture and Food and Drug Administration authorizations for certain uses of irradiation in food processing is zero. In contrast, there is substantial risk in not proceeding with the authorizations. The risk of not proceeding is the risk of illness or occasional death as a consequence of infection with disease-causing microorganisms or parasites ingested in food. Most of these problems could be eliminated by properly irradiating some foods. Dr. Lester M. Crawford, Administrator, Food Safety and Inspection Service, USDA, speaking to the National Broiler Council, June 10, 1991, suggested as a possible regulatory step a program for *encouraging irradiation.*

For more information contact Dr. Edward S. Josephson, (401)792-2978 or Dr. Stanley P. Wilson, Executive Vice President, (515)292-2125.

Tetra Pak Alfa-Laval Group Formed

Tetra Pak's bid to purchase Alfa-Laval has been accepted by Alfa-Laval shareholders with shares corresponding to 98.2 percent of the capital and 98.8 percent of the votes received. Remaining shares will be requested and the bid for those is now being completed.

The new group formed, the Tetra Pak Alfa-Laval Group, will take effect on July 15. The industrial activities of the Group will be operated by two separate units, the Tetra Pak Group and the Alfa-Laval Group, each with its own president and CEO.

Tetra Pak, founded in 1951, is a world-wide supplier of food and beverage packaging machinery and materials and was responsible for introducing aseptic packaging for dairy beverages in Europe in 1961. Alfa-Laval, founded in 1883, engineers, produces and distributes a wide range of equipment for agriculture, food and dairy processing and industrial/environmental services worldwide.

Members of the Tetra Pak Alfa-Laval Group Board will be: Dr. Hans Rausing, chairman and CEO; Dr. Gad Rausing, co-chairman; Mr. Bertil Hagman, working vice chairman. Other board members will be: Mr. Uno Kjellberg; Mr. Lars Halldén; Mr. Sven Agrup; Mr. Göran Ekelund; Mr. Harry Faulkner; Ms. Lisbet Koerner; Dr. Jacob Palmstierna; Mr. Jörn Rausing; Mr. Karl-Erik Sahlberg; Mr. Christer Hedelin; Mr. Lars Leander; Mr. Ragnar Mandersson; Mr. Lennart Ohlsson; Miss Kirsten Rausing (alternate); Miss Sigrid Rausing (alternate).

Mr. Bertil Hagman will remain in his position as president and CEO of the Tetra Pak Group until September 1, 1991 at which time Mr. Uno Kjellberg, who currently holds the position of president and CEO of Tetra Pak Inc., the American affiliate of the Tetra Pak Group, will succeed him. Mr. Lars Halldén will remain as president and CEO of the Alfa-Laval Group.

Tetra Pak Inc., a supplier of packaging material and machinery to dairies and food processors was established in the United States in 1977. Its operations in the United States include packaging material plants in Denton, Texas and Vancouver, Washington, and a machine assembly plant in St. Paul, Minnesota.

Tetra Pak Inc. is responsible for marketing two of Tetra Pak's five packaging systems to U.S. dairy and food processors. The first, the familiar brick-shaped carton commonly referred to as the "drink box", was introduced in 1981. Its second packaging system produces gable-top cartons for juice and pasteurized dairy products.

For more information contact Virginia Harger, Communications Manager, Tetra Pak Inc. at (203)926-6230.

Food Safety and Quality Assurance: Foods of Animal Origin

Written as a textbook for students in veterinary medicine, food science, and related studies, *Food Safety and Quality Assurance* teaches the basics in food production technology for foods of animal origin. Emphasis is on how these foods may become contaminated and serve as sources of foodborne disease. *Food Safety and Quality Assurance* provides an overall view of the food chain, so that the user may clearly recognize potential sources of food contamination, and focuses on efficient prevention and consumer protection.

This third edition reflects the decade-long efforts by Drs. Hubbert and Hagstad to remain current on regulatory and industry changes and the needs of teachers and students for whom the text is intended. In that time, the text has advanced from the typewritten paperback editions *Food Quality Control: A Syllabus for Veterinary Students* (1982) and *Food Quality Control: Foods of Animal Origin* (1986) to its current 20 percent expansion in typeset hardback with Dr. Spangler as a contributor and input from an extensive world-wide review panel.

The book is composed of three parts: "Food Production Technology: The Food Chain," "Foodborne Disease," and "Consumer Protection." The specific aims are to (1) identify human health hazards in foods of animal origin, (2) identify the role of veterinarians in preventing introduction of hazards into the food chain, (3) identify agencies and their activities in maintaining safety in foods, (4) identify principles of safe food handling and processing, and (5) collect and analyze data relevant to investigation of foodborne disease outbreaks.

New to this edition are sections on the production of ducks and rabbits and hazard analysis critical control points, as well as inspection, in Canada. The section on aquatic animal production has undergone substantial revision necessitated by rapid change in the industry. Likewise, the section on controlling chemical adulteration has been revised in accordance with increasing public and governmental concern. Current figures and tables

are presented throughout the text, and each of the three parts concludes with a complete bibliography.

ABOUT THE AUTHORS: William T. Hubbert, D.V.M., M.P.H., Ph.D., Dipl. A.C.V.P.M., is director of the Residue Evaluation and Planning Division for the Food Safety and Inspection Service of the U.S. Department of Agriculture, Harry V. Hagstad, D.V.M., M.P.H., Dipl. A.C.V.P.M., Fellow A.C.E., is professor emeritus in the Department of Epidemiology and Community Health in the School of Veterinary Medicine at Louisiana State University. Contributor Elizabeth Spangler, D.V.M., Ph.D., Dipl. A.C.V.P.M., is a professor in the Atlantic Veterinary College at the University of Prince Edward Island.

Merger Gives Relco Unisystems Inc. Total Turnkey Capabilities

Relco Unisystems, Inc., Willmar, MN, now includes the combined capabilities of two other companies to provide total turnkey systems. The three companies that have merged are: Rolland Engineering, specializing in the engineering and design of dairy and food process systems as well as industrial refrigeration systems; Panel Systems Company, specializing in the manufacture of industrial process control systems; and Relco Unisystems, specializing in the design and fabrication of stainless steel equipment and piping systems.

For more information contact Gail M. Rolland, Sales/Engineering Assistant at (612)231-2210.

Updates . . .

NOW AVAILABLE THE NEW *PROCEDURES TO IMPLEMENT THE HAZARD ANALYSIS AT CRITICAL CONTROL POINT SYSTEM (HACCP)* MANUAL

Developed by the IAMFES Committee on Communicable Diseases Affecting Man, this manual provides instructions to:

- Implement the HACCP System
- Analyze Hazards and Assess Risks
- Determine and Monitor Critical Control Points
- Collect and Test Samples for Pathogens
- Evaluate Processing Systems for Hazards
- Diagram a Processing System
- Take Corrective Actions when necessary
- Verify Efficacy of the HACCP System

To Order your Copy of the All New HACCP Manual, Contact IAMFES at 800-369-6337 (U.S.) or 800-284-6336 (Canada) for Ordering Information.

IAMFES Secretary Nominations Due for 1992 Elections

Nominations are now being taken for Secretary for IAMFES. This year an academia representative will be elected.

Once all nominations are received by the nominating committee, two persons will be chosen to run for the office. This is a five-year term, moving up yearly until he or she is President of IAMFES, then serving one year after as Past President. The term of office begins the last day of the 1992 Annual Meeting. All IAMFES Executive Board Members meet three times a year.

Two people selected are placed on the ballot. The winner is determined by majority vote of the membership through a mail vote, in the spring of 1992.

Please send a biographical sketch and photograph NO LATER THAN OCTOBER 18, 1991 to the Nominations Chairperson:

J. Russell Bishop
Department of Food Science and Technology
VPI & SU
Blacksburg, VA 24061
(703)231-4921

Eleventh Food Microbiology Symposium - University of Wisconsin-River Falls

Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology - October 24-25, 1991

For more information contact Dr. Pumendu C. Vasavada, Department of Animal and Food Science, University of Wisconsin-River Falls, River Falls, WI 54022, (715)425-3704

FOOD & DAIRY EXPO '91
CHICAGO'S MCCORMICK PLACE OCTOBER 26TH - 30TH
SEE IAMFES AT BOOTH #2077

The Food and Dairy Expo '91, sponsored by the Dairy and Food Industries Supply Association, will feature over 500 companies displaying equipment, products and services available to food and dairy processors. The industry's largest international trade show will occupy over 200,000 square feet of Chicago's McCormick Place from October 26-30, 1991. Expo '91 will offer food and dairy processors the opportunity to view new products, innovative technologies and practical applications from leading suppliers in the industry. **Top Packaging and Processing Equipment Companies** like **Tetra Pak,** will display their newest equipment, products and services. **Leading Ingredient Suppliers**, including **Fantasy Flavors,** will show their extensive lines of products. Companies with **Analytical Equipment, Products and Services,** such as **3M Microbiology Products,** have reserved space at Expo '91. **Cleaning and Sanitation Products Suppliers** will also be displaying. Among these are **Klenzade Div. of Ecolab, Sparta Brush, Sani-Matic Systems and Diversey Corp. Design and Engineering Firms,** including **Seiberling Associates,** will be on hand to discuss their services. " The Food and Dairy Expo is more than just a trade show," according to DFISA President Donald Brinks. In addition to the outstanding trade show, the Expo will have a series of 11 informative seminars covering areas of interest to all types of processors. The DFISA Foundation's **Food Megatrends '91,** will feature daily sessions on topics ranging from sanitation and the environment, to ingredients and foods of the future. Food Megatrends is free to all processor attendees. The United States Small Business Administration has selected the Food and Dairy Expo '91 as the site for **Export Expo '91.** This program will provide information to attendees on how to develop international marketing plans, how to finance exports, protect intellectual property rights, and gain tax advantages. **For More Information, call DFISA at 301-984-1444.**

Food and Environmental Hazards to Health

Bacteria in Baby's Food

What started out as an attempt by FDA to resolve nutrient discrepancies in infant formula led to an even more significant finding: potentially serious microbial contamination.

As a result, the manufacturer, Nutricia-Loma Linda Foods Inc., voluntarily recalled more than 245,232 liters (63,760 gallons) of I-Soyalac Concentrate Infant Formula, worth an estimated $500,000, and shut down the firm's California processing plant for an indefinite time.

FDA categorized the recalls as Class I and Class II. Class I means a product is potentially life-threatening. Class II indicates a product is a health hazard but not life-threatening. While no illnesses were definitively traced to the contaminated formula, about 21 complaints of fever, vomiting and diarrhea in infants who had been on the formula were received by the company shortly after the recall was announced.

FDA was first alerted to potential problems at Nutricia-Loma Linda Foods in June 1990, following a routine inspection of the company's facility in Mount Vernon, Ohio, by FDA's Cincinnati district office. Although no longer a manufacturing plant, the facility still contained finished products.

Laboratory analyses of samples collected revealed fluctuations in calcium and phosphorus levels–even among samples from the same lot.

To verify the facility's quality control records (all of which were kept at the company's processing plant in Riverside, Calif.), the Cincinnati office referred the case to FDA's Los Angeles district office. That office, in turn, carried out a series of inspections in June and July at the Riverside facility.

While reviewing records to determine the cause of nutrient fluctuations, an investigator noticed that some cans of formula being held by the firm were "swollen," an obvious sign of bacterial contamination. Some of the swollen cans were almost ready to burst.

Laboratory analysis of the samples showed numerous and varied microorganisms; for example, gram-positive spore-forming rods, motile spores and rods, cocci, and anaerobic gram-positive rods. FDA later concluded that one lot of the product could have been life-threatening to infants.

The source of contamination was never identified. However, an engineer with FDA's Center for Food Safety and Applied Nutrition, who evaluated the firm's aseptic operation, speculated that a crack in the pressure chamber of the sterilizing unit may have allowed exterior air–and thus bacteria–to enter the product. Faulty can seams also were suggested as a possible cause.

FDA learned from company records that the firm had earlier found microbial contamination in formula produced on four different days and that outside laboratory analyses identified *Clostridium*, *Bacillus* and *Streptococcus* bacteria. But, although the company destroyed all contaminated lots, FDA found the firm had not adequately investigated to determine the source of contamination.

FDA also faulted the company for failing to:

- notify the agency that it had begun to manufacture infant formula at its Riverside facility
- register with FDA the new processing procedures used for its infant formula (a low-acid canned food)
- provide the agency with written verification for nutrient content and other required information
- revalidate its aseptic processing system's ability to maintain sterility after portions of the system had been reconfigured.

On July 12, 1990, the company voluntarily recalled 29 lots of its I-Soyalac formula after finding that its entire June 28 production had begun to swell. It sent telegrams to its 70 distributors and issued a press release.

The recalled products, as well as those being held at the California plant, were destroyed.

At the same time, the company chose to close down its California plant and, in early September, began production at its Ohio facility, which had been renovated and upgraded with new equipment and personnel to comply with federal law. The Cincinnati district office is monitoring the facility as part of FDA's infant formula inspection program.

The California plant, now under new management, remains shut down. Following FDA's inspections, company owners had indicated to FDA that the processing equipment would be removed and that if production were restarted, a more reliable sterilization system would be used.

March 1991/FDA Consumer

Importation of Cholera from Peru

On April 9, 1991, a U.S. physician attending a conference in Lima, Peru, had onset of diarrhea. He reported a maximum of eight watery stools in 24 hours and experienced no other symptoms except moderate weakness. The diarrhea lasted 5 days. After arriving in Peru on April 5, he had eaten all his meals, including a cold crab meat appetizer 2 days before onset of illness, in his hotel or at events catered solely for the conference participants. He also consumed ice and municipal water that the hotel reported had been purified. Culture of a stool sample obtained on April 11, after his return to the United States, yielded toxin-producing *Vibrio cholera* O1, serotype Inaba, biotype El Tor. His family did not accompany him to Peru and has remained well.

Editorial Note: An epidemic of cholera is occurring in Peru, Ecuador, and Colombia, and there is potential for spread to other countries. Although the risk for cholera is small for U.S. residents traveling in cholera-infected areas, some U.S. travelers nonetheless may become infected. The best protection is provided by scrupulous adherence to recommendations to prevent traveler's diarrhea; particularly, raw seafood and potentially contaminated water should be avoided. Optimally, travelers should drink only water that they have treated (e.g., by adding iodine or boiling) themselves. In addition, ice, which may be made from contaminated water, should be avoided. Commercially bottled water has transmitted cholera, but *carbonated* bottled water has a low pH and permits only brief survival of *V. cholerae* O1.

Most *V. cholerae* O1 infections cause no symptoms or only mild to moderate diarrhea, but in a small proportion of cases the illness can be life-threatening. Travelers who develop severe watery diarrhea or diarrhea and vomiting during or following travel to an area with known cholera should seek medical attention immediately. Treatment of cholera with proper oral and, if indicated, intravenous rehydration is simple and highly effective.

The risk for secondary transmission of cholera in the United States is extremely small.

MMWR 4/19/91

Federal Register

Department of Agriculture

Agricultural Marketing Service
7 CFR Part 58
(DA-90-013)

United States Standards for Grades of Dry Sweetcream Buttermilk

Agency: Agricultural Marketing Service, USDA.
Action: Final Rule.

Summary: This final rule revises the United States Standards for Grades of Dry Sweetcream Buttermilk. In addition to redesignating this product as dry buttermilk, the final rule expands the scope of the current standards by including criteria which evaluate the quality of dry buttermilk product. The final rule also broadens the application of these standards, to more clearly reflect current industry processing practices and marketing needs, by providing for buttermilk derived from the churning of butter obtained from a variety of cream sources. These changes were initiated at the request of the American Dairy Products Institute.

Effective Date: August 23, 1991.

For Further Information Contact: Roland S. Golden, Dairy Products Marketing Specialist, USDA/AMS/Dairy Division, room 2750-S, P.O. Box 96456, Washington, DC 20090-6456, (202)447-7473.

Supplementary Information: This final rule has been reviewed under USDA procedures implementing Executive Order 12291 and Departmental Regulation 1512-1 and has been classified as a "non-major" rule under the criteria contained therein.

The final rule also has been reviewed in accordance with the Regulatory Flexibility Act, 5 U.S.C. 601 *et. seq*. The Administrator, Agricultural Marketing Service, has determined that these revisions will not have a significant economic impact on a substantial number of small entities because use of the standards is voluntary and these revisions will not increase costs to those utilizing the standards.

USDA grade standards are voluntary standards that are developed pursuant to the Agricultural Marketing Act of 1946 (7 U.S.C. 1621 *et. seq*.) to facilitate the marketing process. Such standards for dairy products identify the degree of quality in the various products. Quality in general refers to usefulness, desirability, and value of the product—its marketability as a commodity.

Manufacturers of dairy products are free to choose whether or not to use these grade standards. When products are officially graded, the USDA regulations and standards governing the grading of manufactured or processed dairy products are used. These regulations also require a charge for the grading service provided by USDA.

In accordance with the United States Department of Agriculture policy for regulatory review, the Dairy Standardization Branch conducted a review of the United States Standards for Grades of Dry Sweetcream Buttermilk and the Department's Specification for Dry Buttermilk Product. The objective of the review was to obtain both current and historical information relating to an industry proposal to revise the current standards for dry sweetcream buttermilk and to formalize quality grade standards for dry buttermilk product.

The review involved the collection and evaluation of information from the Department's Dairy Grading Branch and representatives of the American Dairy Products Institute. It was determined that the current definition for dry buttermilk requires that the liquid buttermilk be derived from the churning of butter made entirely from sweet cream. Buttermilk derived from the churning of butter which contains cream from sources other than sweet cream are specifically excluded in the USDA grade standards. Current industry practices, however, utilize cream from a variety of sources in the manufacture of butter. These sources include cream separated from whole milk, cream separated from whey, which is a co-product of the cheese making process, and cultured cream, which encourages the proliferation of lactic-acid-producing bacteria to provide a cultured flavor in butter. Buttermilk obtained from these sources may be further processed into dry buttermilk and dry buttermilk product.

The final rule provides a broader definition of dry buttermilk, changes the nomenclature of dry sweetcream buttermilk to dry buttermilk, and expands the scope of the standards to incorporate quality criteria for dry buttermilk product eligible for USDA grading service.

The primary property which differentiates the value and usability of dry buttermilk and dry buttermilk product is the protein content. The final rule establishes a minimum protein content for dry buttermilk. To achieve this minimum, the dry buttermilk must be obtained from a cream source which has a composition sufficiently high in protein to meet the minimum requirement.

The final rule also incorporates quality criteria for dry buttermilk product. Dry buttermilk product is considered to be a commodity of lesser economic value and may be obtained from a cream source which has a variable protein content. The resulting dry product will not meet the minimum protein content for dry buttermilk.

Corollary changes are also provided in part 58, subpart B, entitled General Specifications for Dairy Plants Approved for USDA Inspection and Grading Service, to conform the definitions of dry buttermilk and dry buttermilk product set forth therein with the United States Standards for Grades of Dry Buttermilk and Dry Buttermilk Product.

Federal Register/Vol. 56, No. 142/Wednesday, July 24, 1991/Rules and Regulations.

Industry Products

Additional New Antimicrobic Supplement Simplifies Listeria *Detection in Meat And Poultry*

Isolation and identification of *Listeria monocytogenes* from processed meat and poultry products has been simplified by the use of Oxford Medium, prepared by combining Bacto® Oxford Medium Base and Bacto® Modified Oxford Antimicrobic Supplement. This medium selects for *Listeria sp.* which are recognized as an important public health problem leading to serious illness and death. U.S.D.A. regulations, which require modified Oxford Medium for *Listeria* testing, can now be met by adding Modified Oxford Antimicrobic Supplement to Oxford Medium Base.

Listeria is presumptively identified by the esculin hydrolysis in the presence of ferric ammonium citrates observed as a darkening of the medium after incubation. The antimicrobic supplement, containing moxalactam and colistin sulfate, inhibits many common bacterial food contaminants.

Now, selectivity is increased by incorporating Bacto Modified Oxford Antimicrobic Supplement into Bacto Oxford Medium Base. The supplement is easy to rehydrate and added to the medium base without filter sterilization.

Difco extends the *Listeria* testing product line by addition of Bacto® Modified Oxford Antimicrobic Supplement, Moxalactam Antimicrobic Supplement, Fraser Broth Base, and Fraser Broth Supplement. All Difco *Listeria* testing products are available from leading laboratory distributors.

Difco Laboratories - Detroit, MI

Please circle No. 262
on your Reader Service Card

Charm Sciences Inc. Introduces New 3-Minute Charm Transit Test

Reducing antibiotic testing time from 15 or even 8 minutes down to 3 minutes can save hundreds of thousands of dollars a year, according to Humboldt Creamery in Fortuna, California.

Given the task of finding a 3-minute test, Chris Christensen, Quality Assurance Manager at Humboldt, learned that none existed. Christensen then determined that modifying the existing Charm II Test, so that it could be begun on the road by the hauler and completed at the dairy receiving bay, would meet this time constraint. In response to Christensen's innovative vision, Charm Sciences developed the new Charm Transit Test.

The Charm Transit Test includes the following specially-designed features:

1. Eliminates costs of labor associated with testing
2. Allows hauler to unload in only 3 minutes
3. Adds onto Charm II System with little additional equipment required
4. Is accurate and quantitative
5. Allows for multiple antimicrobial drug testing

Reagents for the Charm Transit test are in tablet form, eliminating waste. Total reagent costs are approximately $2.30 per load. Equipment cost is minimal.

Charm Sciences, Inc. - Malden, MA

Please circle No. 263
on your Reader Service Card

Atkins 618 Series Digital Thermometer Replaces Bimetal and Bulb and Capillary Thermometers

A built-in digital thermometer with theremocouple sensors and "2 inch size" diameter housing has been developed by Atkins Technical to replace bimetals and bulb and capillaries with easy-to-read digital numerals. The new instrument, named the 618 series, is resistant to vibration and ambient temperature swings and allows remote temperature monitoring.

Available in °F or °C versions, the new 618 has a range of -100° to +1000°, giving the widest temperature ranges, at the lowest cost, of any thermocouple built-in instrument on the market today. The extended range allows the use of one instrument for a broad variety of applications.

Standard features include remote 120-volt power, immunity to industrial noise, impact-resistant gasketed ABS plastic instrument housing, and 1/4 inch National Pipe Thread for connection to a pipe or conduit. An easy-to-read liquid crystal display (LCD) is used. The 618 digital instrument can be used with any ANSI standard type "K" thermocouple probe including over 150 thermocouple designs Atkins currently manufactures.

The 618 is based on the Atkins Technical dual slope integration linearizing technique which allows a minimum of parts while giving excellent accuracy and ambiant range. The design replaces the 2 inch round bimetal and bulb and capillary thermometers found in most food service and processing applications.

The price of the 618 instrument is $89.00. Quantity discounts are available. Housing for panel, wall or stem mounting are standard.

Atkins Technical Inc. - Gainesville, FL

Please circle No. 264
on your Reader Service Card

Hand and Nail Brush For Food Service

Sparta Brush Company has just introduced a new Hand and Nail Brush to eliminate cross contamination of food.

Sanitarians and health officials agree that improper hand washing is the number one cause of food borne illness. Bacteria is easily transferred by human hands to many different foods throughout a facility. To help prevent this, food service workers should scrub hands many times each day with hot, soapy water, but that doesn't complete the job. Dirt, bacteria and other contaminants trapped beneath fingernails and cuticles must be removed, and the new Sparta Hand and Nail Brush is designed to do that.

The No. 900 Hand and Nail Brush was developed through extensive research and testing. The brush is part of Sparta's continuing product development and efforts to improve food service sanitation.

The exclusive ergonomically designed 5" x 2" polypropylene handle is durable, yet comfortable and easy to grip when wet. The brush will also float in sanitizing solution.

Sparta Brush Co. - Sparta, WI

Please circle No. 265
on your Reader Service Card

New Breakthrough in Summer and Winter Ventilation

At the Plant Engineering show in Chicago, TechMaster Inc. introduced the SeasonMaster Air Direction Controller (Pat. Pend.), that allows the air flow direction from the EnergyMaster make-up air ducts to be easily changed between the cold weather upward position and the warm weather downward position. This is accomplished with a simple adjustment on the unit that takes only seconds and is easily made from the floor level; rather than manually rotating the duct 180 degrees at a high labor cost.

During the year, especially in between the seasons, daily temperatures often fluctuate up and down. In order to prevent the work area from overheating or overchilling, this adjustment should be made whenever necessary, day to day, or even shift to shift. Now with the SEASONMASTER this adjustment is simple, quick and easy.

ENERGYMASTER is an unfired make-up air system that during the "cold weather" season, inexpensively eliminates negative air pressure in a building, by comfortably introducing *unheated* make-up air through its *custom designed* overhead distribution duct system. It also helps to meet clean air regulations inexpensively by controlling air contaminants using less air than would normally be used. ENERGYMASTER decreases, or in most cases, eliminates high cost make-up air fuel bills by up to 100%. Existing installations of heated make-up air systems can also be retrofitted to use the ENERGYMASTER system.

ENERGYMASTER reduces "hot weather" temperatures by evenly distributing cooler outside air towards the floor throughout the entire building.

ENERGYMASTER will also:

1. Relocate excessive objectionable heat to other areas.
2. De-Stratify the heated air at the ceiling of any size building.
3. Give a fast return on investment, often within one-half heating season.
4. Increase heating system efficiency.

TECHMASTER Inc. - Walled Lake, MI

Please circle No. 266
on Your Reader Service Card

Anderson Pulse 400 System Simultaneously Monitors and Displays Liquid Level in Up to Four Tanks

Anderson Pulse 400 Series Microprocessors simultaneously measure and display liquid levels in up to four tanks, (which can be up to 100 feet tall). Operation is hands-free, unlike competitive instrumentation which requires the operator to scroll through a display or resort to the use of tank-selector switches.

Anderson Pulse 400 Series finds use in receiving, inventory and in production tracking and control. Liquid level is displayed with ± 0.5%% accuracy over the full span regardless of the shape of the tank. Thus, the Pulse 400 Series can be used to accurately monitor liquid level, not only in linear-shaped vessels such as perfectly cylindrical, flat-bottom vertical tanks, but also in tanks with dished or cone bottoms, and in pitched horizontal cylindrical vessels having dished heads. The highest degree of accuracy is obtainable by "wet" calibrating vessels on site with the monitor. This service is provided by Anderson field-service engineers upon request.

The monitor's operator interface -- a user-friendly 24-key keypad -- enables the operator to program changes in process parameters under two different levels of security. With the display box in the locked position, there are two programmable functions available to the operator.

Engineering units can be changed from weight to volume and back to weight. And specific gravity values can be modified as required.

A typical example of how these functions can be implemented is the capability to monitor the amount (in the same tank) of pasteurized whole milk on one day, light cream on another day, and high-brix orange juice concentrate on a third day, all with the same high level of accuracy.

With access through the programming keypad the operator has the flexibility of displaying and changing various other parameters: span (the value in weight or volume from sensor to the top of the tank) and the amount of product below the sensor. The operator can also program and display any one of the four setpoints for each channel (at any given time, the alphanumeric display shows the four most recently-tripped alarm setpoints), and can indicate the type of tank being used. A dual-function key can be used as a minus sign when programming negative parameters or as an alarm-acknowledgment command.

Sensors used with the PULSE 400 incorporate pressure transducers and electronic circuitry to convert static head pressure into proportional 4-20 mA output signals which are interfaced with the monitor. The sensors, which comply with 3-A sanitary standards, are compensated for changes in process and ambient temperature and can be cleaned in place to temperatures up to 250 degrees F. Construction is all stainless steel: housing, which accept 1/2-inch electrical conduit, are made of Type 304 SS, and the electropolished product-contact surfaces are fabricated of Type 316L SS for superior corrosion resistance. All sensors are provided with easily-accessible, non-interactive zero and span adjustments to facilitate fine tuning in their field.

Anderson Instrument Co., Inc. - Fultonville, NY

Please circle No. 267
on your Reader Service Card

New NIR Analyzer Range

FOSS FOOD TECHNOLOGY announces the expansion of its product line for the Food Industry with the addition of a range of advanced NIR analyzers manufactured by Oxford Analytical Instruments of England.

The Oxford NIR instruments have state-of-the-art design and are fully IBM compatible. Comprehensive calibration and data handling software is available. The range consists of four instruments, covering both solids/powders and liquid applications. The liquid systems have been designed *specifically* for liquids and are not just adaptations, as is the case with some other NIR units.

FOSS FOOD TECHNOLOGY has exclusive distribution rights for the Dairy, Food and Beverage Industries throughout North America and will provide full sales, service and applications support through its regional network in the United States and Canada.

The is a logical expansion for FFT as a major supplier of instrumentation to the Food Industry and affords Oxford the opportunity to enter the U.S. and Canadian Markets via an established national sales and service organization.

Foss Food Technology Corp. - Eden Prairie, MN

Please circle No. 268
on your Reader Service Card

DATATRACE®, Div. of Mesa Medical Inc. Intrinsically Safe Temperature Sensor

DATATRACE®, Division of Mesa Medical Inc., announces an exciting new product enhancement for measuring temperatures in hazardous environments. The completely self-contained temperature sensor called a Micropack™ has been certified intrinsically safe for *all* hazardous environments, including acetylene, ethylene, hydrogen or propane environments and areas with high concentrations of dust or fibers. Specifically, the standard temp Micropack™ Tracer has been certified intrinsically safe for Class I, Groups A, B, C and D; Class II, Groups E, F and G; Class III; and Encl. 4 hazardous areas.

Temperature monitoring in hazardous and/or explosive environments can now benefit from the DATATRACE® System's ease of use. It takes only a matter of seconds to program the unit. Once programmed, individual Tracers can be placed wherever needed; inside or outside the product, throughout the process. This is possible because the Mircropack™ Tracer monitors your product or process without wires or cables, recording an accurate time-temperature profile. When the process is completed, the Tracers are retrieved and the temperature data recovered quickly and easily. The data can then be reviewed, compared and analyzed, or stored for future reference.

DATATRACE® simplicity and totally self-contained design allows data to be collected in locations and processes that were previously difficult or impossible to obtain. This can reduce the costs of verifying the process and product quality.

DATATRACE®, Division of Mesa Medical Inc. - Wheat Ridge, CO

Please circle No. 269
on your Reader Service Card

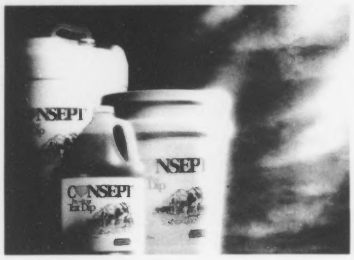
M.B.I. Introduces Sanitary Acoustical Wall Panels, Baffles and Ceilings

Metal Building Interior Products Company has introduced it's San Pan sanitary acoustical product line.

M.B.I. San Pan Type 600 PVF panels provide outstanding acoustical absorption and noise reduction while retaining maximum class clean room standards. MBI San Pan is available as a lay-in panel or as a free hanging baffle. Panels are durable, chemically inert, temperature resistant, USDA listed and available in white or colors. San Pan is suitable for new or retrofit use in quality clean rooms or health Facilities.

M.B.I. Products Co. - Cleveland, OH

Please circle No. 270
on your Reader Service Card



Babson Bros. Introduces Innovative Teat Dip

Consept™, a pre plus post antiseptic teat dip or spray containing the new germicide, AMBICIN N™, is now exclusively available from Babson Bros. Co., makers of Surge dairy equipment and sanitation products.

Consept protects against both environmental and contagious mastitis organisms, without the irritation and residue concerns of commonly used chemical germicides. This is because all-natural, biodegradable Ambicin discriminates in activity, attacking only bacteria and not tender skin tissue.

It has the rapid action essential for pre-dipping applications and the broad spectrum activity that is important for both pre and post-milking teat dipping. Consept is extremely safe, with all of its ingredients classified as Generally Recognized As Safe (GRAS) by the Food and Drug Administration (FDA).

Consept has been tested under both experimental challenge and natural exposure conditions according to protocols recommended by the National Mastitis Council (NMC), and is thought to be one of the most extensively tested teat dips ever introduced in the U.S. In these protocol tests, it has proven to be effective against the most prevalent mastitis pathogens including *Staphylococcus aureus, Streptococcus agalactiae* and environmental streptococcal species.

"Consept is the most innovative, exciting teat dip product we've ever marketed," says Terry Mitchell, vice president of sales and marketing for Babson Bros. Co. "It's a single product that's effective against both environmental and contagious mastitis, yet extremely gentle to the cow with no milk residue worries. It's a product that fits the high quality milk production and strong herd health goals of the dairy operator of the '90's."

The Ambicin technology (patent pending) was developed by Applied Microbiology, Inc. of New York. Applied Microbiology discovered a method for harnessing bacteriocins for commercial use as germicides. Ambicin bacteriocins are naturally occurring, highly pure proteins that are secreted by bacteria as a defense against other bacteria. The distinction between Ambicin and conventional germicides such as iodine, is that Ambicin attacks only bacteria and not healthy skin tissues. Also, Ambicin does not inhibit the healing process of skin the way chemical germicides can.

Babson Bros. Co. - Naperville, IL

Please circle No. 271
on your Reader Service Card

Spraying Systems' Line of Spray Nozzle Compiled in Single Catalog

Spraying Systems' complete line of spray nozzle accessories is usefully complied in a single catalog. The catalog is of special benefit to the food processing industry, which often requires spray accessories for tailor-made spray applications.

The bulletin features more than 40 different typed of accessories. Product photos, performance data, and dimensional information are give throughout the catalog. The convenient 16 page catalog includes such accessories as connectors, ball fittings, valves, pressure regulators and gauges, filters, and strainers...all designed to increase efficiency.

Spraying Systems' Fluid Line Accessories Catalog 10 may be the only spray nozzle accessories resource guide that many companies use. Spraying Systems Co. manufactures more than 19,000 different types of spray nozzles and accessories for hundreds of industrial applications.

Spraying Systems Co. - Wheaton, IL

Please circle No. 272
on your Reader Service Card

New 91/92 Tekmar Catalog

The new 91/92 Tekmar Catalog is now available and it features a variety of new products including PTFE labware, temperature recyclers, hybridization incubator, and mass flow controllers. Also included are products for sample preparation such as homogenizers, stirrers and shakers, as well as items for liquid handling and instrumentation for purge and trap, air analysis, and static headspace analysis.

Tekmar - Cincinnati, OH

Please circle No. 273
on your Reader Service Card

Sanitary Design

A Mind Set (Part III)

Donald J. Graham
Senior Food Technologist
Sverdrup Corp.
St. Louis, MO

Sanitary design applies not only to the inside of a facility but to the outside as well. Proper sanitary design of exterior plant areas reduces the risk of in-plant contamination.

The outside areas of a food processing facility are of major importance to overall plant sanitation and to conveying the impression of a sanitary facility to regulatory inspectors, the public and employees. A plant with neat, uncluttered grounds and attractive landscaping creates a positive first impression. The receiving yard is an often neglected exterior area. This area, especially in fruit and vegetable processing plants, becomes covered with dirt, debris, water and spilled product. If the area is not designed to be cleanable and cleaned on a regular schedule geared to production levels, infestation by insects, rodents and mold quickly becomes a major problem and a potential source of in-plant contamination.

Other food processing facilities requiring receiving yards for ingredients, packaging and major components of the products being processed pose similar hazards. Regardless of the types of processing taking place in the facility, the receiving and shipping areas require good drainage, access for cleaning and cleaning on a regular schedule. Rodent and insect control is as important in this area as it is inside the plant.

Some recommendations for receiving yards include:

- Paving them with concrete to prevent rodents from chewing through and burrowing beneath them. Rodents will chew through asphalt.
- Providing adequate drainage and sloping the pavement towards the drains. The size and number of drains should be designed to accommodate the rainfall that occurs in that particular area. The drains should be provided with catch baskets to prevent any solid debris carried on incoming products, vehicles, or any other source from entering the waste water system.
- Providing one or more hose stations to wash down the area when necessary.
- Placing bait stations around the outside of the receiving yard and around the outside perimeter of the buildings as a first line of defense against rodent infestation.

Lighting

The type of lighting used in the external areas of the plant has a major effect on insect attraction. Many older plants have outside lights directly over the doorways used for receiving, shipping, or personnel. The lights are usually the incandescent type that emit relatively high levels of ultraviolet radiation. Ultraviolet radiation attracts insects since the rays indicate warmth. Lights in the immediate plant vicinity should be placed on standards approximately thirty feet from the building with the light directed toward the building and doorways. The lights should be rated as low UV emitters, like high pressure sodium lights. Low pressure sodium lights are also low UV emitters but can cause significant color distortion. Mercury vapor and metal halide lights give off relatively high amounts of UV radiation and should be placed away from the plant buildings. By placing these lights around parking lots or at the entrance gate, they will act as an insect attractant and reduce the insect pressure on the processing buildings or warehouse. All lights should be adequately shielded with a nonbreakable transparent material to prevent possible injury to employees in the event a lamp breaks.

Roof Construction

Roof construction will, to a large degree, depend on the overall plant construction. If precast concrete wall panels are selected, the roof type could very easily be precast double tee. As was pointed out in the second article, precast double tee construction using the Pocket Beam Construction method results in a cosmetically attractive facility that eliminates many overhead flat ledges which are unacceptable from a sanitary standpoint.

Traditionally, roofs have been pitch and gravel type. Pitch and gravel roofs should not be located over process areas as they are impossible to clean. Dry materials like flour, starch, grain or other products are carried out by the vents and attract birds and insects, while promoting the growth of weeds and being the source of odors caused by bacteria, yeast or mold development. Pitch and gravel roofs, if used, should be confined to warehouses, machine shops and other nonprocess areas. Be sure to check the fire code in the area for any specific regulations pertaining to roof construction.

Smooth membrane-type roofs are recommended over processing areas so they can be swept, hosed off and kept clean with minimal effort. This is especially important if there is the possibility of product spill on the roof.

Roof openings for exhaust fans, air handling systems, etc., should be sealed, flashed and screened or, if applicable, filtered to prevent the entry of outside contaminants such as water, insects, off odors, dust and microbes.

Roof opening caps and roof mounted air handling units should be insulated with sandwich panel insulation. Open insulation is difficult to clean and frequently becomes infested with insects.

Windows and Other Openings

The most sanitary food processing plant will not have any windows. The plant will have environmental control and adequate lighting so windows are not necessary. In addition to being a sanitation hazard due to breakage, windows and frames require continual maintenance to keep them clean, caulked and in good repair.

Windows that cannot be opened are the next best alternative. These should be made from unbreakable polycarbonate material. Unopenable windows let in the necessary light but keep out dust, odors, debris and insects. Another alternative is windows that can be opened but have permanent screens preventing the entry of insects. A major problem with screened windows is that sections of screen will be cut out to "let in more air." For that reason this alternative is not recommended. If openable windows are already in place they can be secured provided there is adequate air handling in the facility. A routine inspection and screen maintenance program must be in place and enforced if the windows cannot be secured shut.

When windows are included in plant design, the placement of the window in the wall is a sanitary design consideration. The recommended and preferred placement is to have the window flush with the inside wall so there is no sill on the inside to catch debris, dirt, etc. The sill on the outside should be sloped at a 60 degree angle to prevent birds from roosting and debris such as leaves, dust, etc., from collecting.

The second best design for windows is to place them flush with the outside wall and slope the inside sill at a 60 degree angle. The placement of the window in the center is not recommended since it is virtually impossible to maintain an adequate seal if both the outside and inside sills are sloped. It is also more expensive to attempt to slope both sills.

When deciding whether or not to include windows, consult the local fire codes as some municipalities require windows. However, even if windows are required or already in place, by keeping the idea of sanitation in mind, acceptable sanitary conditions can be established.

Doors

Unless one has the ideal (but impractical) plant - a stainless steel box with no openings, coved wall/floor junctures, rounded corners and a full CIP system - there must be openings to allow ingress and egress of personnel, ingredients, supplies, utilities and finished product. Doors of any kind offer a potential entry point for undesirable intruders (rodents, birds, insects, dust, and other airborne contaminants).

When placing access doors, consideration should be given to the prevailing wind pattern at the site. If the dock or freight doors are to be continually in use and frequently open, they should be located on the lee side of the facility. In addition, the doors should be equipped with the rapid open/close type rollup doors. The rollup chamber should be designed to be as tight as possible to minimize insect infestation and breeding sites.

The exterior of the doors should be equipped with air curtains. To be effective, air curtains must be correctly designed for the job they are expected to do. They can be extremely effective in keeping flying insects, airborne dust and debris from entering the plant. The air curtains should extend completely across the opening and the air should have a down and out sweep. There should be no "dead" spots close to the door frames and the air velocity should be a minimum of sixteen hundred feet per minute measured three feet from the floor. In addition, air curtain motors should be wired directly into the door opening switch so the instant the door starts to open, the air is turned on and cannot be shut off until the door is fully closed. Manual shutoffs can be provided, but they should be key controlled by a supervisor.

Outside Pest Control

Outside pest control is the food processors first line of defense against in-plant infestation.

Previously described criteria summarized below will help keep the rodent problem to a minimum.

- Plant bushes and trees at least thirty feet from the buildings.
- Good drainage prevents standing water.
- Place pea gravel strips thirty inches wide between the outer walls and lawns or non-paved areas.
- Place bait boxes along the outer walls of the building.
- Maintain grounds that are uncluttered and keep the weeds and grass cut.
- Store all unused equipment in a manner consistent with part 110 21CFR Food and Drug Regulations.
- Provide lighting systems as previously described that reduces the attractiveness to insects.
- Keep the grounds (rail sidings, truck doors, receiving yards) free of spilled product to reduce the attraction for rodents, insects, and birds.
- Wall penetrations must be sealed the same day and not left overnight.
- Use sixty degree sloped ledges to discourage bird roosting and nesting.
- Smooth membrane roofs are easily cleaned to reduce food sources for pests.
- Provide smooth membrane roofs that are easily cleaned.
- Provide a positive program of pest control with constant monitoring and updating.

Affiliate News

TAMFES Annual Meeting Report

The 9th annual meeting of the Texas Association of Milk, Food and Environmental Sanitarians was held June 11 and 12, 1991 at the Howard Johnson South Plaza Hotel in Austin, Texas.

Over 295 persons registered for the meeting. Special guests that attended the meeting were Mr. Inda Aurto of Mexico and Mr. Steven Halstead of IAMFES.

A "standing room only crowd" attended the laboratory session presided over by Mr. Joe Bare, Texas Department of Health. Other speakers and their topics were: Mr. J. Russell (Rusty) Bishop, Virginia Polytechnic Institute and State University "Determination of Antibiotic Residue in Milk and Dairy Products"; Ms. Sherry Clay, Texas Department of Health, "Focus on Safety in the Laboratory"; Mr. Joseph Bare, Texas Department of Health, "Basics of Milk Analysis, a Procedural Overview"; and Mr. John Cowan, Associated Milk Producers, Inc. "Visual Aids for Laboratory Techniques and Procedures."

A golf tournament was held at the Woodcreek Golf Course with over 78 attendees taking part.

Nick Fohn, incoming president of TAMFES, gave the opening remarks for the Tuesday afternoon general session. Plaques were awarded to Dr. Ranzell Nickelson and Dr. Al Wagoner for outstanding service to the Texas Association of Milk, Food and Environmental Sanitarians.

Featured speakers for the session were: Mr. Al Place, New York, Department of Agriculture "I.M.S. Update"; Mr. Jerome "Jerry" Kozak, International Dairy Foods Association, "New Food Labeling Laws-Its Impact on the Food Industry"; Dr. J. Russell (Rusty) Bishop, Virginia Polytechnic Institute and State University, "Consequences of Animal Drug Residues"; and Mr. Don Kinser, Dean Foods, "Energy Conservation."

On Wednesday morning session speakers and their topics were: Dr. Roy Carawan, North Carolina State University, "Pollution Prevention Pays"; Mr. Michael Coleman, Neotronics of North America, "Confined Space Entry"; Mr. Stephen Gardner, Attorney General's Office, "Health Fraud in Food Labeling"; and Mr. Jordi Castells, Trade Commission of Mexico, "Marketing Texas Manufactured Food Products in Mexico."

On Tuesday night a barbecue and country western dance was held for attendees at the Manchaca volunteer Fire Department. TAMFES extends its thanks for the sustaining members for their generous contributions for the hospitality suite.

A business meeting followed the adjournment of the meeting. Following persons were elected as officers: President - Nick Fohn; President elect - Linda Ybarra; 1st Vice President - Kent Roach; Treasurer - Dr. Ron Richter; Secretary - Janie Park and Kenneth Seaman, Past President.

Nick Fohn, incoming president of TAMFES, presenting a plaque to Dr. Ranzell Nickelson for outstanding service to the Texas Association of Milk, Food and Environmental Sanitarians.

Upcoming IAMFES Affiliate Meetings

1991

OCTOBER

•**2-4, South Dakota Environmental Health Association** will hold its Annual Meeting at the Howard Johnson Hotel, Rapid City, SD. For more information call Dave Micklos, SD State Department of Health, (605)773-3364.

•**15, Associated Illinois Milk, Food and Environmental Sanitarians Fall Seminar** will be held at the Woodfield Hilton Hotel, Arlington Heights, IL. For more information contact Bob Crombie at (815)726-1683.

•**16-17, Iowa Association of Milk, Food and Environmental Sanitarians, Inc. 50th Anniversary Annual Meeting** will be held at the Ramada Inn, Waterloo, IA. For more information contact Dale Cooper (319)927-3212.

•**24-25, Kansas Association of Sanitarians** will meet in Emporia, KS. For further information call John Davis, Wichita, KS, (316)268-8351.

NOVEMBER

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

Nick Fohn, incoming president of TAMFES, presenting a plaque to Dr. Al Wagoner for outstanding service to the Texas Association of Milk, Food and Environmental Sanitarians.

Illinois Affiliate Fall Conference October 15, 1991

The Annual Meeting and Fall Conference is planned for Tuesday, October 15th. Charles Price, Senior milk specialist with the FDA, is the program chairman. The conference will begin in the morning and end in the afternoon. It will include the noon meal at which time the annual meeting will take place and newly elected officers will be announced. IAMFES members, dairy and food industry and health professionals are encouraged to attend this educational seminar. More details will be provided in the AIMFES News Letter. To be sure you are on the mailing list, or for further information contact: Robert A. Crombie, Secretary, AIMFES, 521 Cowles, Joliet, IL 60435, (815)726-1683 (Voice & FAX).

IAMFES Audio Visuals Library

A Free IAMFES Members' Benefit

DAIRY

❑ **The BST Debate: Biotechnology and the Dairy Case** - (13 minute videotape). Provides retail grocers with an overview of bovine somatotropin or BST...a biotechnology product now being used to enhance the efficiency of milk production in cows. This video report focuses on how BST fits into the overall biotechnology picture, what possibilities it is likely to present at the retail level, and offers some specific tactics retailers can use in addressing questions shoppers may have on BST. (Monsanto Agricultural Company)

❑ **Babcock Method for Determination of Butterfat in Raw Milk** - A videotape report that describes the purposes, procedures and refinements of The Babcock Method for determining fat content in raw milk. Revised test procedures are presented which will result in greater accuracy and reproducibility. Viewing is recommended by anyone in public health or the dairy industry who uses the Babcock test. (Ozark Film & Video Production, Inc.)

❑ **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)

❑ **Causes of Milkfat Test Variations and Depressions** - (140 slides-tape-script-30 minutes). 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)

❑ **Controlling Volumes and Fat Losses** - (110 slides-tape-script-30 minutes). Keeping milk volume and product loss from farm to supermarket of fluid dairy products is discussed. This set was done with the cooperation of the dairy industry who reviewed the script and provided opportunities to take pictures. It is designed to be used by milk plants for their processing personnel, regulatory representatives, field staff and milk haulers. (Penn State-1982)

❑ **Ether Extraction Method for Determination of Raw Milk** - (26 minute video). 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-1990)

❑ **The Farm Bulk Milk Hauler** - (135 slides-tape-script-30 minutes). 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)

❑ **The Gerber Butterfat Test** - (7 minute video). 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., 59-min.-1986)

❑ **The How and Why of Dairy Farm Inspections** - (110 slides-tape-script-15 minutes). 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)

❑ **Milk Plant Sanitation: Chemical Solution** - (13 minute video). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titration 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.

❑ **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)

❑ **Processing Fluid Milk** - (140 slides-script-tape-30 minutes). 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)

❑ **Producing Milk of Good Quality and Flavor** - (114 slides-tape-script-25 minutes). The steps and corrective measures necessary to produce quality milk with good flavor are outlined. It is directed at dairy farmers, field staff, milk haulers and youth. (Penn State-1982)

❑ **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. (Comell University)

❑ **Tests for Milk Quality and Composition** - (140 slides-tape-script-25 minutes). This set shows and describes in simple terms the various quality tests performed on milk samples. These include bacteria, antibiotics, freezing point, pesticides, somatic cells, flavor and others. The purpose, desirable results, and ways to improve poor results are outlined. It was developed for farmers, youth, field staff and allied industry. (Penn State, 1983)

FOOD

❑ **BISSC - A Sign of Our Times** - (50 slides-script-tape). The presentation was prepared by the Baking Industry Sanitary Standards Committee. The purpose of BISSC, formed in 1949 by six of the national organizations serving the baking industry, is to develop and publish voluntary standards for the design and construction of bakery equipment. Those Standards are now recognized as the definitive sanitation standards for equipment used in the baking industry.

❑ **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.)

❑ **The Danger Zone** - (30 minute videotape). Teaches deli department employees about food safety and sanitation and how they help build deli customer traffic. Recommended for retail employees who sell products in the deli department, as well as brokers, distributors and manufacturers who sell their products in the deli department. The tape is accompanied by printed material that serves as excellent training supplements. (The International Dairy-Deli Association)

❑ **Food Irradiation** - (30 minutes). 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 Quality, Food Safety, and You!** - (80 slides, script, and cassette tape). This is an educational program designed for consumers. The presentation deals with the role of the consumer in maintaining the freshness, quality and safety of food in the home. It is intended for use by home economists, dieticians, cooperative extension agents and others interested in food quality and safety. (Cornell University)

❑ **Food Safe - Series I** - (4-10 minute videos). (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) "Foodservice 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 Foodservice 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) "Foodservice 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).

❑ **Food Safe - Series II** - (4-10 minute videos). 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).

❑ **Food Safe - Series III** - (4-10 minute videos). 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).

❑ **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)

❑ **Food Safety: For Goodness Sake, Keep Food Safe** - (15 minute videotape). Teaches food handlers 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)

❑ **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** - 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.)

❑ **On the Front Tine** - (18 minute video). 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)

❑ **On the Line** - (30 minute VHS videocassette). 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.

❑ **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.).

❑ **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.

❑ **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)

❑ **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).

❑ **Sanitation for Seafood Processing Personnel** - A training video suited for professional food handlers working in any type of food manufacturing plant. The film highlights Good Manufacturing Practices and their role in assuring food safety. The professional food handler is introduced to a variety of sanitation topics including: 1) food handlers 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 video). Provides an introduction to basic food safety for professional food handlers. 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 VHS). Anyone who handles seafood, from processor to distributor to retail and foodservice, 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).

❑ **Wide World of Food Service Brushes** - An 18 minute video tape that 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.

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

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 Ass'n.)

❑ **Acceptable Risks?** - (16 minute VHS). 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 Humanitites & Sciences, Inc.).

❑ **Air Pollution: Indoor** - (26 minute VHS). 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.).

❑ **Down in the Dumps** - (26 minute VHS). 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 tape). 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.

❑ **EPA Test Methods for Freshwater Effluent Toxicity Tests (using Fathead Minnow Larva)** - (15 minute tape). 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.

❑ **Fit to Drink** - (20 minute VHS). 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 flocculation, 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.).

❑ **Kentucky Public Swimming Pool and Bathing Facilities** - (38 minute videotape). It was 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. It was very well done and could 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 VHS). 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 VHS). 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 video). 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 Requirements** - (48 minute videotape). The removal process is a short term action and usually an immediate response to accidents, fires and illegally 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 minutes). 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 minutes). 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 minutes). 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.)

❑ **Waste Not: Reducing Hazardous Waste** - (35 minute VHS). 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 video). 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** - (14 1/2 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)

❑ **Legal Aspects of the Tampering Case** - (about a 25-minute, 1/2" videocassette). 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)

❑ **Psychiatric Aspects of Product Tampering** - (about a 25 minute, 1/2" videocassette). 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)

❑ **75th IAMFES Annual Meeting Presentations.** 30 cassette tapes covering the complete conference. 5 videotapes covering various symposia and sessions (For more specific information, contact Vicki.)

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 to: IAMFES, Lending Library, 502 E. Lincoln Way, Ames, IA 50010-6666. (You'll be notified by telephone when your tape or slide set is being mailed. Material from the Lending Library can be checked out for one week only so that others can benefit from its use.)

IAMFES MEMBER ONLY Date Mailed: _____

Name: _____

Company: _____

Address: (For UPS Delivery) _____

City: _____ State/Province _____ Zip Code _____

Country: _____ Daytime Phone No. _____

IAMFES New Members

Alabama

Alice Rollins
Mobile County Health Department
Mobile

California

Richard A. Bolman
Sonoma County Public Health
Santa Rosa

Gordon Brock
Micro Lab Foster Farms
Livingston

Gary DuBois
Taco Bell Corporation
Irvine

Mauro Nepomuceno
Sorrento Cheese Company
San Jose

District of Columbia

Cathy McCharen
Egg Nutrition Center
Washington

Charles S. Otto, III
USPHS/FDA
Washington

Georgia

Carl E. Davis
USDA, ARS
Athens

Cheong-Kit Leung
University of Georgia
Athens

Doug Zweigoron
BTG, Inc.
Decatur

Illinois

David T. Laird
FDA
Palis Hills

Indiana

Ted Alexander
Indiana State Board of Health
Indianapolis

Dora May Coleman
Food Sanitation Consultant
Floyds Knobs

P. Douglas Walling
Boehringer Mannheim
Indianapolis

Kentucky

Joe Bohannon
Beckmar Environmental Laboratory
Louisville

Chuck Gipperich
Brown-Forman
Louisville

Worley Johnson
Eastern Kentucky University
Richmond

Louisiana

Jae Joong Kim
Louisiana State University
Baton Rouge

Maryland

Janice Ferralli
Manor Hill Food Corporation
Baltimore

Paul Raynes
FDA
Rockville

Gale J. Reed
State of Maryland
Baltimore

Massachusetts

Ellen Fitzgibbons
Agri-Mark
W. Springfield

Minnesota

Paula J. Herald
Minnesota ALG Program
St. Paul

Robert Koeritzer
Land O'Lakes, Inc.
Minneapolis

Philip S. Wolff
USDA, AMS, Dairy Division
Burnsville

Missouri

Hans Grover
Fru-Con Engineering Inc.
Ballwin

Joann Robertson
Missouri State Milk Board
Springfield

Michigan

Pat Spinrad
Michigan Department of Agriculture
East Lansing

North Carolina

J. Alan Baker
Hunter Jersey Farms
Charlotte

Curtis Crickmore
Fast Food Merchandizers Inc.
Rocky Mount

North Dakota

Gary G. Hoffman
N.D. Department of Agriculture
Bismarck

New Jersey

Tony Grilli
Nabisco Brands
Fairfield

Alton Bradshaw
Johanna Farms
Flemington

Marvin E. Winston
Winston Laboratories, Inc.
Ridgefield Park

New York

Carol Heaver
Ogden Services
Jamaica

Pennsylvania

Elise Behler
Beatrice Cheese, Inc.
Whitehall

Shira Kramer
The Sterilex Corporation
Haverford

John A. Marriott
City of Hermitage
Hermitage

Joseph Noro
Schneider's Dairy
Pittsburgh

Texas

Joel A. Gambrell
Houston Dairy
Houston

Michael Gray
Department of Defense
San Antonio

John Paroulek
Associated Milk Producers
Arlington

Virginia

John B. Adams
National Milk Producers Fed.
Arlington

Wisconsin

Dawn Jones
Stephan & Brady
Madison

Kenneth H. Springer, Jr.
Hawthorn Melody Farms Dairy
Whitewater

Myeong-Ae Yu
University of Wisconsin-Madison
Madison

Canada

Donna Christensen
Agriculture Canada
Calgary, Alberta

J. J. Kennelly
University of Alberta
Edmonton, Alberta

Glenn P. Morrison
UNOX Meats Canada
Weston, Ontario

Italy

Giovanni Simoncini
Arena Finanziaria S.P.A.
Sommacampagna, Verona

Saudi Arabia

Nasser I. Kaud
King Saud University
Riyadh

Dairy, Food and Environmental Sanitation Instructions for Authors

Nature of the Magazine

Dairy, Food and Environmental Sanitation is a monthly publication of the International Association of Milk, Food and Environmental Sanitarians, Inc. (IAMFES). It is targeted for persons working in industry, regulatory agencies, or teaching in milk, food and environmental protection.

The major emphases include: 1) practical articles in milk, food and environmental protection, 2) new product information, 3) news of activities and individuals in the field, 4) news of IAMFES affiliate groups and their members, 5) 3-A and E-3-A Sanitary Standards, amendments, and lists of symbol holders, 6) excerpts of articles and information from other publications of interest to the readership.

Anyone with questions about the suitability of material for publication should contact the editor.

Submitting Articles

All manuscripts and letters should be submitted to the Editor, Margie Marble, 502 E. Lincoln Way, Ames, Iowa 50010-6666.

Articles are reviewed by two members of the editorial board. After review, the article is generally returned to the author for revision in accordance with reviewer's suggestions. Authors can hasten publication of their articles by revising and returning them promptly. With authors' cooperation articles are usually published within three to six months after they are received and may appear sooner.

Membership in IAMFES is not a prerequisite for acceptance of an article.

Articles, when accepted, become the copyright property of *Dairy, Food and Environmental Sanitation* and its sponsoring association. Reprinting of any material from *Dairy, Food and Environmental Sanitation* or republishing of any papers or portions of them is prohibited unless permission to do so is granted by the editor.

Reprints

Reprints of an article may be ordered by the author. An order form for reprints will be sent to you. Reprints may be ordered with or without covers, in multiples of 100. Reprint costs vary according to the number of printed pages in the article. Reprints cannot be provided free of charge.

Types of Articles

Dairy, Food and Environmental Sanitation readers include persons working as sanitarians, fieldmen or quality control persons for industry, regulatory agencies, or in education. *Dairy, Food and Environmental Sanitation* serves this readership by publishing a variety of papers of interest and usefulness to these persons. The following types of articles and information are acceptable for publication in *Dairy, Food and Environmental Sanitation.*

General Interest

Dairy, Food and Environmental Sanitation regularly publishes nontechnical articles as a service to those readers who are not involved in the technical aspects of milk, food and environmental protection. These articles deal with such topics as the organization and application of a milk or food control program or quality control program, ways of solving a particular problem in the field, organization and application of an educational program, management skills, use of visual aids, and similar subjects. Often talks and presentations given at meetings of affiliate groups and other gatherings can be modified sufficiently to make them appropriate for publication. Authors planning to prepare general interest nontechnical articles are invited to correspond with the editor if they have questions about the suitability of their material.

Book Reviews

Authors and publishers of books in the fields covered by *Dairy, Food and Environmental Sanitation* are invited to submit their books to the editor. Books will then be reviewed and the review will be published in an issue of *Dairy, Food and Environmental Sanitation.*

Preparation of Articles

All manuscripts should be typed, double-spaced, on 8-1/2 by 11 inch paper. Side margins should be one inch wide.

The title of the article should appear at the top of the first page. It should be as brief as possible and contain no abbreviations.

Names of authors and their professions should follow under the title. If an author has changed location since the article was completed, his new address should be given in a footnote.

Illustrations, Photographs, Figures

Wherever possible, submission of photographs, graphics, or drawings to illustrate the article will help the article. The nature of *Dairy, Food and Environmental Sanitation* allows liberal use of such illustrations, and interesting photographs or drawings often increase the number of persons who are attracted to and read the article.

Photographs which are submitted should have sharp images, with good contrast.

Examples of Proper Bibliographic Citations

Paper in a journal

Alderman, G. G. and E. H. Marth. 1974. Experimental production of aflatoxin in citrus juice and peel. J. Milk Food Technol. 37:308-313.

Paper in a book

Marth, E. H. 1974. Fermentations. pp. 771-882. In B. H. Webb, A. H. Johnson, and J. A. Alford (eds.). Fundamentals of dairy chemistry (2nd ed.), AVI Publishing Co., Westport, CT.

Book

Fennema, O. R., W. D. Powrie, and E. H. Marth. 1973. Low-temperature preservation of foods and living matter. Marcel Dekker, Inc., New York. 598 p.

Patent

Hussong, R. V., E. H. Marth, and D. G. Vakaleris. 1964. Manufacture of cottage cheese. U. S. Pat. 3,117,870. Jan. 14.

Business Exchange "Classifieds"

Services/Products | **Services/Products** | **Services/Products**

Services / Products

Consulting Services

Consulting Services

IAMFES MEMBERS
BE SURE TO SEND IN YOUR NOMINATIONS FOR IAMFES SECRETARY
(See Page 524 for Details)
DEADLINE:
OCTOBER 18, 1991

"PROCEDURES" Booklets

Procedures to Investigate Foodborne Illness * Procedures to Investigate Waterborne Illness * Procedures to Investigate Arthropod-borne and Rodent-borne Illness *

These three excellent manuals are based on epidemiologic principles and investigative techniques that have been found effective in determining causal factors of disease outbreaks. Used as a guide by Health Departments throughout North America.

Prices per booklet:

IAMFES Members: $5.00 **Non-Members: $7.50**

(add $1.50 postage & handling for first item and $0.75 for each additional item ordered)

For more information or to place an order, contact Vicki at IAMFES, 800-369-6337 (U.S.) or 800-284-6336 (Canada). Multiple Copy Discounts Available.

CIRCLE READER SERVICE NO. 359

NEW HACCP MANUAL

Now Available From IAMFES

Developed by the **IAMFES Committee on Communicable Diseases Affecting Man** to ***Promote Food Safety.***

See the Post Card Insert of this issue for ordering information.

3-A SANITARY STANDARDS

The Complete book of 3-A Dairy and E-3-A Egg Sanitary Standards is available from the IAMFES Office. These standards detail the design, materials and fabrication of dairy and egg processing equipment to assure proper cleanability and sanitation.

Standards Available	Price per book
3-A Dairy Sanitary Standards	IAMFES Member:$33.00 Non-Member: $49.50
E-3-A Egg Sanitary Standards	IAMFES Member:$28.00 Non-Member: $42.00
Both Sets Combined	IAMFES Member:$48.00 Non-Member: $72.00
(add $3.25 postage & handling for each item ordered.)	
3-A Five Year Update Service	IAMFES Member:$44.00 Non-Member: $66.00

To Order, call Vicki at 800-369-6337 (U.S.) or 800-284-6336 (Canada).

CIRCLE READER SERVICE NO. 358

Equipment For Sale

Equipment For Sale

IAMFES

NEW RATES EFFECTIVE SEPTEMBER 1, 1991

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

MEMBERSHIP APPLICATION

MEMBERSHIP

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

SUSTAINING MEMBERSHIP

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

STUDENT MEMBERSHIP

- ❑ **Membership *Plus* including BOTH journals $35**
- ❑ **Membership with *Dairy, Food and Environmental Sanitation* $20**
- ❑ **Membership with the *Journal of Food Protection* $20**

*Student verification must accompany this form

- ❑ **Surface**
- ❑ **AIRMAIL**

POSTAGE CHARGES: Outside the U.S. add $15 per journal surface rate OR $95 per journal AIRMAIL rate. U.S. funds only, drawn on U.S. Bank.

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

Name_____ Company Name_____

Job Title _____ Office Phone #_____

Address_____ FAX # _____

City_____ State/Province_____ Country_____ Zip_____

Renewal_____ New Membership/Subscription_____

PAYMENT MUST BE ENCLOSED IN ORDER TO PROCESS

MAIL ENTIRE FORM TO:

IAMFES
502 E. LINCOLN WAY
AMES, IA 50010

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

U.S. FUNDS on U.S. BANK

CARD #_____

EXP. DATE _____

YOUR SIGNATURE _____

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

Coming Events

1991

October

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

•**1-4, Canadian Institute of Public Health Inspectors Annual Conference**. For further information contact John Foruna, Public Health Inspector at Hamilton-Wentworth Regional Department of Public Health Services, P. O. Box 897, Hamilton, Ontario, Canada, L8N 3P6; (416)546-3570 or FAX (416)521-8093.

•**2-4, South Dakota Environmental Health Association** will hold its Annual Meeting at the Howard Johnson Hotel, Rapid City, SD. For more information call Dave Micklos, SD State Department of Health, (605)773-3364.

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

•**2, National Automatic Merchandising Association's Pre-Convention Early Education Sessions**, Chicago, IL. For further information contact NAMA Convention Department at (312)346-0370.

•**3-5, National Automatic Merchandising Association's** National Convention, Trade Show and Education Sessions for Vending/Foodservice Management, will be held at the McCormick Place, Chicago, IL. For further information contact NAMA Convention Department at (312)346-0370.

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

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

•**7-8, The Tenth Annual Midwest Food Processing Conference** will be held at the Radisson Hotel in LaCrosse, Wisconsin. For further information contact Kris Nelson, MFPC Publicity Chairperson, Minnesota Grain Pearling Company, P.O. Box 545, Cannon Falls, MN 55009, (507)263-3325.

•**8-10, Advanced Sanitation & Quality Assurance Managers' Workshop**, sponsored by the American Institute of Baking, will be held in Manhattan, Kansas. For more information call AIB at (913)537-4750 or (800)633-5137.

•**9-10, Glass Packaging Integrity Workshop**, Washington, DC. Contact: Dr. James Charbonneau, NFPA, 1401 New York Avenue, NW, Washington, DC 20005, (202)639-5972.

•**16-17, Iowa Association of Milk, Food and Environmental Sanitarians, Inc. 50th Anniversary Annual Meeting** will be held at the Ramada Inn, Waterloo, IA. For more information contact Dale Cooper (312)927-3212.

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

•**16-17, Cheese Symposium: California Dairy Foods Research Center Annual Conference** will be held at the University of California, Davis, CA. For more information please contact Bob Pearl/Sharon Munowitch, University Extension, University of California, Davis, CA 95616 or call (916)757-8899.

•**23-24, Establishing Hazard Analysis Critical Control Point (HACCP) Programs**, Syracuse, New York. Contact: Dr. Ken Stevenson, NFPA, 6363 Clark Avenue, Dublin, CA 94568, (415)828-2070.

•**24-25, Thermal Processing Workshop on Process Deviations**, Washington, DC. Contact: Austin Gavin, NFPA, 1401 New York Avenue, NW, Washington, DC 20005, (202)639-5980.

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

•**29-30, Dairy Food Processors' Symposium** will be held at the Palmer House, Chicago, IL. For more information contact the International Dairy Foods Association, 888 Sixteenth Street, NW, Washington, DC 20006; (202)296-4250.

•**30-Nov. 2, National Fisheries Institute 46th Annual Convention** will be held at the New Orleans Marriott, New Orleans, LA. Contact the NFI at (703)524-8881 for more information.

November

•**4-7, The Science of Ice Cream Manufacturing**, sponsored by the University of California, will be held at the Food Science and Technology Department, Cruess Hall, UC Davis Campus. For further information contact James Lapsley, Program Director, University of California, Davis, CA 95616-8598; (916)757-8692.

•**6, Food Industry Sanitation and Food Safety Workshop,** presented by the University of California Cooperative Extension, will be held at the Anaheim Plaza Resort Hotel, 1700 S. Harbor Blvd., Anaheim, CA. For more information contact Heidi Fisher, Food Science and Technology, University of California, Davis, CA 95616; (916)752-1478.

•**6-9, The Fundamentals of Selling & Merchandising** will be held at the Holiday Inn, Chicago, IL. For more information contact the International Dairy Foods Association, 888 Sixteenth Street, NW, Washington, DC 20006; (202)296-4250.

•**7-8, Consumer Focus - The '90's**, San Francisco, CA. Contact: Phillip Olivetti, NFPA, Claims Dept., 1401 New York Avenue, NW, Washington, DC 20005, (202)639-5946.

•**11-14, Industrial Refrigeration Workshop West**, sponsored by the University of California, will be held at the Food Science and Technology Department, Cruess Hall, UC Davis Campus. For further information contact James Lapsley, Program Director, University of California, Davis, CA 95616-8598; (916)757-8692.

•**12, Warehouse Sanitation**, sponsored by the American Institute of Baking, will be held at the Industry Hills Sheraton Resort, One Industry Hills Parkway, City of Industry, CA. For more information call AIB at (913)537-4750 or (800)633-5137.

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

•**15-17, National Automatic Merchandising Association Financial Management Seminar** will be held at the Las Vegas Hilton Hotel, Las Vegas, NV. For further information contact NAMA Convention Department at (312)346-0370.

•**18-20, International Association of Biological Standardization (IABS)** will hold its 22nd Congress and Exposition on "Characterization and Standardization of Purified Biologicals" in San Francisco, CA. For more information, contact Crest International, 940 Emmett Avenue, #14, Belmont, CA 94002. Telephone (415)5955-2704 or outside California (800)222-8882, and by fax, (415)595-3379.

•**19, Warehouse Sanitation**, sponsored by the American Institute of Baking, will be held at the Sheraton Atlanta Airport Hotel, 1325 Virginia Avenue, Atlanta, GA. For more information call AIB at (913)537-4750 or (800)633-5137.

•**21-22, Establishing Hazard Analysis Critical Control Point (HACCP) Programs**, Davis, CA. Contact: Sharon Munowitch, University Extension, University of California, Davis, CA 95616-8727, (916)7557-8899.

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

Index of Advertisers

Display Advertising

Business Exchange "Classifieds"

IAMFES

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

IAMFES Booklets

Qty.		Total $
_____	Procedures to Investigate Waterborne Illness $5.00/member; $7.50/non-member	_____
_____	Procedures to Investigate Foodborne Illness - new 4th Edition $5.00/member; $7.50/non-member	_____
_____	Procedures to Investigate Arthropod-borne and Rodent-borne Illness $5.00/member; $7.50/non-member	_____
_____	Procedures to Implement the Hazard Analysis Critical Control Point System $5.00/member; $7.50/non-member	_____

Multiple copies available at reduced prices.

Subtotal _____
Shipping _____
Add $1.50 for first item. $.75 for each additional item
Booklet Total _____

3-A Sanitary Standards

Qty.		Total $
_____	Complete set 3-A Dairy Standards $33 member; $49.50 non-member	_____
_____	Complete set 3-A Dairy & Egg Standards $48 member; $72 non-member	_____
_____	3-A Egg Standards $28 member; $42 non-member	_____
_____	Five-year Service on 3-A Sanitary Standards 3-A Dairy & Egg Standards $44 member; $66 non-member	_____

Subtotal _____
U.S. Shipping _____
Add $3.25 for each item
Shipping
Outside U.S. _____
Add $8.25
3-A Sanitary Standards Total _____

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

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

PAYMENT MUST BE ENCLOSED IN ORDER TO PROCESS

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

U. S. FUNDS on U. S. BANK

CARD # _____
EXP. DATE _____
YOUR SIGNATURE _____

MAIL ENTIRE FORM TO:

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

($25.00 minimum Charge Card Order)
OR USE YOUR CHARGE CARD 1-800-369-6337
1-800-284-6336 (Canada)
515-232-6699 FAX 515-232-4736

OW AVAILABLE
rocedures to Implement
he Hazard Analysis at
ritical Control Point
ystem (HACCP) Manual

o Expedite Your Order,
se a Credit Card, Com-
lete this form, and FAX
o IAMFES at:
15-232-4736
RDER NOW!!!

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

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

• Implement the HACCP System • Analyze Hazards and Assess Risks • Determine Critical Control Points • Monitor Critical Control Points • Collect Samples • Test Samples for Pathogens • Evaluate Processing Systems for Hazards • Diagram Processing Systems

TO ORDER: Complete this card, place in envelope, and return it, with Check or Money Order, to IAMFES.

MANUAL PRICES:

IAMFES Member: $5.00 (US) each Non-Member: $7.50 (US) each

POSTAGE & HANDLING: BE SURE TO ENCLOSE **$1.50** FOR FIRST MANUAL AND **$0.75** FOR EACH ADDITIONAL MANUAL.

Please send _____ HACCP Manuals Amount Enclosed $_____

To:

NAME COMPANY STREET ADDRESS

CITY/STATE/ZIP PHONE

OR Charge To: VISA MASTERCARD AMERICAN EXPRESS (PLEASE CIRCLE ONE)

CARD # EXP. DATE SIGNATURE

MINIMUM CREDIT CARD ORDER: $ 25.00

IAMFES Members

INVITE A COLLEAGUE TO JOIN THE ASSOCIATION

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

Name: _____ **Company:** _____

Address: _____ **City:** _____

State/Prov.: _____ **Zip:** _____ **Phone:** _____

Your Name: _____ **Your Phone:** _____

WHEN ORDERING, PLEASE PLACE THIS CARD
IN AN ENVELOPE, WITH YOUR PAYMENT.

RETURN TO:

IAMFES, INC.
502 E. LINCOLN WAY
AMES, IOWA 50010 USA
OR FAX TO 515-232-4736

JFP
DFES
9/91

FOR MORE INFORMATION, CALL
800-369-6337 (U.S.)OR 800-284-6336 (CANADA)

Place
Stamp
Here

JFP
DFES
9/91

IAMFES

502 E. Lincoln Way
Ames, Iowa 50010

With 11 Years of Support To Independent Prepared Media Producers, It's Time To Know Us As Well As Our Products

Acumedia manufactures over 300 dry bacteriological media formulations furnished in 1, 5, and 25 pound sizes. Bacteriological grade agar, peptones and other media ingredients also available.

ON-TIME, DEPENDABLE, HIGH QUALITY WITH LARGE SAVINGS

Request our new price list and compare.

DAIRY CLINICAL WATER FOOD BIOTECHNOLOGY INDUSTRIAL

acumedia™

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

Call (301) 467-3200 (800) 783-3212 Fax (301) 366-8563 (800) 875-8563 or TLX 904059 WSH

Please circle No. 160 on your Reader Service Card

No More "Maybe"

Testing for antibiotics in milk is no longer an option, but a necessity. Which means you need more than "maybe" for an answer. You need a definite yes or no. One you feel confident about.

You need to be able to ***quantitate*** your results to meet changing P.M.O requirements.

You need broad spectrum capability, and a test that detects all members of a family (i.e., beta-lactams, sulfa drugs). Assays should be fast, with minimal hands-on time. And, because you want your money's worth, the system shouldn't be limited to antibiotic testing.

But what kind of residue testing system can do all that?

Only one. The Charm II System.

No other system offers everything the Charm II does:

- Testing for all beta-lactams, other antibiotics and sulfa drugs
- Easy-to-use, low-priced tablet reagents
- Standards included at no extra charge
- 80 - 90 seconds hands-on-labor time
- 3-minute Transit Test, run by hauler
- Quantitative aflatoxin testing @ 35% the cost of other assays
- Single procedure for any combination of antibiotics, sulfa drugs and aflatoxins
- 3-minute alkaline phosphatase test (CAP Test)
- Live bacterial counts (ABC Test): 5,000 - 50,000 bacteria/ml — 10 minutes
- Computer input/result analysis
- Equipment supplied through purchase of reagents
- 24-hour hotline service
- A.O.A.C. approval (liquid reagents) for both Charm I and Charm II

If you need a residue testing system that delivers more than "maybe", you need a Charm.

CHARM SCIENCES INC.

36 FRANKLIN STREET, MALDEN, MA 02148-4120 U.S.A. TEL: (617) 322-1523 FAX: (617) 322-3141

Please circle No. 185 on your Reader Service Card
See Us at Food & Dairy Expo '91, Booth #1862

Nothing works like a Charm.