ISSN:0273-2866
Box 701
Ames, Iowa 50010

July, 1984
Vol. 4, No. 7
Pages 253-292
$5.00

Dairy and Food Sanitation®

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

Producing Milk with a Low Bacteria Count

Food Service Managerial Certification

IFT Installs Nine Members As Fellows

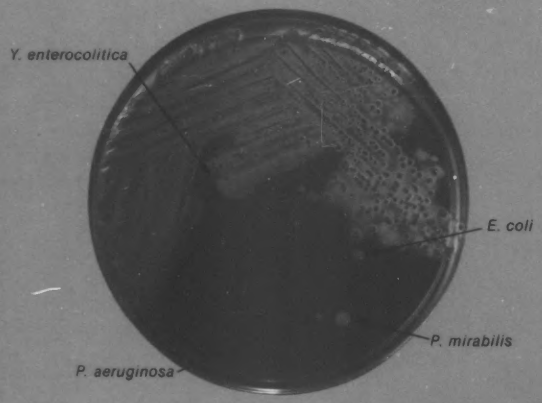
National Frozen Food Convention November 11-14

New National Dairy Council Brochures Stress Calcium Needs

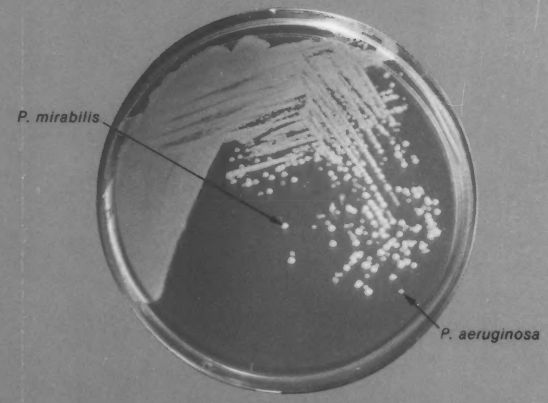
Iowa and Florida Affiliate News

71st Annual IAMFES Meeting August 5-9, 1984, in Edmonton Alberta, Canada. Registration form in this issue.

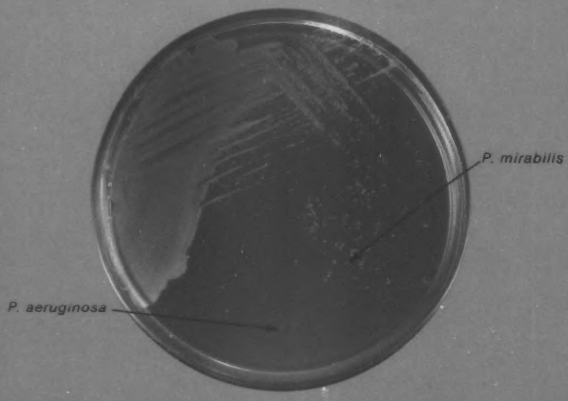
Do you want a better look



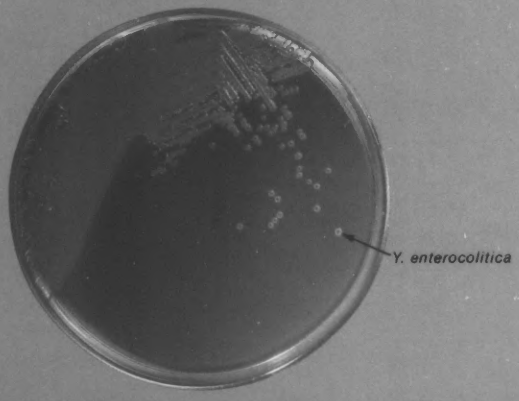
MacConkey Agar



SS Agar



Cellobiose Arginine Lysine Agar



Yersinia Selective Agar

at YERSINIA*?

With the combination of **Bacto Yersinia Selective Agar Base** and **Bacto Antimicrobic Supplement CN** normal enteric organisms are greatly inhibited. This facilitates excellent recovery of *Yersinia enterocolitica*. So, if your previous attempts to find *Yersinia enterocolitica* have been complicated by either overgrowth of normal enteric organisms or low productivity of available media, try **Bacto Yersinia Selective Agar Base** and get a faster, better, more-certain look.

NOTE: Plates were inoculated identically with suspensions of *Y. enterocolitica*, *E. coli*, *P. mirabilis* and *P. aeruginosa* and incubated under aerobic conditions for 20 hours at 30 C.

* *Yersinia enterocolitica*

For information, contact your Difco representative or write Difco Laboratories, P.O. Box 1058A, Detroit, Michigan 48232, USA.

DIFCO

De Laval just made fly control pushbutton easy.

Now you can control flies full time, all season long, with the De Laval® Multi-Task 4™ System. It's a computerized insect and environment control system that knocks out flies and insects by the millions. Simply program it and forget it. It even tells you when to refill sprayers.

- Delivers as many as 200 timed-sprays a day.
- Programs as many as 16 sprayheads in up to four separate areas.
- Protects up to 80,000 sq. ft.
- Can integrate lights, fans, vents and shutters into your fly control system for greater effectiveness.
- Easy installation. No complicated wiring, no expensive piping.
- As easy to use as a pocket calculator.
- Provides season-long protection.
- Effective against house, horn, face, stable, and horse flies and mosquitos.
- Approved for direct application to lactating cows, beef, cattle, swine.
- Amazingly low cost.

DE LAVAL®
ALFA-LAVAL, INC.
Agri-Group
Kansas City, Missouri

IAMFES Sustaining Members

Alpha Chemical Services, Inc.
P.O. Box 431
Stoughton, MA 02072

Anderson Chemical Co.
Box 1041
Litchfield, MN 55355

Angenics, Inc.
100 Inman St.
Cambridge, MA 02139

Associated Milk Producers, Inc.
830 N. Meacham Rd.
Schaumburg, IL 60195

Babson Bros. Co.
2100 S. York Road
Oak Brook, Illinois 60521

Borden, Inc.
Dairy & Services Div.
16855 Northchase
Houston, TX 77060

C.I.S.I.
Via Massarenti 54
40138 Bologna, Italy

Dairymen, Inc.
10140 Linn Station Road
Louisville, KY 40223

Darigold
635 Elliott Ave. W.
Seattle, WA 98109

Dean Foods
1126 Kilburn Ave.
Rockford, IL 61101

De Laval Agricultural Division
Alfa-Laval Inc.
11100 North Congress Avenue
Kansas City, MO 64153

Difco Laboratories
P.O. Box 1058-A
Detroit, MI 48232

Eastern Crown, Inc.
P.O. Box 216
Vernon, N.Y. 13476

GAF
140 West 51st St.
New York, NY 10020

G. B. Fermentation Industries Inc.
PO Box 241068
Charlotte, NC 28224

Gerber Products Co.
445 State St.
Fremont, MI 49412

W. A. Golomski & Associates
1006 Martin Dr. West
Bellevue, NE 68005

H. B. Fuller Co.
Monarch Chemicals Div.
3900 Jackson St. NE
Minneapolis, MN 55421

IBA Inc.
27 Providence Rd.
Millbury, MA 01527

Kendall Co.
One Federal St.
Boston, Massachusetts 02101

Klenzade Division
Economics Laboratory, Inc.
Osborn Building
St. Paul, MN 55102

Maryland & Virginia Milk Producers Assn., Inc.
P.O. Box 9154 Rosslyn Station
Arlington, Virginia 22209

Michigan Milk Producers Assoc.
24270 W. Seven Mile Road
Detroit, MI 48219

Mid America Dairymen, Inc.
P.O. Box 1837 SSS
800 W. Tampa
Springfield, MO 65805

M. M. Muzzarelli Modena s.r.l.
P.O. Box 469
41100 Modena Ferrovia, Italy

Naige Co.
P.O. Box 365
Rochester, NY 14602

Nasco International
901 Janesville Ave.
Fort Atkinson, Wisconsin 53538

National Mastitis Council
1840 Wilson Blvd.
Arlington, VA 22201

National Milk Producers Federation
1840 Wilson Blvd.
Arlington, VA 22201

Norton Co.
P.O. Box 350
Akron, Ohio 44309

Oxoid USA, Inc.
9017 Red Branch Rd.
Columbia, MD 21045

Reitman Manufacturing Co.
10319 Pearmain St.
Oakland, CA 94603

Rosista, inc.
P.O. Box 685
Wood Dale, IL 60191

Seiberling Associates, Inc.
11415 Main St.
Roscoe, IL 61073

SmithKline Animal Health Products
P.O. Box 2650
West Chester, PA 19380

United Industries, Inc.
1546 Henry Avenue
Beloit, WI 53511

Universal Milking Machine Div.
Universal Cooperatives Inc.
408 S. First Ave.
Albert Lea, MN 56007

Walker Stainless Equipment Co.
601 State St.
New Lisbon, WI 53950

Dairy and Food Sanitation is published monthly by the International Association of Milk, Food and Environmental Sanitarians, Inc., executive offices at PO Box 701, 5th & Burnett, Ames, IA 50010. Printed by Heuss Printing, Inc., 911 Second St., Ames, IA 50010. **Second-class postage paid at Ames, IA. Postmaster: Send address changes to IAMFES, 5th & Burnett, Ames, IA 50010-0701.**

Manuscripts: Correspondence regarding manuscripts and other reading material should be addressed to Kathy Hathaway, PO Box 701, Ames, IA 50010-0701. 515-232-6699.

"Instructions to Contributors" can be obtained from the editor.

Orders for Reprints: All orders should be sent to IAMFES, Inc., PO Box 701, Ames, IA 50010-0701. Note: Single copies of reprints are not available from this address; address reprint requests to principal author.

Business Matters: Correspondence regarding business matters should be addressed to Kathy R. Hathaway, IAMFES, PO Box 701, Ames, IA 50010-0701.

Subscription Rates: $60.00 per volume, one volume per year, January through December. Single copies $5.00 each. No cancellations accepted.

Sustaining Membership: A sustaining membership in IAMFES is available to companies at a rate of $300 per year, which includes $100 credit toward an ad in the "annual meeting issue" of the Journal, the July issue. For more information, contact IAMFES, PO Box 701, Ames, IA 50010-0701, 515-232-6699.

Membership Dues: Membership in the Association is available to individuals only. Direct dues are $28.00 per year and include a subscription to **Dairy and Food Sanitation.** Direct dues and both journals are $50.00. Affiliate and International Membership include both journals for $50, plus affiliate dues. Student membership is $10.00 per year, with verification of student status, and includes one journal. 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., PO Box 701, Ames, IA 50010-0701, 515-232-6699.

Dairy and Food Sanitation

CONTENTS Vol. 4 No. 7 July, 1984

Dairy and Food Sanitation, Vol. 4, No. 7, Pages 256-259 (July 1984)

Producing Milk With A Low Bacteria Count

STANLEY E. WALLEN
Microbiologist, Harris Laboratories
624 Peach Street
Lincoln, NE 68501

and

DON J. KUBIK, *Extension Dairyman;* **STEPHEN L. JAMES,** *Chief, Environmental Health Section, Division of Housing and Environmental Health, State Health Department;* **DANIEL J. BORER,** *Head Milk Inspector, Bureau of Dairies and Foods, State Department of Agriculture;* **GERALD R. BODMAN,** *Extension Agricultural Engineer Livestock Systems;* **E. DENIS ERICKSON,** *Associate Professor of Veterinary Science;* **DUANE N. RICE, DVM,** *Extension Veterinarian;* **PHILIP H. COLE,** *Extension Dairyman;* **FOSTER G. OWEN,** *Extension Dairyman, University of Nebraska-Lincoln.*

Bacteria are tiny microorganisms that are too small to be seen without a microscope. More than 400 million of them can be packed in the space occupied by a grain of sugar. Their tiny size makes their elimination from dairy equipment a challenge. Millions may be present on a piece of equipment that appears clean. Bacteria are capable of tremendous population growth in a very short time. A bacterium grows until it reaches maturity, and then divides to form two new bacteria, identical to the mother cell. They can reproduce as often as every 15 minutes. Under ideal conditions one bacterium may produce more than one billion descendants in less than eight hours (Table 1). "Bacterial count," "total plate count," "standard plate count," "direct microscopic clump count" and "plate loop count" are terms used to indicate the number of bacteria that grow under specific laboratory conditions from one milliliter of milk (about 20 drops). Because bacterial growth in milk may cause spoilage and possibly human illness, one of the best indicators of top quality milk is a low bacterial count. The yield and quality of cheese produced from high bacteria count milk is significantly reduced. Milk will usually be of top quality if properly harvested from healthy, clean cows with clean equipment, cooled quickly and kept cold.

GROWTH CONDITIONS

The requirements for bacterial growth are similar to those needed for human survival. Bacteria must have:

1. Water - If surfaces coming into contact with milk are allowed to drain and dry, the bacterial population will not increase between milkings.
2. Food - Milk is an excellent source of nutrients for bacteria. Removing milk solids during cleaning helps prevent growth of surviving bacteria on the equipment.
3. Favorable temperature - Bacteria multiply rapidly at warm temperatures (70 to 90°F). Although they can grow at 40°F or lower, few species multiply rapidly below 40°F, so cooling is effective for controlling growth. Milk cooled to 40°F immediately after milking and delivered to the processing plant within two days generally will not show a significant increase in bacterial numbers.

SOURCES OF BACTERIA IN MILK

Milk secreted from the udder of a healthy cow usualiy contains few bacteria. However, when excessive numbers of bacteria are found in milk they likely come from one or more of the following sources:

1) Unclean or unsanitary milking equipment and facilities.
   a) Infrequent cleaning and sanitizing of equipment;
   b) improper use of cleaners and sanitizers;
   c) cleaning water too cold or too hot;
   d) unclean weigh jar connections or other fittings;
   e) failure to replace inflations and other rubber parts before they become rough and cracked;
   f) poor water drainage from equipment;
   g) unclean vacuum system;
   h) inadequate volume and turbulence of cleaning solutions in pipeline systems;
   i) failure to clean gaskets;
   j) unclean milking area.
2) Inadequate cooling of milk.
3) Improper udder preparation.

TABLE 1. *Rate of bacterial growth in warm milk.*

Number of generations	Number of Bacteria/ml of milk	Time
0	1	0
1	2	15 min
2	4	30 min
10	1024	150 min (2 1/2 h)
20	1,048,576	300 min (6 h)
30	1,075,374,176	450 min (7 1/2 h)

a) Foremilk not removed;
b) premilking sanitizer not used to wash udders;
c) sponges and washcloths used for washing udders instead of single service paper towels;
d) excessive amount of udders wetted with high volume/high pressure sprayers;
e) udders not dried off with single service paper towels;
f) udders not clipped.

4) Unclean cows due to wet, dirty and unprotected loafing and feeding areas.
5) Dirty hands and clothes of milker.
6) Bacteria in the udder associated with mastitis.
7) Aeration or foaming of milk.
8) Leaking or improperly used bulk tank outlet valve.
9) Infrequent pick up of milk.

WAYS TO REDUCE THE BACTERIAL CONTAMINATION OF MILK

Milk with clean equipment in a clean environment.

Cleanliness of the milking area and the milk house is very important in maintaining a low bacterial count. Of particular importance is the cleanliness of milking equipment surfaces. Routine attention to the following points will help assure a low bacterial count.

Clean and sanitize frequently - To assure low bacteria counts in milk, wash equipment immediately after and sanitize it just before every milking as required by regulation. Less frequent cleaning and sanitation results in higher bacterial counts.

Use cleaners and sanitizers properly - To avoid bacterial contamination from surfaces that contact milk, routine use of a four-step cleaning and sanitizing process is recommended:

i) Rinse with 100 to 115°F water immediately after completing milking.
ii) Wash as soon after using as possible (regulations specifically require this). Wash clean-in-place (CIP) equipment with a 140° to 165°F (non-foaming) chlorinated alkaline cleaning solution (other types of products are commercially available and may be satisfactory). For hand washing, use brushes and a solution temperature of at least 120°F.
iii) If you have hard water, rinse with an acid solution at 100° to 110°F and allow to drain and air dry. Otherwise, you need only rinse with clear water. Visually inspect equipment after it has dried, for proper cleaning.
iv) Apply an EPA approved and registered sanitizer of proper strength just before every milking (required by regulations). Do not rinse equipment after applying the sanitizer. Allow the system to drain before milking is begun to prevent sanitizer residues in the milk.

The *initial rinse* flushes residual milk from the equipment surfaces. Rinse water should be at least 100°F but no greater than 115°F. Use a thermometer regularly to check the water temperature. Water that is too hot will set or "cook" the milk onto surfaces; water that is too cold will not remove the fat. Flush the entire system and all milk contact surfaces.

For pipeline milking systems, do not circulate a prerinse, but discharge to a drain. Continue flushing until the water is clear at the outlet. The amount of water needed varies from 20 to 50 or more gallons depending on the system size.

Once rinsed, the equipment must be washed. Alkaline cleaners are used to remove residual milk and to help prevent milkstone build-up. Use the proper concentration of the chlorinated alkaline cleaner for washing. Too weak a solution will not clean properly and may leave a film of fat on the equipment surface. Water will "bead" on such a surface. Too strong a solution corrodes surfaces, increases deterioration of rubber hoses, inflations and gaskets, and wastes money. *Be sure to read the product label for manufacturer's directions.* The correct water level should be marked on buckets and tanks used for washing milking equipment to facilitate mixing the proper concentration every time. Note: Store chlorinated cleaners in tightly closed containers to help keep the chlorine from escaping.

Most cleaners are compatible with water that contains up to 10 grains per gallon of calcium and magnesium hardness. Specially formulated cleaners, containing water conditioning chemicals, are necessary for water with 10 to 30 grains of hardness, and water softening treatment is invariably needed when a water supply contains 30 or more grains of total hardness. Obviously, checking water quality on a dairy farm is essential to producing high quality milk.

The temperature of the cleaning solution is very important to ensure proper cleaning. Cleaning solutions should be 165°F to start for CIP equipment, and not less than 120°F at the end of the cleaning cycle. Water at 170°F and over may cause clear milk tubing to turn brown.

To assure enough hot water is available, be sure the water heater is of adequate size and is set at the right temperature. For some dairy farms, equipment suppliers recommend installing two hot water heaters - one for washing the cows and one for washing the equipment. If enough hot water is not available, check with a chemical supplier for assistance. Tepid water cleaners or cleaners that function at low temperatures (about 120°F) may be used if a soft water supply is available.

A booster heater can be installed in the wash sink to maintain a high water temperature. Another alternative is to insulate the stainless steel or glass lines. The insulation must be a closed cell foam to prevent water absorption, and the outside surface must be smooth. Attach foam pieces to within an inch of all fittings and valves. Use plastic or metal clips to hold the insulation around the line. Insulating lines may raise the temperature at the end of CIP wash cycle by 20°F. Insulated and covered wash vats may also be used. A heat recovery system is another alternative. In most systems, milk warms the compressor refrigerant fluid which in turn heats the water, thereby increasing the supply of hot water at milking time.

Keep CIP wash cycle times to a minimum (usually 8 to 10 minutes) - the longer the circulation time, the greater the temperature drop. Manual timers can be put on CIP systems that don't have automatic timers to control circulation time. Note: Never

use detergents that foam in CIP systems as they can cause pumps to burn out and lines not to clean.

For equipment that needs to be hand washed, prepare a solution with 120° to 160°F water. Use a cleaner that is compatable with the water supply and follow the manufacturer's directions. Disassemble and soak all small parts for a few minutes. Then scrub all parts with good quality brushes specificially designed for the individual pieces. For bulk tanks that must be manually cleaned, thoroughly wash problem areas such as the bridge, covers, agitator, calibration stick, and valve after each pick up. Weigh jar connections are an area of particular concern and should receive special cleaning considerations.

The third step is the final rinse, which removes residual cleaning compounds. On farms with hard water, adding acid to the rinse may be necessary to prevent milkstone build-up.

The fourth step in the process is applying a sanitizer. Sanitize equipment just before it is to be used rather than immediately after it has been washed. This assures a low number of bacteria on the equipment and prevents corrosion of the stainless steel, which can occur if certain sanitizers are in contact with the metal for a long period of time. The most common active ingredients in chemical sanitizers include chlorine, iodine and acid anionic compounds. Except for very specific conditions, quaternary ammonium compounds do not have regulatory approval for use as dairy farm equipment sanitizers. Surfaces must be completely clean because the effectiveness of a sanitizer is retarded by the presence of organic matter, such as milk, dirt and manure.

As with cleaners, proper concentration, time of exposure (at least 2 minutes), and water temperatures (75 to 90°F is optimum for chlorine sanitizers) are important when using a sanitizer. A chlorine solution exposed to air dissipates rapidly, especially at warm solution temperatures. Don't attempt to save sanitizer from one milking to the next. The sanitizer should not be rinsed off before milking. To prevent residue in the milk, it's important that: 1) the sanitizer be drained; and 2) the concentration of sanitizer used not exceed that which is recommended.

Regulations require the use of approved sanitizers. Do not use household sanitizers such as chlorine bleach as they are not labeled for this use.

Replace hard and cracked rubber parts - As inflations age, they become hard and cracked, and therefore difficult to clean. Because bacteria are small they can live and multiply in these cracks. To assure low bacteria counts, replace inflations on a routine basis, typically 1,200 milkings or as recommended by the manufacturer. Other rubber parts, including air lines, milk lines and water hoses, also become cracked and should be replaced on an as needed basis.

Be sure equipment drains dry between milking - The moist, warm environment provided by a poorly drained pipeline or claw assembly is ideal for microbial growth, thus adequate equipment drainage or dryness is important. All lines, hoses, claws and related equipment must be installed to assure complete drainage at the end of the final rinse cycle. Proper ventilation of the milking parlor and the milk house helps assure that equipment dries between milkings.

Clean vacuum system - Vacuum systems are often overlooked as a source of bacterial contamination. Because milk can get into vacuum systems through cracked inflations, it is important that they be kept clean. This helps assure low counts by preventing the growth of bacteria in the vacuum system and their subsequent movement into the milk line either during milking or during clean up. It also helps assure adequate vacuum by preventing the clogging of lines.

Clean air and vacuum hoses and pulsators regularly. Check manufacturer's recommendations for specific directions as to how to clean the pulsator.

To clean the vacuum lines, mix 6 ounces of a liquid chlorinated alkaline detergent per gallon of hot water. The capacity of the system's trap or pump tank determines the volume of solution needed. Do not draw more solution into the system than the trap or tank will hold.

Draw the cleaning solution through a stanchion hose into the vacuum line at each stall cock starting closest to the pump. Drain the dirty solution from the trap; rinse the line and trap with the same amount of clean hot water and drain again.

Next, prepare an acid rinse solution using 3 ounces of a liquid acid rinse per gallon of water. Draw this solution into the vacuum line at each stall cock, starting at the one farthest from the pump. Drain from the trap.

Rinse again with the same amount of clean hot water, starting at the stall cock farthest from the pump. Drain from the trap. Open all of the stall cocks and run the pump to dry the lines.

Maintain adequate volume and turbulence of cleaning solutions - This is a particular concern in large diameter (2-or 3-inch) pipelines. Without adequate volume and turbulence (velocity), the top of the line will not clean because the wash solution does not come into contact with it. Proper turbulence (velocity) is maintained by air injection or by pumping in flooded systems. Larger vacuum pumps may be needed in some sytems to assure proper velocity. Milk lines of varying dimensions (i.e. 3-inch line connected to a 1 1/2-inch line) should not be installed because they are impossible to clean due to inadequate cleaning solution turbulence. They are also not approved by regulation.

"Dead ends" in milk line are impossible to clean in a CIP system. Milk solids build up in dead ends and bacteria grow there, causing counts.

Clean gaskets routinely - To prevent a bacterial build-up in pipeline couplings, gaskets must be cleaned regularly. Replacement may be necessary if gasets are worn or extend into the milk line due to improper installation.

Cool milk rapidly

Proper refrigeration of bulk milk is needed to ensure a quality product.

Refrigeration stops or substantially reduces the multiplication of most bacteria.

Storage at temperatures below 40°F prevents the growth of most bacteria that cause disease.

By regulation, bulk tanks on Grade A farms must be able to cool milk in the tank to 45°F within two hours after the first milking. On farms producing manufacturing grade milk, the milk must be cooled to 50°F within 2 hours. On both Grade A and manufacturing grade farms the blend temperature must not rise above 50°F.

Regular service and maintenance of the bulk tank helps to assure proper milk cooling. Checking to see if the compressor is the right size and periodic cleaning of the condensing unit are two important consideration. Having a standby generator can be most helpful if the electricity goes off for any reason.

Agitating the milk in the bulk tank at milking time helps assure rapid cooling. Installing a recording thermometer is an excellent way to monitor the adequacy of cooling in a bulk tank.

Use proper udder preparation and milking techniques

Clip udders as needed to reduce the amount of soil and hair that can get into milk from the udder. Generally, hair long enough to be sucked into the inflation is too long.

Forestripping is an important aspect of udder preparation and needs to be done to eliminate the high numbers of bacteria normally found in foremilk. Forestripping should be done before washing the udder, providing the teats are fairly clean. This way bacteria transmitted by forestripping can be eliminated by premilking sanitation. Forestrip the udders after washing if the teats are not clean when the cows come into the barn.

Premilking sanitation (udder washing) is a critical point for controlling the bacteria count in milk. Although a large percentage of bacteria are removed from teats by the physical washing process, using a sanitizer helps to further reduce their numbers. The water used for premilking sanitation (washing) of the teats must contain a sanitizer of proper strength (required by regulation). In all cases, follow the recommendations of the sanitizer manufacturer regarding concentration of product and wash temperature. The proper concentration for chlorine sanitizers is 50 to 200 ppm; for iodine 12.5 to 25 ppm (do not use quaternary ammonium compounds as a premilking sanitizer). Note: Avoid using premilking sanitizers in concentrations greater than those recommended by the manufacturer as this may cause udder damage.

Sprayers are more convenient and generally more sanitary for washing udders than are buckets of water. Low pressure sprayers that deliver a low volume of water are better than high pressure sprayers that provide a high volume, Bacterial build-up can occur in a bucket of wash water, particularly when sponges and washcloths are used. However, if single-service paper towels are used, the chance for bacterial build-up and cross contamination from a bucket of wash water is reduced.

When washing the cow's udder, particularly with a sprayer, it is important to wet only a minimum of it. If the entire udder is wetted, dirty water drains down its sides and into the teat cups, thereby increasing the bacteria count of the milk. After washing, use a single-service paper towel to dry the udder. No towel should ever be used on more than one cow.

Provide a clean, dry, and properly ventilated environment for cows.

A properly designed and maintained environment helps assure the cleanliness and health of the cows. This in turn leads to the production of milk having a low bacteria count. Muddy lots have made bacteria counts a real problem for some dairies. Concrete used around feeders, waterers and barn entrances will minimize muddy conditions.

It is important to keep cows out of swampy areas where stagnant water may get on teats and udders. And, it is critical that cow stalls be kept bedded and as clean and dry as possible.

Wash hands before milking and during milking as necessary and wear clean clothes.

Having clean hands is particularly important when putting the filters into place or replacing them. Clean hands also help prevent the spread of mastitis.

Milk foaming

The aeration or foaming of milk may affect its bacterial count. Generally, the more air that is incorporated into milk, the faster the bacteria grow. Equipment designed and maintained to prevent foaming will help keep bacteria counts down. Air leaks in the milking system are one of the more frequent causes of foaming. Therefore, repair all leaks and avoid enlarging claw air vents. Never use air vents in both the claw and inflation systems. Other causes of foaming include the improper entrance of milk into the bulk tank and improper position of milk hose nipples into milk lines.

Replace leaking bulk tank outlet valves

A leaking bulk tank outlet valve can also contribute to a high bacteria count in milk. Milk passing through this outlet is warmer than that in the bulk tank. The resulting bacteria build-up contaminates the milk conveyed through it to the bulk tank. Replace leaking vales. Be sure to disassemble and clean the valve each time the bulk tank is emptied.

Using the bulk tank milk outlet valve to obtain milk for on-farm use may also contribute to a bacteria buildup if it is not washed and sanitized after the milk is withdrawn. Under no circumstances should jugs or dippers be used to obtain milk from bulk tanks for on-farm use as this may introduce large numbers of bacteria or other contaminates into the milk.

Have milk picked up frequently

Milk picked up on a daily basis generally has lower bacterial counts than milk picked up every other day. On-farm pick-ups less frequent than every two days is not permitted by regulation and should be discouraged.

Dairy and Food Sanitation, Vol. 4, No. 7, Pages 260-264 (July 1984)

Food Service Managerial Certification: How Effective Has It Been?

HAROLD K. PENNINGER, MSEH

VAY A. RODMAN, DR. P.H.

Dept. of Environmental Health
East Tennessee State University
Box 22960A
Johnson City, TN 37614-0002

The Food Service Industry has always been a vital growing and dynamic industry in our modern society. Fast food chains have multiplied since World War II. The growth of food service businesses has been phenomenal. It ranks fourth in sales behind grocery stores, the auto industry, and general merchandise stores. It is first in the United States in number of business units and in employment; it hires almost eight million people. In such an expanding industry, a total of 250,000 employees are added yearly to meet their needs and at least 10 percent or 25,000 must fill management positions.(1) How effective has food-service managerial certifiction been?

Since the 19th century, regulating and enforcement agencies have attempted to police the operations of the food service industry with questionable results. Police enforcement seems impossible, for who can monitor numerous restaurants with many employees, 24 hours a day?

Environmentalists have long observed that the most progress in restaurant sanitation has always been with the conscientious, well-informed manager. Many of these supervisors requested that Food Handler Classes be conducted for their employees. These classes met with some degree of success, depending largely upon managerial emphasis and follow-up of enforcement.

Some obstacles to direct teaching of food handlers have become apparent, such as,

1. Many employees, especially the older group, have been antagonistic against being told how to do their jobs by a "school boy" with no experience in food work.
2. Some cleaning personnel and kitchen helpers have had little education resulting in a slower comprehension of sanitation principles.
3. Two or three food handlers classes, as good as they might be, are often not followed up by re-enforcement of in-service training.
4. Uninformed managers have assumed that these classes were complete in themselves and these managers would not be prepared to follow up the courses by instruction, enforcement of hygienic principles, inspection and evaluation.
5. The large turnover of untrained new employees has defeated, in some cases, the purpose of Food Handlers Classes.

As the industry has grown, conscientious supervisors and environmentalists have realized that a cooperative effort must be made by both industry and the community. Gradually, these cooperative efforts have shifted from Food Handlers Classes to the implementation of Food Service Managerial Certification Classes, sponsored by both industry and regulatory agencies. Numerous programs have been started throughout the country with varying degrees of success and with varying degrees of cooperation between agencies in cities, counties and states.

The major objective of the study was to determine the effectiveness of existing voluntary and mandatory food service managerial certification training programs. A questionnaire was developed and a limited random survey was conducted of 13 voluntary and 13 mandatory programs. The replies from this random sampling revealed that 9 of the 13 voluntary agencies (69%) and 11 of the 13 mandatory agencies (85%) cooperated by completing and returning the questionnaire for evaluation. The population considered was obtained from the Food and Drug Administration's "Food Service Managers Training and Certification Program Directory (1980)".(2) This reference listed 77 local government sponsors of which 28 were mandatory programs and 49 were voluntary programs.(2)

Foodservice Managerial Certification-- Questionnaire

The questionnaire was composed of three sections. The first section, status, was designed to indicate how long the training programs had been in effect and whether they were voluntary or mandatory. The second section of the questionnaire dealt with the course curriculum. Informa-

tion was requested on the structure of the course, the qualifications of the instructors, texts, references, and audio-visual aids. The third section of the questionnaire dealt with course evaluation. The purpose of this section was to ascertain the comparative effectiveness between voluntary and mandatory programs and whether they were viable and cost-effective programs.

Status

The status of the program dealt with the length of time the training course had been in effect in each regulatory agency. It was discovered that 77.8 percent of all voluntary programs were implemented during the past five years while 63.6 percent of the mandatory programs started between 5-10 years ago. At present, 90 percent of all training programs were initiated during the past 10 years. Table 1 reviews the length of time programs have been in effect.

Curriculum

Study results indicated that the qualification of instructors were generally high. Most of them had a college degree or even higher. Three of the agencies sent their food service management trainees to local colleges for the training program. Some agencies used little or no reference material or audio-visual aids. When asked what is the title of the text used 4 of the 9 voluntary agencies replied that they used *Applied Food Service Sanitation*[3]

Forty-five percent of all agencies indicated that they produced their own references. Table 2 reviews the texts used by agencies. Professionally prepared aids are often used to supplement and enrich presentations. When asked what audio-visual aids are used most agencies replied that they developed their own aids. The film "The Spoilers" was used by 35% of the agencies. Table 3 reviews the audio-visual aids utilized by the reporting agencies.

Presentations

There is a wide divergence in hours of class presentation as indicated in Table 4. In the 5-9 hour grouping, 2 (22.2%) voluntary agencies and 5 (45.5%) mandatory agencies are listed, a total of 7 (35%) of all agencies. The next significant area is in the 15-19 hour grouping. In this group, 2 (22.2%) of the voluntary agencies and 4 (36.4%) of the mandatory agencies structured their training programs. To determine the ideal length of time and the type of curriculum, pilot training programs were initiated by the F.D.A. in several states. Each of these experimented with programs of different length until finally the F.D.A. finalized the 15-hour program as one that was sufficiently long enough to present all the necessary material and yet not so long as to demand more time than either the regulatory agency or the food industry could assign to the program.[2] Although longer courses of instruction involving 20 or more hours of class time would seem to be ideal, it would not prove cost-effective to the regulatory agency. At the same time, industry may not have the time to take away its managers and assign them to a time consuming program. The National Institute for the Food Service Industry's *Applied Food Service Sanitation Certification Course* is designed to be taught in 15 hours of classroom time.[4]

TABLE 1. *How long has the program been in effect?*

Years	9 Voluntary		11 Mandatory		20 Total Agencies	
	#	%	#	%	#	%
1-5	7	(77.8)	3	(27.3)	10	(50.0)
6-10	1	(11.1)	7	(63.6)	8	(40.0)
11-15	0	(0)	1	(9.1)	1	(5.0)
16-20	1	(11.1)	0	(0)	1	(5.0)
Total reporting	9	(100%)	11	(100%)	20	(100%)

TABLE 2. *What is the title of the text used?*

Texts	Most Commonly Used Texts					
	11 Mandatory		9 Voluntary		20 Total Agencies	
	#	%	#	%	#	%
Developed own texts	4	(36.3)	5	(55.6)	9	(45)
Applied Food Service Sanitation	1	(9)	4	(44.4)	5	(25)
Preventing Food-borne Illness	0	(0)	2	(22.2)	2	(10)
Quantity Food Sanitation	2	(18)	0	(0)	2	(10)
Other	2	(18)	3	(33.3)	5	(25)

The size of classes was quite varied. The majority of the voluntary agencies 5 (55.6%) preferred the 15-19 student grouping while the mandatory agencies seemed almost equally divided between the 10-14 group at 2 (20%) and the 20-24 group at 3 (30%). Since one of the 20 agencies sent their managers to two local colleges for training, they did not report the size of classes offered. Table 5 reviews the size of classes receiving training.

Evaluation

The study was concerned with evaluating the percentage of managerial certification, acceptance, and whether pre- and post-testing was administered to trainees. The training agencies were also asked how cost-effective their programs were.

The agencies were asked for the approximate percentage of certified managers. No training program is complete without an evaluation of its effectiveness. The majority of mandatory agencies estimated that their training program is effectively certifying most managers in their area. The mean certified was 83.6%, with the range between 65 to 99 percent. In the voluntary agencies, the averages ranges between 2% to 30% with one exception at 100%. The mean certified was 28.66%. The high range percentage of mandatory agencies seemed to support the premise that mandatory programs are more successful in certifying than voluntary programs.

The agencies were asked if there had been any improvement in food service health inspection scores after the training. Results indicate that 10 of the 11 mandatory agencies (91%) claimed improvement while only 3 of the 9 voluntary agencies (33.33%) observed improvement.

Table 6 reviews this question. Some comments made by these agencies indicated that results in inspection scores were not the objective of their program. They implied that sanitation training and public relations with industry was their goal. It seems that an indicator of good sanitation training and good public relations with industry would be reflected in an improvement in inspection scores. The lack of response would seem to indicate that some agencies have not compared pre- and post-training food service inspection scores.

Several questions were asked the agencies concerning

TABLE 3. *What Audio-visual aids are used?*

Audio-visual aids	11 Mandatory		9 Voluntary		20 Total Agencies	
	#	%	#	%	#	%
1. Produce own material	3	(27)	5	(55.6)	8	(40)
2. *The Spoilers*	4	(36.4)	3	(33.3)	7	(35)
3. None used	1	(9)	3	(33.3)	4	(20)
4. *Outbreak of Salmonella Infection*	1	(9)	2	(22.2)	3	(15)
5. *Protecting the Public--Series*	2	(18.2)	1	(11.1)	3	(15)
6. *The Invaders*	0	(0)	2	(22.2)	2	(10)
7. *Rules Make Sense*	0	(0)	2	(22.2)	2	(10)
8. *The Unwanted Four*	2	(18.2)	0	(0)	2	(10)
9. *The Freeloaders*	2	(18.2)	0	(0)	2	(10)

TABLE 4. *How many hours of class presentation?*

Class Hours	9 Voluntary		Regulatory Agencies 11 Mandatory		20 Total Agencies	
	#	%	#	%	#	%
0-4	0	(0)	1	(9.05)	1	(5)
5-9	2	(22.22)	5	(45.4)	7	(35)
10-14	2	(22.22)	0	(0)	2	(10)
15-19	2	(22.22)	4	(36.4)	6	(30)
20-24	1	(11.11)	1	(9.05)	2	(10)
25-29	1	(11.11)	0	(0)	1	(5)
30-34	1	(11.11)	0	(0)	1	(5)
Totals reporting	9	(100%)*	11	(100%)	20	(100%)

*Approximate.

TABLE 5. *What is the average size of class?*

Class Size	9 Voluntary		Regulatory Agencies 11 Mandatory		20 Total Agencies	
	#	%	#	%	#	%
10-14	1	(11.1)	2	(20)	3	(15.8)
15-19	5	(55.6)	1	(10)	6	(31.7)
20-24	2	(22.2)	3	(30)	5	(26.4)
25-29	0	(0)	1	(10)	1	(5.2)
30-34	1	(11.1)	1	(10)	2	(10.5)
35-39	0	(0)	1	(10)	1	(5.2)
40+	0	(0)	1	(10)	1	(5.2)
Totals reporting	9	(100%)	10	(100%)	19	(100%)*

*Approximate.

TABLE 6. *Have food service health inspection scores improved?*

Answer	9 Voluntary		11 Mandatory		20 Total Agencies	
	#	%	#	%	#	%
Yes	3	(33.3)	10	(91)	13	(65)
No	1	(11.1)	0	(0)	1	(5)
N.A.*	5	(55.6)	1	(9)	6	(30)
Totals Reporting	9	(100)	11	(100)	20	(100)

pre-testing the trainees before taking the training course and post-testing after the training to determine the effectiveness of the course. Data results listed in Table 7 indicate that 36.4% of the mandatory agencies and 66.6% of the voluntary agencies administered pre-tests. Concerning post-testing the data indicated that 63.6% of the mandatory and 66.6% of the voluntary agencies give post-training tests to their trainees.

Next the agencies were asked the percentage of average improvement between pre-and post-training scores. A table of the results was not prepared as less than 50% of the agencies answered this question. Only 3 of the mandatory and 6 voluntary agencies answered the question. The mean score improvement for the mandatory agencies was 20.7%. In comparison the voluntary agencies indicated a mean score improvement of 51.17%.

The agencies were asked how the turnover rate of certified managers affected their program. Most agencies responding to this question indicated that manager turnover did occur and that turnover had to be dealt with. Some indicated that new managers were given a specified time frame in which to be certified or more frequent food service inspections would occur. Other agencies indicated that when turnover occurs a new license to operate had to be obtained and the new manager certified in a specified time frame such as within 90 days. Certified manager turnover is a very important question and must be handled carefully if the certifying program is to work.

Finally the agencies were asked if the training program has been cost-effective in providing positive results. This question was interpreted in two ways, cost-effective and worth the cost. Only 1 of the voluntary agencies (11.1%) and 5 of the mandatory agencies (45.5%) indicated that their programs have been cost-effective or self-supporting.

Although the original intent of the question was to determine the cost-effectiveness of the program, many respondents interpreted the question to mean "Is it worth the cost?" Even though some agencies could not claim their programs were worth the investment. Improvements noted by the respondents were as follows:

1. Managers become more cognizant of sanitation principles.
2. A sense of pride is developed in the food service personnel.
3. A better relationship develops between the manager and the environmentalist.
4. A certified manager is in greater demand in industry.
5. There is an improvement in inspection scores.
6. When inspection scores improve, less inspections are necessary.
7. Less time is needed for inspection (resulting in lower unit service costs).

Recommendations for Research

Since questionnaires are often answered in a biased manner and some questions may be subject to different interpretation, the following recommendations are given:

1. It is recommended that a larger sampling of agencies be evaluated. The Food and Drug Administration has a Registry of Sponsoring Agencies from which a larger sampling may be drawn.[5]

2. Care should be taken to design a questionnaire to exclude the personal evaluation of respondents to affirmative, negative and number answers. Only such numerical answers as are normally kept on record should be used.

3. A preferable method would be to seek the cooperation of agencies to be surveyed to administer a standardized test before and after the manager training course is taken and submit both tests or copies of the results to the research for evaluation.

These test results, correlated with a description of the curriculum and hours of class instruction could form the basis for comparative evaluation.

As regulatory agencies become more uniform in curriculum, hours of lecture, textbooks and reference materials, the use of audio-visual media, and in testing, evaluation of comparative effectiveness of training programs will become easier and more reliable.

Recommendations for Regulatory Agencies

1. It is recommended that each state establish a Teacher Training Program to instruct prospective Food-service Sanitation Instructors in teaching skills. This would include techniques and order of presentation, the use of visual aids and class participation. It is suggested that such classes need not be conducted more than once a year or for more than five days. However, they should be taught by experienced teachers. Instructors trained in such a class would be more effective teachers in a Managerial Certification Training Program.

2. A standard curriculum should be developed by each state and proposed to each regulatory agency for adoption and use. In this curriculum lists of references and audio-visual aids should be provided along with sources of supply. Each state or local regulatory agency should develop

TABLE 7. *Do you give pre- and post-training tests?*

Tests	11 Mandatory				9 Voluntary					20 Total Agencies					
	Yes		No		Yes		No		N.A.*	Yes		No		N.A.*	
	#	%	#	%	#	%	#	%	# %	#	%	#	%	#	%
a. Pre-training	4	(36.4)	7	(63.6)	6	(66.6)	1	(11.2)	2 (22.2)	10	(50)	8	(40)	2	(10)
b. Post-training	7	(63.6)	4	(36.4)	6	(66.6)	1	(11.2)	2 (22.2)	13	(65)	5	(25)	2	(10)

N.A. = no answer.

a resource library for reference material and audio-visual aids. A good beginning point in this area would be to use *Applied Food Service Sanitation* developed by the National Institute for the Food Service Industry.[4]

3. This standardized course of study should cover basic food service sanitation problems, proportioning time periods according to the need of each topic. The time periods should be standardized for each agency as defined by a state or regional curriculum committee.

4. It is also recommended that following the implementation of a standardized program of instruction, regulatory agencies should work toward a reciprocity agreement with each other, further minimizing the turnover problem that exists with the mobility of managers to other food service establishments.

5. Considering the degree of success of mandatory regulatory agencies, it is further recommended that voluntary agencies take under advisement the implementation of a mandatory program in their enforcement area.

REFERENCES

1. Davis, A. Sidney. 1977. Sanitation training for food service managers--a must! *Journal of Food Protection* 40(3):198-199.
2. U. S. Department of Health and Human Services, Public Health Service, Food and Drug Administration. 1980. *Food Service Managers Training and Certification Program*.
3. National Institute For the Foodservice Industry, *Applied Food Service Sanitation*, 1978. Published by D. C. Heath and Company, 2 ed.
4. National Institute For The Foodservice Industry. *Applied Food Service Sanitation*. 1983. Published by National Institute For The Foodservice Institute, Chicago, IL.
5. U. S. Department of Health and Human Services, Public Health Service, Food and Drug Administration. 1983. *A Registry of Manager Training and Certification Programs in Food Protection*.

IFT Honors Nine Fellows

Nine distinguished members of the Institute of Food Technologists are to be honored by being installed as Fellows of the 21,000 member professional society, according to Gilbert A. Leveille, IFT president.

To be selected as a Fellow of IFT, a member must have held "professional classification for at least 10 years and have made outstanding contributions to the field of food science and technology," Dr. Leveille pointed out.

The new Fellows were recognized at the opening session of IFT's annual meeting, held June 10-14 in Anaheim, California.

Named IFT Fellows this year were:
Robert E. Berry, U.S. Department of Agriculture, Winter Haven, FL;
Wilbur S. Claus, Carnation Co. (retired), Santa Barbara, CA;
Weld E. Conley, Chemetron Corp. (retired), Louisville, KY;
John E. Kinsella, Cornell University, Ithaca, NY;
William W. Marion, Iowa State University, Ames, IA;
Leon J. Rubin, University of Toronto, Toronto, ONT;
Don F. Splittstoesser, Cornell University, Geneva, NY;
Kent K. Stewart, Virginia Polytechnic and State University, Blacksburg, VA; and
Herbert Stone, Tragon Corp., Palo Alto, CA.

The Institute of Food Technologists is a professional scientific society devoted to the discovery and application of new and existing knowledge to improving the world's food supply. Its 21,000 members are active in academic, industrial, and government organizations.

DASI FreeFallingFilm UHT System To Be Installed at Penn Dairies

DASI, Inc., Chevy Chase, MD and Penn Dairies, Lancaster, PA, have reached an agreement under which Penn Dairies will produce shelf-stable milk, juices and other products for DASI, using DASI's FreeFallingFilm UHT (ultra high temperature) system (R).

Production of DASI brand long-life products is scheduled to begin in early September at Penn Dairies' 170,000 square-foot Lancaster facility.

One of the largest independent dairies in the mid-Atlantic states, Penn Dairies produces nearly 400 products and distributes them in ten states from Massachusetts south to Virginia and west to Ohio. In addition, the company operates more than 70 convenience stores.

DASI, Inc. is the developer of the FreeFallingFilm UHT process, a technology that makes shelf-stable products that maintain their fresh flavor.

DASI will install the system in Lancaster, which will be the first production facility turning out the DASI brand products.

In announcing the new operation, Dr. John Nahra, president of DASI, said, "This is another important step in the expansion of the DASI system in the American dairy industry. We expect to continue broadening the applications of our FreeFallingFilm technology."

New Brochures Hit Life-Long Calcium Needs

People of all ages will acquire a new appreciation for the importance of milk through a series of colorful new brochures on calcium, produced by the National Dairy Council.

"The brochures are designed to make the public more aware of the relationship between milk and milk products and healthy bones," said NDC President M. F. Brink, Ph.D. "Consumers will learn that milk products are a primary source of calcium and must be included in their diets at every stage of their lives," he said.

The three easy-to-read brochures point out that by including milk and other calcium-rich foods in their diet, Americans can decrease their chances of suffering from osteoporosis, a debilitating bone disease that plagues millions. One brochure, titled "The All-American Guide to Calcium-Rich Foods," points out that milk and milk products are primary calcium sources. Creative ways are suggested to incorporate milk-group foods into a well-balanced diet.

A second NDC brochure, "Calcium: You Never Outgrow Your Need For It," offers a simple test to help consumers determine if they are getting enough calcium in their diets. The pamphlet traces the role calcium plays at all stages of life, and specifies the number of servings needed from the milk group according to age. The brochure also suggests ways people can maintain strong bones through diet, exercise, and other lifestyle patterns.

The third brochure is called "Are You at Risk for Bone Disease?" It alerts consumers to the growing problem of osteoporosis and the fact that this crippling bone disease is associated with dietary calcium deficiencies. Other factors that lead to weakened bones are cited too, including heredity, sex, age, (postmenopausal women are most

susceptible), lack of exercise, stress, and smoking. The brochure suggests ways to reduce risks of bone disease through increased consumption of calcium-rich foods.

The brochures are available from affiliated Dairy Council units or National Dairy Council, 6300 N. River Road, Rosemont, IL 60018.

Anhydro Offers Free Brochure

Anhydro, Inc., one of the world's largest suppliers of spray dryers, evaporators and fluidized bed systems to the Dairy Industry has a 16 page brochure entitled "Agglomeration and Instantization of Milk Powders."

The brochure describes various agglomeration techniques, reconstitutability and physical structure of different types of powders, and is complete with flow diagrams of the various systems required to achieve desired results.

For a free copy of this brochure, contact Anhydro, Inc., 165 John L. Dietsch Square, Attleboro Falls, MA 02763. Ask for Bulletin K-17.

CREPACO Offers Guide

CREPACO offers an 8-page "Guide to Aseptic Processing" which discusses 4 methods of aseptic processing and how to properly apply them to specific products. Includes aseptic time-temperature curve profiles, descriptions of equipment and system operation, installation photos, product lists, and more.

For more information contact: Marketing Communications Department, CREPACO, Inc., 100 CP Avenue, Lake Mills, WI 53551. 414-648-8311.

Chef John Dorman Wins First Annual Louis Sherry "Salute to Spring" Competition

John Dorman, Executive Chef of Loews Hotel Summit, New York, took first place in the 1984 Louis Sherry "Salute to Spring" Competition.

Dorman received his training at the Culinary Institute of America. Before his recent appointment to the Hotel Summit, Dorman was executive sous-chef of New York's Regency Hotel for three years. His dessert of warm chocolate honey sauce over ice cream and fruit-filled crepes, decorated with spun sugar nests, was voted the winning entry of the 10 finalists.

The competition was held at the Inter-Continental Hotel, New York, NY, Thursday, April 12. Gold medal winner Alexander Feher, the Inter-Continental's Executive Chef, was the host/participant of the event.

Entries were judged on the basis of presentation, creativity and taste. The purpose of the contest was to find and award the New York chef who could create the most innovative dessert using Louis Sherry Ice Cream.

The competition was open to chefs from New York hotels, restaurants and pastry shops.

Preview of '84 National Frozen Food Convention and Exposition

Safeway Chairman and CEO Peter Magowan will be the keynote speaker at the 1984 National Frozen Food Convention and Exposition Nov. 11-14 in San Francisco, California, sponsored by the American Frozen Food Institute (AFFI) and the National Frozen Food Association (NFFA).

In addition to a group of top-notch speakers, headed by Magowan, the Convention, with the theme "The Pursuit of Excellence," will feature a number of new programming concepts. The most important of these will be the invitation of 1000 key frozen food buying/merchandising executives from top retail and foodservice organizations to the Convention, the

frozen food industry's only national business meeting.

An offer of complimentary Convention registration is being extended to two executives per company at the top 300 supermarkets and top 200 foodservice organizations in the U.S.

With outstanding speakers and programs, the special invitation of 1000 key foodservice and retail executives, an Exposition of the latest frozen products, ingredients, supplies and services, and a dynamite San Francisco location, the 1984 National Frozen Food Convention and Exposition--the industry's only national business meeting--is a "must attend" event. It's important to register early to ensure receipt of your choice of accommodations.

For registration material and further information, contact the National Frozen Food Convention and Exposition, 1700 Old Meadow Road, Suite 100, McLean, VA 22102. 703-821-0770.

Third New York Gourmet Products and Tabletop Show to Open Day Earlier

The third New York Gourmet & Tabletop Show, with 90% of its available space already reserved, will open on Sunday, November 11, a day earlier than previously announced, said Leonard S. Rogers, president of National Fairs Inc. in San Francisco.

The show will continue through Tuesday, November 13, at the new 1984 location: Passenger Pier Terminals at 52nd Street and the Hudson River on Manhattan's West Side.

This year's show, for the first time incorporating tabletop merchandise into its format, is timed to coincide with the New York Tabletop Show in various showrooms. Because of the Gourmet and Tabletop merger, the number of buyers is expected to exceed the 7,200 in attendance last year.

For further information, call National Fairs at 415-474-2300, or George Little Management at 212-686-6070.

New Jersey Dairy Is The First To Use DASI UHT System In U.S.

A New Jersey dairy will soon become the first facility in the United States to use an innovative ultra high temperature (UHT) system developed by DASI, Inc. for producing shelf-stable products that retain their fresh flavor. The DASI system is manufactured by Tri-Canada, Mississauga, Canada, under an agreement with DASI.

Cumberland Dairy, in Bridgeton, New Jersey, expects to begin operation of its new DASI/Tri-Canada FreeFallingFilm system (R) in July. The system will produce Cumberland's shake mix, distributed largely to fast food chains in the dairy's market area including Philadelphia, PA, Wilmington, DE, and Camden, NJ.

"We are very pleased to be the first to utilize the DASI system in the country," said Carmine Catalana, Sr., president of Cumberland Dairy. "The DASI system will increase our product's shelf life from 10 days to 35 days." Catalana adds, "By using the computer controlled processing system, the bacteria in the product will be eliminated, while sustaining the qualities of our fresh dairy products. This will provide more flexibility in inventory and improve customer service and cost control while at the same time maintaining the high quality standards we have achieved for over half a century."

The DASI system will allow the dairy to produce its products at the rate of 18,000 pounds per hour for distribution in 2-1/2 gallon bag-in-box packages.

As part of a servicing arrangement, DASI, Inc. will provide Cumberland Dairy with its DASI FreeFallingFilm Integrity Program. This is a package that includes start-up instruction, inspection and maintenance programs, service plans, and, when requested, consultation for increasing production or processing new products.

"We expect the Cumberland installation to be the first of many applications of the DASI system in the United States," said Dr. John Nahra, president of DASI, which is headquartered in Chevy Chase, Maryland. "At the same time, we are continuing to expand DASI operations abroad."

EMA Announces 1984 National Conferences

Sanitation executives from throughout the United States and Canada will assemble in Clearwater Beach, Florida at the Holiday Inn Surfside, October 19-25 for "Directions in the 80's - 90's," the theme of the 27th annual National Educational Conferences & Exposition of the Environmental Management Association (EMA) and its subsidiaries, the Health Care Facilities, the Food Sanitation Institute, the Buildings-Grounds Subsidiary, and the Sanitation Suppliers & Contractors Institute.

The individual subsidiary conferences and the overall general educational conference will hear presentations ranging from public speaking, communications to attitude, dust, rodent controls, professionalism and contract management, to marketing, budget cuts, chemicals, pesticides, writing skills.

Nationwide suppliers of sanitation maintenance products and services will display their products/services

to the 600 sanitation administrators expected to attend the conferences.

Complete conferences/exposition information and registration forms are available from the EMA National Executive Offices at 1019 Highland Avenue, Largo, FL 33540. 913-586-5710.

Frozen Food Future Optimistic

The frozen food industry is an industry that has clearly and effectively defined the needs of the consumer for the 1980's, Thomas K. Zaucha, president and chief executive officer of the National Grocers Association, told AFFI members gathered in Washington for a March 27-28 Convocation of Committees.

Zaucha, who spoke at breakfast at the Convocation on March 28, said, "the frozen food industry is positioned well in my judgement to meet, in addition to the (needs of the) traditional family make up, the needs of the two-career family, the single-member household, the retired family, the consumer who is interested today in nutrition and is very weight conscious.

"From 'Good Housekeeping' and 'Better Homes and Gardens' to 'American Health' and 'Executive Fitness,' your marketing programs effectively communicate to the consumer the quality and nutritious characteristics of frozen products," he said.

However, Zaucha suggested that the frozen food industry's excellent track record might be improved if AFFI and NGA work together on programs aimed at bettering the handling and merchandising of frozen foods.

"If we were able to improve the handling procedures at the warehouse and retail store level, might that record be improved. Might that record be a little better if the wholesalers and the retailers did a much more effective job of merchandising frozen products.

"I'd like to suggest something that we might do together at the National Grocers Association and the American Frozen Food Institute to address both these two questions," he said.

Zaucha said that NGA has a very extensive training system that runs from in-store video training tapes to a wide range of conferences. "For instance, from the state of Illinois we just had 180 grocers come in on improved meat merchandising. Well, if we can improve the merchandising of meat, we can certainly improve merchandising techniques for frozen food."

Through special programs, NGA believes that "this year we will provide training to at least 10,000 warehouse executives and retail grocers," Zaucha said. "That doesn't even count the exposure that will be given at our national conferences and national conventions.

"The key word in my judgement is continuity. We all can put on programs at a conference or a convention. We can present a one-day seminar . . . But I know in our membership campaign and our government relations campaign, or in any training program, to truly get the word across, it has to have continuity.

"I think if we can develop--and the resources are probably already there, as Tom (AFFI President Thomas B. House) and I have discussed--a program that can improve frozen food handling at the warehouse level and at the retail level--and couple that with the improved merchandising of frozen food products--we will have something going for us--a total systems approach."

Zaucha said that "we tend to do more in just deals and promotions and forget to put some basic merchandising back in our scheme." This increased emphasis on basic merchandising, he added, can best be accomplished through close cooperation by processors and retailers.

He stressed the importance of proper handling of frozen products as a cornerstone of such a program. "When you look at mishandling of the product, you are not just looking at the edibility of the product, but the quality of the product. And to the extent that you can protect the quality integrity that was placed in the product by the manufacturer, it necessarily makes the next step of merchandising and marketing that product much easier."

1984 Dairy Tour Set for Western Oregon

Dairy farmers, DHI technicians, Extension educators and others involved in the dairy industry will have a chance to explore dairy marketing options on the scenic Pacific Coast of western Oregon, on the 1984 Dairy Study Tour set for July 22-28.

The tour, sponsored by the University of Minnesota Agricultural Extension Service and the Department of Animal Science, provides an annual opportunity to visit and study modern dairy facilities located throughout the U.S.

Tourgoers are able to learn about and compare the ways dairy products are produced and marketed in other parts of the country while viewing a variety of feeding, housing, breeding, waste disposal, calf raising, and management systems. This year's excursion will focus on farms near Portland, Tillamook, Salem, Corvallis, Eugene and Cottage Grove, and will be highlighted by a tour of Oregon State University dairy facilities. University of

Minnesota and Oregon extension dairy specialists will act as commentators for the trip.

Participants will depart from Minneapolis-St. Paul; however, arrangements may be made for departure from other points.

Cost for the tour is approximately $600 and will include air and ground transportation, meals and insurance. For further details, call or write the Office of Special Programs, Agricultural Extension Service, 405 Coffey Hall, University of Minnesota, St. Paul, MN 55108. 612-373-0725.

New Industrial Maintenance Text Available

Managing a sanitation program can be a monumental task, whether it's in a manufacturing plant, hotel, hospital, university, food service or food production facility. The Soap and Detergent Association's new manual, "Programmed Cleaning Guide," is designed to assist the environmental sanitarian with important maintenance responsibilities.

The Association is offering the book at $9.00 a copy.

Soft-cover bound in a handy 5 1/2" x 8" size, the guide contains 14 chapters and 190 pages. A unique appendix includes carpet and floor stain removal charts; a laundry stain removal guide; warewashing problems and solutions; and "how-to's" related to the cleaning of building surfaces, safety and cleaning equipment.

The "Programmed Cleaning Guide" spans the field of industrial and institutional sanitation and contains chapters on:

* Floor and Carpet Care
* Modern Cleaners
* How to Determine Cleaning Costs
* Warewashing in Food Service Facilities
* Sanitation in the Food Production Industry
* On-Premise Laundering
* Vehicle Care and Safety.

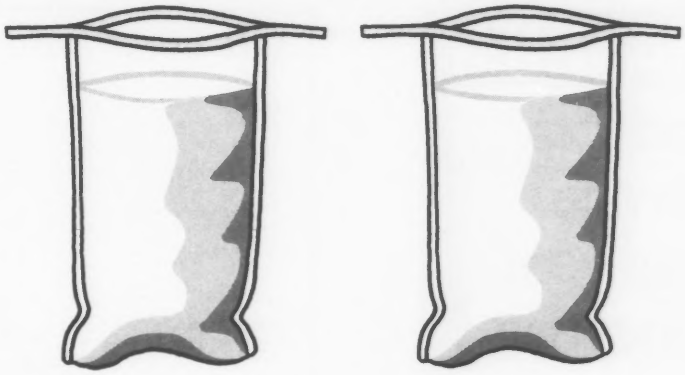
Additional segments deal with the importance of sanitation; the types of soils encountered in various facilities; the routine cleaning of windows and restrooms; how to determine which cleaners to use; and how to organize a cleaning program.

Detergents, abrasives, solvents, disinfectants . . . are discussed generically throughout the text. The chemistry and use of specialty products are also explained -- carpet shampoos and floor polish; institutional dishware cleaners; sanitizers and cleaners employed to clean food production apparatus and hospital surfaces; and detergents and laundry aids necessary to launder apparel and linens.

There are no brand names mentioned. However, the "Programmed Cleaning Guide" categorizes types of cleaning products manufactured by over 60 member companies of The Soap and Detergent Association. Company names appear in this chart, to serve as a handy supplier reference. A list of related associations, and a roster of additional sources available to those in the trade completes the manual.

The "Programmed Cleaning Guide" is a valuable professional tool for environmental sanitarians, executive housekeepers, custodial supervisors, and employees of companies who manufacture industrial and institutional cleaning products -- especially your sales force! You may even order a supply for your customers.

For more information contact: Industrial & Institutional Division, Dept. PCG, The Soap and Detergent Association, 475 Park Avenue South, NY, NY 10016.



Finally, a 6-minute milk antibiotic assay.

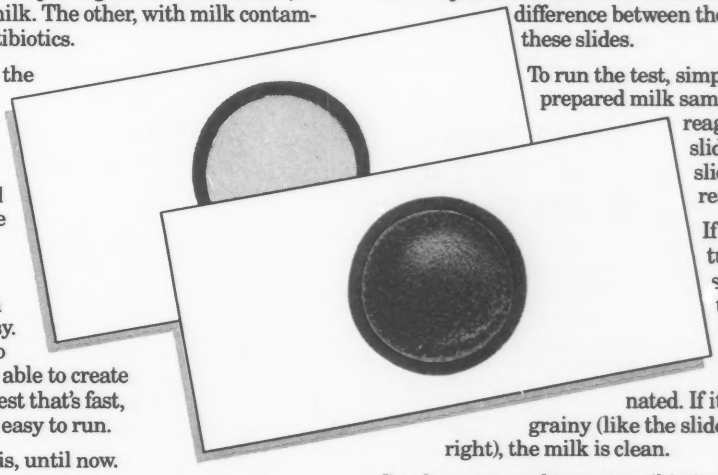
One of these sample bags is filled with fresh, wholesome milk. The other, with milk contaminated by antibiotics.

You can't see the difference. Even with a microscope. You can't taste or smell the difference either.

Detecting antibiotics in milk isn't easy. That's why no one has been able to create a screening test that's fast, accurate and easy to run.

No one, that is, until now.

With The SPOT TEST, you can see the difference between clean milk and contaminated milk in just 6 minutes. And it's as clear as the difference between the spots on these slides.



To run the test, simply mix a prepared milk sample and reagents on a slide. Rock the slide, then read.

If the mixture looks smooth (like the slide on the left), the milk is contaminated. If it looks grainy (like the slide on the right), the milk is clean.

So when you need to spot antibiotics fast, run The SPOT TEST. And get results in 6 minutes.

SPOT TEST™

For more information, contact:

ANGENICS

100 Inman Street
Cambridge, Massachusetts 02139
617 876-6468 (In Mass., call collect)
1-800-523-2250

New Product News

The products included herein are not necessarily endorsed by Dairy and Food Sanitation.

Angenics Introduces 6-Minute Antibiotic Test For Milk

• Angenics, the 3-year-old biotechnology firm, has begun marketing The SPOT TEST™, a 6-minute antibiotic screening test for dairy plants and receiving stations.

The SPOT TEST™ enables dairy processors and receivers to test milk for antibiotic contamination in minutes--before it is unloaded from a tanker. The procedure is so fast and easy it can be incorporated into a plant's routine without holding up haulers or disrupting operations.

Designed to predict the outcome of the *Bacillus stearothermophilus* disc assay, the industry's 2 1/2 hour standard test for antibiotics, The SPOT TEST™ has earned a record of 99.8 percent agreement with the disc assay.

From start to finish, The SPOT TEST™ takes 6 minutes, making it the fastest screening test on the market today. The test requires only two minutes of technician time.

To perform the test, a prepared milk sample and reagents are mixed on a slide. The slide is placed on the Angenics Rotator and gently rocked for 4 minutes. When time is up, the user observes the slide's appearance to determine results.

If the slide is filled with grains, the milk is free of antibiotics. If the slide has a smooth, white appearance, the milk contains antibiotics at a level greater than or equal to the disc assay's 16 mm zone.

Users say the test is easy to run and results are clear and easy to distinguish. Most technicians, milk receivers and haulers master the procedure after just one or two practice runs.

The SPOT TEST™ system fits conveniently on a square-foot desk or counter top. Components include the Angenics Rotator 500 and two dispensing devices, as well as The SPOT TEST™ Kit, which contains all the reagents and disposable supplies needed to perform 100 tests.

For more information, contact: Marilyn B. Saltzberg, 617-876-6468.

Spot Test System

New From Jet Sediment Tester Company

• A milk cleanliness grading photo guide has been developed by using membrane filters. The guide can be used for several test size samples, namely, 1 pint, 4 ounce and 1 ounce.

By virtue of on-surface retention, the membrane filters as shown in the actual photo tend to bring out with good definition the several sediment densities.

The regular milk sediment test discs would continue to be used in conducting milk sediment or cleanliness tests.

A copyrighted photo guide is also available showing several densities of non-white suspended matter filtered from water by membrane filters and the corresponding Turbidity Units (T.U.) for each of the disc results, as determined by a turbidimeter. Thus, by filtration and photo comparison of the sample test disc, the T.U. can be approximated.

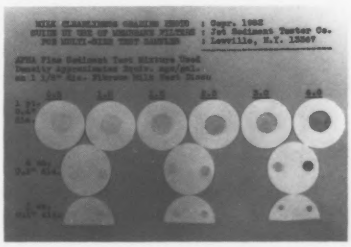
The standard method for measuring turbidity is by the use of a turbidimeter which measures the degree of light scattering by suspended particles in water, and the result is obtained from a meter or dial and is then recorded as Nephelometric Turbidity Units (NTU).

The basis of the filter screening test is the use of a 1.0 cm diameter filter area of a 1.2 to 5.0 micron pore size membrane filter and the filtration of a 50 ml sample. Vacuum such as may be supplied by an aspirator attached to a water faucet is used to urge passage of the test sample. The membrane filter, being fragile, is supported by a fibrous milk sediment test disc. The membrane filter is likely to plug when the turbidity approaches 5.0 NTU level.

Milk sediment testing equipment having a 0.40" diameter (1.02 cm) filter area can be used. Tests are repeatable and the filter provides a permanent record of the result.

For public health reasons, 1.0 NTU or less is the desired level for drinking or food grade water. This type of testing provides for a practical means for estimating the turbidity aspect of the sanitary quality of water.

For further information, write to: Jet Sediment Tester Co., Lowville, NY 13367.



Milk cleanliness grading photo guide

LIQUI-GEST Treatment for Organic Waste

• LIQUI-GEST, manufactured by One-Stop Products, Inc., is a liquid-alive bacterial solution which liquifies, digests and deodorizes organic waste. The non-contaminating, non-polluting bacteria have many applications involving human and animal waste. In farm applications, LIQUI-GEST neutralizes foul odors from feed lots and eliminates algae growth and scum blankets when applied to ponds and lagoons.

According to the manufacturer, LIQUI-GEST is 100% ecologically safe and is effective in reducing BOD (biochemical oxygen demand), and actually adds oxygen to the water, thereby enhancing fish and aquatic plant life. The waste is broken down into its original components, making it ecologically acceptable to the sub-soil or water body receiving it.

For further information, contact Bob Hayes, One-Stop Products, Inc., P.O. Box 762, Smithtown, NY 11787. 516-462-5900.

New Surface Sampler Available

• A portable automatic surface sampler is the preferred method for surface microbiological sampling of meat and associated products.

"P.B.I. International" is proud to present a standardized system for the routine analysis of surface from a microbiological point of view.

For more information, contact P.B.I. International, Via Novara 89, I-20153 Milano-Italy. Phone 02/4047941. Tlx 334883.

Pressure Sensitive Tape Printer

• The Bell-Mark *PT-13* is a revolutionary new patented imprinting system designed to imprint any message on any type of pressure sensitive tape. It attaches directly to your random or uniform case sealing equipment, making it possible for you to code, date, name, price, identify or imprint an important message on the tape as it seals your cases.

The *PT-13* uses the moving tape as its power source. It is installed simply and easily and uses long lasting Bell-Mark type. This ensures that only clear, clean impressions are made each time. Maintenance and service are extremely simple, as nothing interferes with the mechanism of the case sealer.

For further information, please contact: Bell-Mark Corporation, 444 William Street, East Orange, NJ 07017, Attn: Sandra Haagen, Marketing Coordinator. 201-674-7711 or Toll-Free 800-526-1391.

New In-Line Valves From TANACO

• TANACO IN-LINE VALVES are a *revolutionary departure* from the regular three-way valves which are used in sanitary processing lines.

The chemically resistant plastic plugs can be thoroughly cleaned-in-place WITHOUT REMOVING them from the bodies, hence "cleaned-in-line," eliminating the labor costs of manual cleaning, possible contamination and damage to the equipment.

The valves come with either a Hand Actuator or an Air Actuator, which are interchangeable. The latter turns the plug 90°by a push button remotely controlled, which has four indicating lights, showing the four possible positions of the valve.

An adjusting nut on the outside of the actuators raises or lowers the stem, attached to the plug, for varying product viscosities. A stainless spring in the actuator pushes down to seal the plug in the body. Pressure of product flowing through the valve pushes the plug upwards. Added pressure of the cleaning cycle and the resulting suction completely washes all around the plug for total sanitation.

All models of the TANACO IN-LINE VALVES carry the 3-A symbol, which indicates they are in compliance with all regulations of the 3-A Sanitary Standards. Bodies and actuators are of stainless steel, steam sterilizable, and suitable for asceptic processing to 350°.

At present these valves are being used in processing plants in California, Washington, Texas, Massachusetts, West Virginia and New York.

For more information contact: TANACO PRODUCTS, 3860 Loomis Trail Road, Blaine, WA 98230. 206-332-6010.

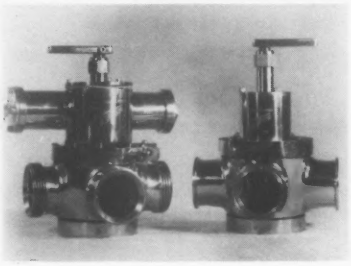
Sanitizing Hand Cleaner For E2 Applications

• New Oakite Sanitizing Hand Cleaner is authorized by the USDA for Code E2 applications.

It gets out tough soils as it destroys gram-positive and gram-negative bacteria. No extra sanitizing step is needed.

Oakite Sanitizing Hand Cleaner comes in a one-use cartridge that fits into Oakite's sturdy plastic dispenser. The dispenser won't clog or leak and is guaranteed for three years.

For more information on Oakite Sanitizing Hand Cleaner and the Oakite dispenser, write for bulletin F.15766 from Oakite Products, Inc., 50 Valley Road, Berkeley Heights, NJ 07922.



In-line Valves by Tanaco

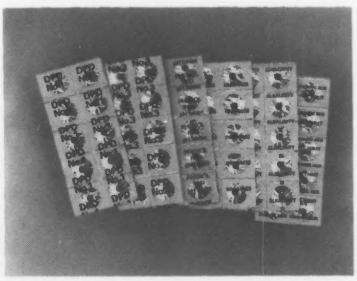
Tablet Reagents for Simplified Water Quality Testing

• PALINTEST TABLET REAGENTS for water quality testing in the lab or in the field are described in a new catalog published by LaMotte Chemical. Fast, easy-to-use tablet tests are offered for dairy sanitizing rinse control and routine maintenance testing of drinking waters, boiler and cooling waters, and other water supplies.

In the unique Palintest concept, a complete reagent system is compounded into a single tablet to create a simple, one-step test. This reduces the number of reagents to be handled and eliminates hazardous solutions. Each tablet contains a precise dosage for a single test. Measuring errors are avoided, and every test gives accurate, repeatable results. Tablet reagents reduce shelf-life problems, because they are more stable than liquids or powders. In the lab, Palintest tablets save steps and reduce reagent costs. In the field, tablet tests are fast, reliable, and require no special training.

The LaMotte Palintest catalog offers the tablet reagents themselves in small or bulk quantities for use with existing test equipment. The catalog also offers complete tablet test kits with calibrated test vials and other appropriate accessories, such as LaMotte colorimeters, comparators, or color charts.

The Palintest Tablet Catalog is available free of charge from the LaMotte Chemical Products Company, P.O. Box 329, Chestertown, MD 21620. 301-778-3100.



Water Quality Testing Tablets

MI-T-M Introduces Hot Water Pressure Washers

• Mi-T-M has recently introduced a complete line of hot water pressure washers. The Mi-T-Hot Power Washers have seven sizes available ranging from 700 PSI to 3000 PSI with volumes of 2 to 5 GPM.

Each model features two special innovations, a total stainless steel design and a ceramic combustion chamber. The stainless steel frame, cover, fuel tank and even the heating coils translate into rust-free, problem-free maintenance. And the exclusive ceramic combustion chamber generates hotter, quicker and cleaner burns for an unequaled high-efficiency operation.

The Mi-T-Hot Power Washers complement Mi-T-M's cold water washer line. And, just like the cold water units, they convey the same features of quality, dependability, long-service and easy operation.

For more information, call the Mi-T-M Corporation toll-free at 1-800-553-9053 and in Iowa 1-800-942-0014. Or contact Jerry Brimeyer at the Mi-T-M Corporation, Box 50, Peosta, IA 52068.

Mi-T-M Hot Water Pressure Washers

Updated Brochure Describes Complete Tri-Canada Line of Valves

• A new 10-page catalogue shows and describes the full range of stainless-steel valves from Tri-Canada.

Tri-Canada is a leading Canadian manufacturer of liquid processing systems, with complete design and fabrication facilities at its Mississauga, Ontario, plant.

The brochure describes, with photographs, cutaways and diagrams, two main types of process control valve: Compression Valves, and the "Sandisc" stainless-steel disc valve.

Also described in this informative brochure are double block and bleed valves, throttling valves, relief valves, flush bottom tank valves, check valves, and a line of unique Tri-Canada wide-angle plug valves.

For a copy of this brochure and more information, contact: Tri-Canada Inc., P.O. Box 4589, Buffalo, NY 14240. 716-856-2648.

Food Packaging Materials: Aspects of analysis and migration of contaminants, by N. T. Crosby, Applied Science Publishers LTD, London, 1981.

Food Packaging Materials: Aspects of analysis and migration of contaminants by N. T. Crosby, is an excellent introductory text dealing with the potential chemical contamination of food products by packaging materials. The object of the text was to cover as many aspects of monomer and chemical transfer from packaging materials into the food during storage as possible without great detail in any specific area. The author lists over two hundred references and suggested readings to those who wish to learn more about specific reas. The book contains 190 pages, 39 tables and 21 figures. There are many chemical and mathematical formulas presented in the text.

The book is divided into eight chapters. The first chapter discusses Food Packging Requirements. A review of food spoilage mechanisms, the function of packaging in food spoilage and problems involving food packaging is presented. Chapter two reviews plastic packaging materials. The major polymers found in the food packaging industry are discussed. The use of thermoplastics is presented including polyofins, polyproplylene, polyvinyl chlorine, vinylidene chloride, polytetrafluoroethylene (PTFE), and polystyrene. Non-ethylenic thermoplastics such as polyamides and polycarbonates are also discussed. Laminates, copolymers and other constituents of plastics are briefly mentioned.

Chapter three discusses monomers which may transfer from the plastic into the food during storage periods. A discussion of trace levels of monomers in polymers and food and sampling methods available for vinyl chloride monomer (VCM) is presented. Headspace gas chromatography (HSGC) application to the determination of monomers is discussed.

Chapter four discusses the toxicological aspects of packaging material chemicals and biological systems. Here LD_{50} values are presented. The Frawley concept involving food packaging materials and levels of chronic exposure or no-effect levels of chemical toxicants are reviewed. Several toxicological testing methods are presented. Chapter five previews international legislation involving food packaging materials and food purity.

Chapter six and seven review migration from theoretical aspects and by experimental determination. These chapters review both global and specific migration. Some physicochemical principles involving molecular theory of diffusion. Flick's laws of diffusion and the Nernst-Einstein equation are presented. The influence of time and temperature on migration is discussed. Gibbs equation describing adsorption is presented briefly. The last chapter discusses over food contact materials used as food packaging materials. Brief reviews of tin plate cans, stainless steel, aluminum, pewter, ceramics, cellulosics, glass and rubber are discussed.

The author recognizes that food packaging is a multidisciplanary science involving plastic technology, food science, chemistry,toxicology, food production engineering and other sciences. He believes that no area has greater public concern or health importance than the release of chemicals into our food supply. *Food Packaging Materials* offers an excellent introduction into the problems of analyses and migration of contaminants from food packaging materials into food products.

Vay Rodman
East Tennessee State University
Department of Environmental Health
Box 22960 A
Johnson City, Tennessee 37614-0002

Spices Volume I: The Story of Spices, The Spices Described. John W. Perry. Chemical Publishing, Inc., New York. Second Edition 1983. 235 pages.

"Not a botanist's family, but a spice merchant's family - the group of aromatic and pungent products of which the goods of spice merchants throughout the world are composed. It is of these that this story is written."

Part I of Volume I, The Story of Spices, includes a comprehensive historical, in chronological sequence, view of spices. John Perry writes the "story" of spices since the Ancient World to the Modern World. Uses, trade importance, medicinal importance and the lengthy quest for the Spice Islands is discussed in these first 155 pages. Although this section is long, it does give the reader some insight to the importance of spices in the history of today's civilization.

John Perry makes the reader aware of the importance of spices in today's society. A brief synopsis of this importance is the theme of the transition pages between Part I and Part II.

Part II of Volume I, The Spices Described, is introduced by a description and definition of essential oils, plant parts, climate effects on spice growth and flavor potential, whole vs. ground spices and milling procedures. The remainder of this volume includes a brief description, growing areas, fruiting potentials, flavor, uses and a photograph of each spice. The spices described include: allspice, anise, capsicums, caraway, cardamon, celery, cinnamon, chervil, cloves, coriander, cumin, curry powder, dill, fennel, fenugreek, garlic, ginger, laurel leaves, marjoram, mint, mustard, nutmeg, mace, onion, oregano, parsley, pepper, poppy seed, rosemary, saffron, sage, savory, sesame seed, sweet basil, tarragon, thyme and turmeric.

This volume would be of interest to spice manufacturers, companies that purchase or sell spices in large quan-

tities, home economists, Food Science Department Libraries and any individual interested in spices. The book is easy to read and contains many historical quotes. The author includes a short bibliography section which includes general spice books and historical reference books.

Ricardo Alvarez, Ph.D.
Director, Quality Assurance
Tone Brothers, Inc.
P.O. Box AA
Des Moines, Iowa 50301

Methods in Food and Dairy Microbiology. DiLiello, L. R. 1982. AVI Publishing Co., Westport, Conn.

The author's ultimate goal for this manual is to enhance the learning and understanding of analytical methods necessary for the operation of the food and dairy testing laboratory. This goal is achieved in several ways. The diagrams and directions for making dilutions and for other basic procedures are direct and simple; they can be readily interpreted by the novice. A chapter of particular appeal is one dealing with the morphological characteristics of molds or microfungi. The illustrations and photographs are clear and show identifying structures of certain commonly occurring molds. The information in the thirty-two chapters in the manual is representative of the foods and organisms that are likely to be encountered in the quality control laboratory. In some instances, the descriptive materials may be too brief and leave the reader wanting more information. As with all laboratory manuals, however, additional explanations and mention of other alternatives must be made by the instructor. In some instances, it would be informative to have a brief statement when adaptations of generally accepted procedures were made for convenience in the teaching laboratory. This manual achieves its ultimate goal; for basic procedures, it is an excellent guide for the individual wanting to learn basic techniques. Instructors of introductory food microbiology should give this manual serious consideration as a guide or text for their laboratory studies.

Homer W. Walker, Professor
Department of Food Technology
Iowa State University
Ames, Iowa 50011

Sanitation in Food Processing. 1983. John A. Troller. Academic Press, New York, New York. 456 pages.

An outstanding example of scientific and educational writing. John Troller should be commended for a great book. In one cover, he has tried to create an overall perspective of food processing sanitation (a very broad subject) and to emphasize and illustrate principles with examples rather than to cover comprehensively all sanitation aspects. The author provides the necessary tools to answer and proceed to timely solutions to sanitation questions. The book has applications to specific food related industries; however, the subject matter is mainly restricted to the food processing industry.

The book is divided into nineteen chapters and four appendices. Each one covers a separate, but related, area of food processing sanitation. The chapters include: Introduction; Food plant sanitation programs; Food plant design and construction; Process equipment; Cleaning and sanitizing; Microbial growth in Foods; Food-borne diseases and their prevention; Personal hygiene; Insect control; Significant insects in the food industry; Rodents and their control in the food environment; Birds and their control in the food environment; Packaging sanitation; Food storage sanitation; Food transport sanitation; Water sanitation; Air; Raw materials and other ingredients and Food laws and regulations. The appendices include: Transportation guidelines; Food defect action levels, FDA factory inspection forms and FDA district offices, regions and jurisdictional areas.

The author has gone to great effort to ensure the accuracy and completeness of material in this book in accordance with the state of the art at time of publication. A particular example of this precision is shown in Chapter 6, Microbial Growth in Foods. The author describes the current techniques available for quantification of microorganisms. In this discussion, he includes direct microscopic counts most-probable-number techniques, turbidity, total plate count, cell mass, radiometric methods, impendance methods. Automated and rapid methods are discussed. Each chapter includes a reference section.

Sanitary practice possesses a commanding influence in the establishment and maintenance of a complete quality assurance system. Every individual involved in quality control/quality assurance education and/or practice in industry should have a copy of this book. Such areas as microbiology, food pests and their control, worker hygiene, and government regulations are considered from the perspectives of their interaction with process equipment design, plant construction, raw materials, and food packaging, transport and storage. All food scientists will find this book a useful, up-to-date technological resource. Students and teachers will also be interested in this volume as a primary text and reference book in many sanitation and quality assurance related courses, respectively, offered by universities, industry, regulatory agencies and commercial institutes.

This book is an exciting and practical contribution to the field of food processing sanitation.

Ricardo Alvarez, Ph.D.
Director, Quality Assurance
Tone Brothers, Incorporated
P.O. Box AA
Des Moines, Iowa 50301

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

MEMBERSHIP APPLICATION

All memberships on calendar year basis. Memberships include subscription to *Journal of Food Protection, Dairy and Food Sanitation,* or both journals.

BEST BUY Check one:

- ☐ I want to receive BOTH journals $50
- ☐ I want to receive *Dairy and Food Sanitation* $28
- ☐ I want to receive *Journal of Food Protection* $40

FOREIGN: Add $7 for each Journal ordered for postage

*Student Membership $10 for 1 Journal - $20 for both — please include student verification

SUBSCRIPTION APPLICATION
for agencies, associations, and institutions

All subscriptions on a calendar year basis.

BEST BUY

- ☐ BOTH Journals $75
- ☐ *Dairy and Food Sanitation* $60
- ☐ *Journal of Food Protection* $60

FOREIGN: Add $7 for each Journal ordered for postage

PUBLICATION ORDER FORM

3-A Sanitary Standards

( ) Complete set 3-A Dairy ..... ea $20.00
( ) Complete set 3-A & Egg 3-A Stds ..... ea $25.00
( ) Egg 3-A Stds ..... ea $15.00

Five-Year Service on 3-A Sanitary Standards

( ) 3-A Stds ..... Five years $12.00
( ) Egg 3-A Stds ..... Five years $ 6.00

☐ Procedures to Investigate Waterborne Illness ..... ea $ 1.75
25-99 copies, $1.50 ea., 100 or more, $1.15 ea.

☐ Procedures to Investigate Foodborne Illness ..... ea $ 1.50
25-99 copies, $1.25 ea., 100 or more, $.90 ea.

☐ Procedures to Investigate Arthropod-borne and Rodent-borne Illness ..... ea $ 2.00
25-99 copies; $1.75 ea., 100 or more, $1.50 ea.

Please fill out completely

Name _____ Company Name _____

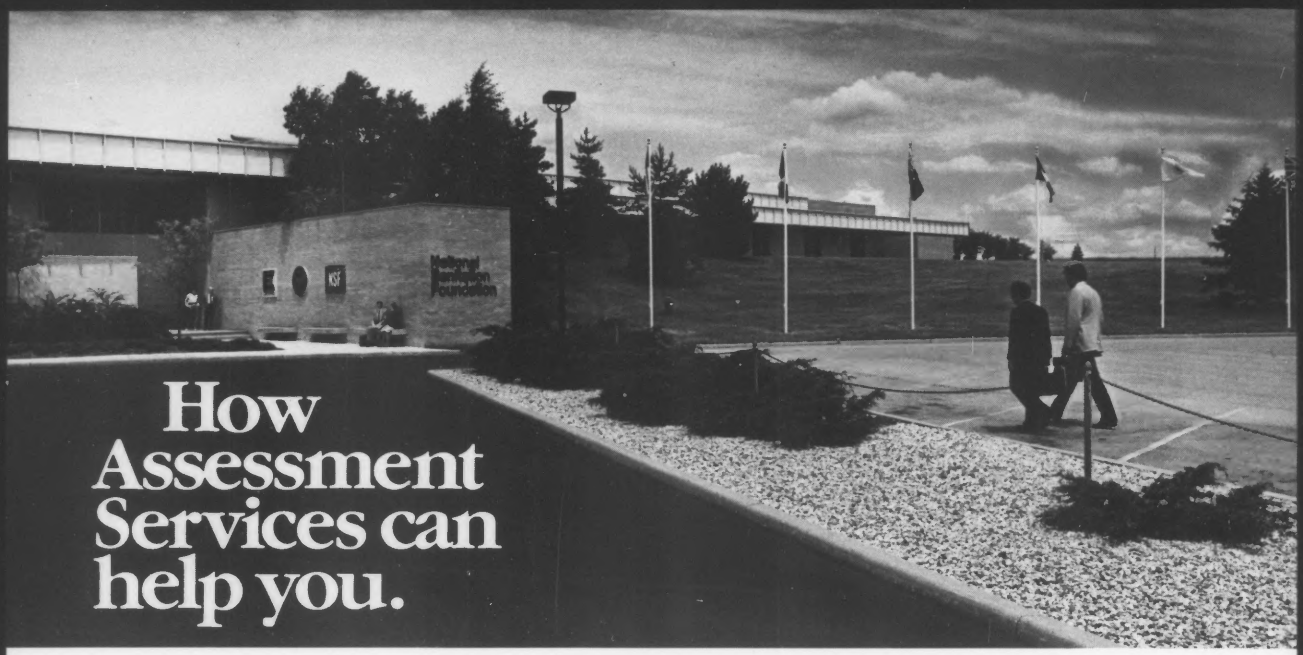
Address _____

City _____ State _____ Province _____ Zip _____

- ☐ Payment enclosed
- ☐ Mastercard/Visa (circle appropriate card)
  - Card # _____
  - Expiration Date _____
- ☐ Bill me (payment due upon receipt)
- ☐ Please check here if you would like information on joining your state/province association.

MAIL ENTIRE FORM TODAY TO: IAMFES–Dept. C
P.O. Box 701
Ames, IA 50010

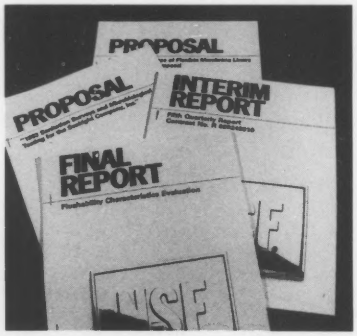
For faster service use your charge card & call 515-232-6699 extension C



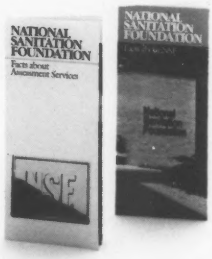
How Assessment Services can help you.

At the National Sanitation Foundation, the Assessment Services group evaluates products, systems, and services not covered by our Listing and Certification Services. We undertake special testing, research, demonstration projects, and studies for industry, service companies, government, and individuals with health and environmental concerns. The objectivity and integrity associated with NSF make Assessment Services unique. We provide specialized physical, chemical, and microbiological testing, including field testing by trained professionals. It could be just the help you need! Some examples:

Disposable containers
Microbiological testing and plant inspection services are provided to 10 manufacturers of disposable



containers through the Single Service Institute. The routine testing required by state regulatory authorities and voluntary plant inspections



Find Out What Assessment Services Can Do For You!
Write or Phone for Free Information:
- Assessment Services Brochure
- NSF Facts Brochure

are carried out in accordance with US Food and Drug Administration standards.

Water Disinfection Systems
A study of cruise vessel drinking water disinfection systems was performed for the Centers for Disease Control to assist them in protecting passengers' health.

Water Treatment
Under a contract with the US Environmental Protection Agency, we are studying the costs, maintenance requirements, and effectiveness of various small central systems and point-of-use units to reduce fluoride levels in drinking water.

Hazardous Wastes
In another project, the solidified product from a hazardous waste chemical treatment and solidification process was rigorously tested for leaching of hazardous or toxic constituents. Test results were provided to the state regulatory agency reviewing the process.

Wastewater Treatment
Under contract with manufacturers, new products have been tested and evaluated for their effects on various onsite wastewater treatment systems.

Please contact Assessment Services for more information, or to discuss your needs in detail. Inquiries from anywhere in the world are welcome.

National Sanitation Foundation

Offices and laboratories, P.O. Box 1468, Ann Arbor, MI 48106 Phone: (313) 769-8010

Food Science Facts
For The Sanitarian

Robert B. Gravani
Cornell University
Ithaca, NY

Clostridium botulinum food poisoning

BOTULISM

Botulism is the most severe type of food poisoning. It occurs following the consumption of food that contains the toxin produced by the organism *Clostridium botulinum*. There are seven types of *Clostridium botulinum* and each produces a somewhat different toxin that results in botulism. Fortunately, botulism rarely occurs, but this illness requires much attention due to its severe and life-threatening nature.

Between 1899 and 1977, there were 766 botulism outbreaks reported in the United States involving 1,961 people and 999 deaths. Although botulism has been reported in three forms - foodborne, wound and infant botulism - only foodborne botulism will be discussed.

HABITAT

Clostridium botulinum is widely distributed in nature and is found in soil, water, on plants and in the intestinal tracts of animals and fish. The bacteria produce spores that are harmless, unless stimulated to grow under certain conditions. Spores of this organism can contaminate raw foods during production, harvest or processing and if not properly processed, the spores will germinate and produce a deadly toxin in the food. Although the toxin is very potent, it can be destroyed by boiling the food for 10-15 minutes. *Clostridium botulinum* grows in the absence of air (anaerobic), and is usually associated with low-acid canned foods that have been improperly processed, stored and consumed without appropriate heating. The organism cannot grow below pH 4.6, so food with a pH higher than this should be processed at high temperatures (under pressure) for sufficient time to destroy the heat resistant spores.

FOODS INVOLVED

Foods that have been involved in botulism outbreaks include:

- Low acid canned vegetables -- green beans, beets, mushrooms, corn, spinach, asparagus and others
- Fish and fishery products
- Fruits
- Condiments such as chili peppers, tomato relish and chili sauce.

These products have been responsible for a majority of outbreaks. Meat, poultry and dairy products are rarely involved in botulism outbreaks, but several have been reported.

From 1899-1977, 72% of the botulism outbreaks have been traced to home processed foods while 9% have been caused by commercially processed foods; 19% of the botulism outbreaks could not be traced. When one considers that Americans have consumed the contents of billions of containers of canned foods, the record of botulism outbreaks shows that properly processed canned foods are safe. The botulism outbreaks in home processed foods are usually due to under processing -- either by not using a high enough temperature, by processing for too short a time, or a combination of these conditions. Well informed and knowledgeable home food processors, using up-to-date and accurate time and temperature charts, can also produce safe canned foods.

THE DISEASE

Botulism is an intoxication because it is caused by a toxin produced by *Clostridium botulinum*. This toxin is one of the most potent natural poisons known to man, and small amounts can cause death. It is a neurotoxin which affects the body's nervous system.

After eating food contaminated with botulinum toxin, the symptoms usually appear within 12-36 hours. In general, the shorter the incubation period, the more severe the disease and the higher the fatality rate. The earliest symptoms are usually digestive disturbances followed by nausea, vomiting and possibly diarrhea. Fatigue, weakness, dizziness, headache, and occasionally constipation also occur. Blurred or double vision, and difficulty in swallowing and speaking are common symptoms. People exhibiting the symptoms of botulism also complain of dryness of the mouth, constriction of the throat and a swollen or "coated" tongue. Involuntary muscles become paralyzed, and this paralysis spreads to the respiratory system and heart. Death usually occurs due to respiratory failure.

Successful treatment of botulism requires quick medical attention and diagnosis of the disease, prompt administration of the antitoxin and close medical supervision.

Although the death rate from botulism has been above 60%, since about 1950 there has been a gradual decrease in deaths. This is probably due to improvements in intensive care facilities and prompt administration of the antitoxin.

TRANSMISSION OF THE DISEASE

The following conditions are necessary for an outbreak of botulism to occur:

1) The microorganism *Clostridium botulinum* must be in the food;

2) The food is canned or processed in some way (inadequate processing or heating permits spores to survive);

3) Conditions after processing allow spores to germinate and the bacterial cells to grow and produce toxin;

4) The food is not sufficiently heated before eating to inactivate the toxin; and

5) The poisonous food is eaten.

PREVENTION AND CONTROL

The key to preventing botulism is the proper heat processing of low acid canned foods. Four basic principles should be followed:

1) Use approved heat processes for commercially canned foods. For home canned foods, use pressure cookers and cook long enough at high enough temperatures to destroy the spores of *Clostridium botulinum*.

2) Reject all swollen, gassy, or spoiled canned foods.

3) Avoid tasting or eating foods from containers that are:

- Leaking, bulging, severely damaged or cracked
- Spurt liquid or foam when the container is opened
- Have abnormal odor or appearance.

4) Boil home processed low acid canned food for 10-15 minutes prior to serving.

To assure the safety of canned foods, it is necessary to control and monitor the entire canning process from beginning to end. By following the principles of good sanitation and good manufacturing practices, botulism can be prevented.

Dairy Quality

by **Darrell Bigalke and Dr. Rulon Chappel,** *Food & Dairy Quality Mgmt., Inc., St. Paul, MN*

HIGH TECHNOLOGY APPLIED TO MICROBIOLOGICAL ANALYSIS OF DAIRY PRODUCTS WILL LEAD TO IMPROVED PRODUCT QUALITY

Methods for microbiological testing of dairy products have remained virtually unchanged for years. These tests fulfill a regulatory requirement and provide information useful for historical purposes, which has helped to improve product quality. However, to aid in controlling a given day's production, these tests are not useful due to the time frame required to obtain results.

Incubation time requirements of present microbiological tests make it impossible for the dairy quality control lab to obtain results in a significant time frame. Time requirements of 1 to 9 days to obtain data result in a quality control lab taking on an after-the-fact type function to an overall operation. Instead of being a dynamic department where vital decisions are made on product and ingredient quality, many view quality control activities as a necessary evil. Unfortunately, the fact that results are obtained only *after* the processing of raw materials or after the distribution of finished products seems to perpetrate the disregarding of microbiological test results.

One possible solution to this quality control dilemma may be found in high technology testing methods. Morowski (3) suggests the use of high-performance-liquid-chromatography (HPLC) as an automated rapid method of chemical or analytical analysis of dairy products and ingredients. In the area of microbiological assays (4), a number of rapid methods are available, including measurement of changes in impedance, radiometric measurements, direct cell counting devices, measurement of ATP levels and measurement of by-products of microbial metabolism such as carbon dioxide. Recent published studies (1,2,5) point out the usefulness of some of the procedures for quality control purposes.

While some of these automated methods for microbiological analysis may not be fully developed, it is in the best interest of the dairy industry to consider their application. As a whole, rapid automated methods offer the potential user a number of advantages. Through these methods, a quality control lab can take on a quality assurance function for which it was originally designed. Since the time required for obtaining results becomes significantly reduced, raw ingredients can be tested prior to processing, and finished products can be tested prior to distribution. In addition, increased testing capacity will result from the use of these automated testing procedures. Most importantly, high technology testing devices will improve corporate profits by reducing processing costs, improving product quality, improving product uniformity and increasing consumer satisfaction.

Before high technology, automated microbiological testing equipment can totally replace present testing methods, additional development is required. However, presently the dairy industry could utilize this equipment in various applications such as:

1. Monitoring culture activity.
2. Determining biomass of cultures.
3. Reduce time required for shelf life testing, when used in conjunction with preliminary incubation.
4. Develop methods to reduce time required for determining population of specific organism such as gram negative bacteria in raw milk supplies.

The present practice in the dairy industry of monitoring culture activity by measuring metabolic products such as acid could be supplemented or replaced by direct measurement of metabolic activity (ATP) or cell mass. This could result in more positive control of culturing processes by enabling processors to know the potency of cultures more precisely.

In selecting high technology instrumentation for rapid methods of microbial monitoring, several features should be considered, including:

1. System Flexibility. The system or technique to be used should be capable of performing a large number of microbiological analyses.
2. System Speed. Results should be relatively rapid in comparison to standard plating techniques.
3. Correlation. The technique should possess a high degree of correlation when compared with current procedures.

4. Automation. A high degree of automation to reduce the possibility of error.
5. Reproducibility. Results should be highly reproducible among duplicate samples.

Undoubtedly, in the near future, automated testing equipment will prove to be a useful tool for various quality control functions. The reduced time required to obtain results will further enable quality control departments to take a more active role in improving product quality and corporate profits. At this time, the challenge is to the automated equipment manufacturers to improve the sensitivity and overall application of this equipment for the dairy industry. At the same time, the dairy industry must challenge itself to applying automated equipment to presently proven application such as monitoring culture activity, and to become familiar with this equipment to develop procedures for monitoring other quality attributes of dairy products.

1. Bossuyt, R. G. and Waes, G. W., 1983. Impedance Measurements to Detect Post-Pasteurization Contamination of Pasteurized Milk. J. Food Prot. 48(7): 622-624.
2. Firstenberg-Eden, R. and Tricarico, N. R., 1983. Impedimetric Determination of Total, Mesophilic and Psychrotrophic Counts in Raw Milk. J. Food Sci. 48(6): 1750-1754.
3. Morawski, J., 1984. Analysis of Dairy Products by HPLC. Food Technol. 38: 70-78.
4. O'Connor, F., 1983. Rapid Methods for Estimating Microbial Quality of Foods. I. R. J. Food Sci. Technol. 7: 61-63.
5. Waes, G. W. and Bossuyt, R. G., 1982. Usefulness of the Benzalkon-Crystal Violet-ATP Method for Predicting the Keeping Quality of Pasteurized Milk. J. Food Prot. 45(10): 928-931.

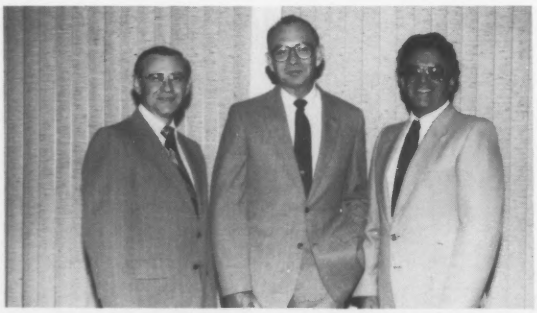
FAMFES Reports On Annual Educational Conference

The Florida Association of Milk, Food and Environmental Sanitarians held their Annual Educational Conference at the Quality Inn Motel, Cypress Gardens, Florida, April 24 and 25, 1984. There were 100 registrants for the meeting, with 81 attending the Annual Banquet. FAMFES was pleased to have Kathy Hathaway attend the meeting, giving members an opportunity to become better acquainted with IAMFES.

The four scientific sessions included 15 presentations on a wide variety of topics, including: Restaurant Sanitation; Red Tide Poisoning in Shell Fish; FDA Food Service Inspection Program; Status and Update of Refugee Problems in South Florida; Role of the Public Health Lab in the Community; Light Effect on Dairy Product Flavors in Plastic Containers; EDB in Food Products; Bottling Water in Dairy Plants - Some Reflections on Equipment Sanitation; Vitamins in Milk - Practical Considerations; Fruit and Flavoring Materials; New Cleaning Materials; Artificial Sweeteners; What is Wrong with our Buttermilk Today; Topics of Current Interest in the Dairy Division (Florida Agric. Dept.); Batch Pasteurization of Frozen Desserts Mix; and a plant tour of the Velda Dairy Plant in Winter Haven. It is hoped that some of these papers will be submitted for publication in the Journal - they were all most interesting.

Since 1977, FAMFES has awarded a door prize at its Annual Banquet consisting of an all expense paid trip to the IAMFES Annual Meeting. Over the past seven years, four of our members have participated. This year's winner is Melvin Fluty of Borden's Tampa. During the meeting many interesting door prizes were made available by the interest and participation of our Industry members.

New Officers and Board Members for 1984-85 are: President, James Strange of Tallahassee; Vice President, Cliff Muncy of Miami; Past President, Dr. Ken Smith of Gainesville; Secretary/Treasurer, Dr. Franklin Barber of Ft. Myers; Directors, Richard Jolley of St. Petersburg, Jane Foos of Tallahassee, Dave Fry of Orlando, Janet Johnson of West Palm Beach, and Cleo Cooke of Winter Haven.



FAMFES officers, 1984-85, from left to right, President, James Strange; Past President, Dr. Ken Smith; and Pres. Elect, Cliff Muncy.

Highlights of IA AMFES Spring Meeting

The annual Spring Meeting of the Iowa Association of Milk, Food and Environmental Sanitarians was held at the Howard Johnson's in Cedar Falls on April 17, 1984.

The meeting program included a two hour morning session on the Dairy Diversion Program, presented by Lee Kilmer from the ISU Extension Office. The afternoon session opened with Implementation of Pre-Incubation Testing presented by Lyle Cunningham of Mid-America Dairymen Lab and Dr. W. S. LaGrange, Dept. of Food Technology, ISU. To complement, Nan Willie from H. B. Fuller spoke on Methods to Reduce Pre-Incubation Counts. The final session was presented by Leon Gustafson from G. B. Fermentation Ind., Inc., with a film on antibiotic residues in milk.

Hale E. Hansen, although not present to receive his award, was recognized for seventeen years of service as secretary-treasurer of IA AMFES. Also, a gavel was presented to N. H. Ormond in recognition of his past year as the Association's president.

The following officers were elected: President, Derward Hansen of Exira; President-elect, Ralph Sanders of Waterloo; First Vice-president, Monty Berger of Decorah; Second Vice-president, Wilbur Nielson of Independence; and Secretary-Treasurer, Karen Scherer of Monticello. These positions became effective April 17, 1984.

Newly-elected President Derward Hansen has been employed by Mid-America Dairymen, Inc. and predecessor organizations for twenty-five years. Currently he is a field representative for the Iowa Division, serving dairy farmers in the south west corner of Iowa.

Mr. Hansen has been active in the IA AMFES for many years and has held the offices of president-elect, first vice-president and second vice-president.

Derward and his wife Darlene live in Exira, Iowa.

Iowa Assoc. President Derward Hansen

Whirl-Pak's the one for bulk milk sampling

When you need a superior container for bulk milk sampling, Whirl-Pak is the one to choose. Available in a variety of sizes, Whirl-Pak bags offer versatility and adaptability to any situation. That's why milk haulers find them so convenient to use on the farm.

Accurate and legible identification of milk samples is also of primary importance. Whirl-Pak's bar code, easy identification and precoded bags diminish the possibility of error. This design makes them convenient for lab use, as well.

In addition, Whirl-Pak bags are well suited for automation. They are presently being used extensively with modern automated milk fat, solids and protein testing equipment.

Only Whirl-Pak gives you a choice of three sample container sizes. They come in one-, two- and six-ounce bags to suit your sampling requirements.

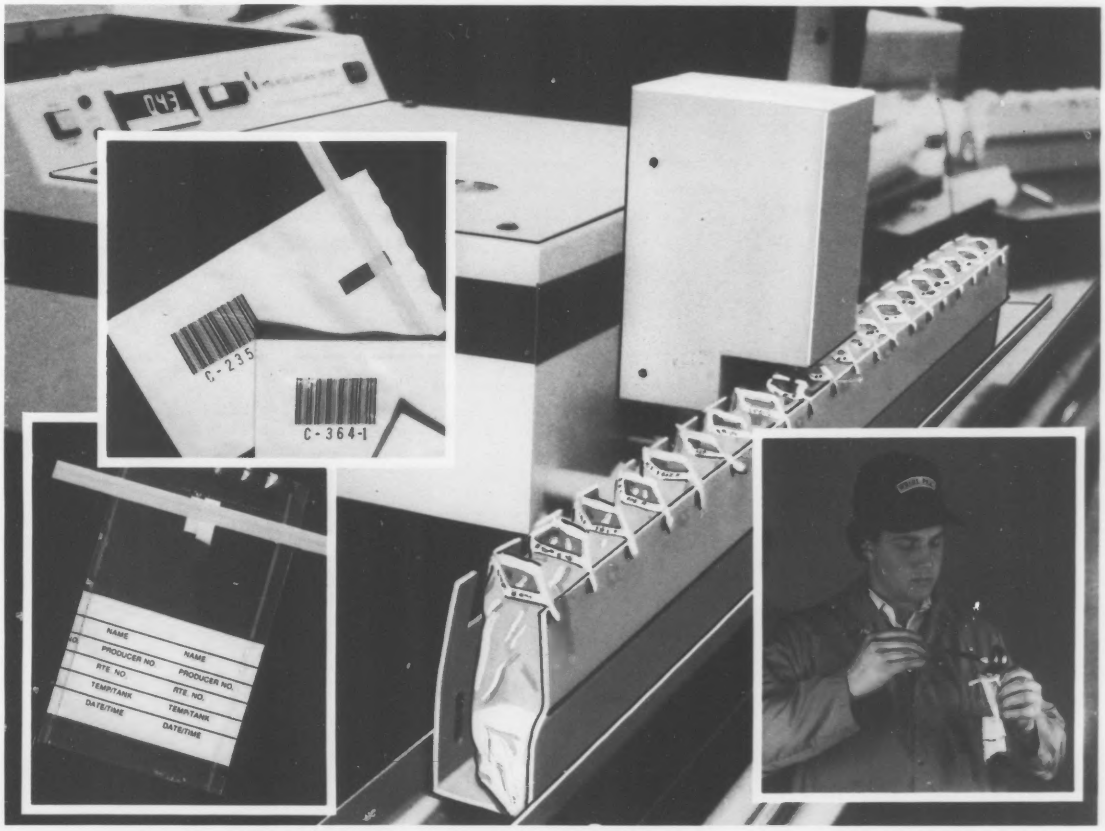
Whirl-Pak bags are the most cost efficient sampling containers available today. They're easy to use, and take up far less space than other sample containers.

For all your sampling needs, Whirl-Pak is the one. To get your **free** copy of Nasco's Sampling Equipment Catalog and to receive a **free** trial pack of Whirl Pak bags, call or write Dept. WL-847.

Free Phone Order Service 1-800-558-9595

Fort Atkinson, WI 53538
Modesto, CA 95352

Nasco



Come To Edmonton in '84!

You are extended a warm Western Canadian invitation to attend the 71st Annual Meeting of IAMFES, August 5-9, 1984 at the Edmonton Inn, Edmonton, Alberta. We promise you an enjoyable, educational and memorable meeting - bring the whole family and plan a vacation around it! We've planned a special Western BBQ and Klondike Breakfast as part of the "good times" you'll have here in Edmonton. You shouldn't miss it!

71st IAMFES Annual Meeting
Edmonton Inn, August 5-9, 1984
Edmonton, Alberta, Canada

MAIL TO: Peggy Marce, Registration Chairman,
c/o AAMFES,
P.O. Box 8446, Station F.
Edmonton, Alberta
T6H 5H3, Canada

Make cheque or money order payable to
"IAMFES 1984 Meeting Fund"

All prices quoted in Canadian funds.

Please check where applicable:

- ☐ Affiliate Delegate
- ☐ Affiliate Member
- ☐ IAMFES Member
- ☐ Past President
- ☐ Executive Board
- ☐ Speaker
- ☐ 30 year Member
- ☐ 50 year Member
- ☐ Non-Member
- ☐ Student

ADVANCE REGISTER BEFORE JULY 15, 1984 . . . AND SAVE
(Refundable if cancelled prior to June 30, 1984)

	ADVANCE REGISTRATION				REGISTRATION AT DOOR			
	Member	Companion(s) of Delegate	Student	Non Member	Member	Companion(s) of Delegate	Student	Non Member
Registration	☐ $30	☐ $10	☐ Free	☐ $40	☐ $35	☐ $12	☐ Free	☐ $45
Early Bird Reception*	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free
Fort Edmonton Park & Western BBQ	☐ $20	☐ $20	☐ $20	☐ $20	☐ $22	☐ $22	☐ $22	☐ $22
Klondike Breakfast	☐ $8	☐ $8	☐ $8	☐ $8	☐ $9	☐ $9	☐ $9	☐ $9
BEST BUY Banquet & Reception	☐ $20	☐ $20	☐ $20	☐ $20	☐ $22	☐ $22	☐ $22	☐ $22
Complete Package**	☐ $75	☐ $45	☐ N/A	☐ $80	☐ $85	☐ $55	☐ N/A	☐ $90
UHT Tour (Aug 9)*	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free	☐ Free

*Indicate attendance **Includes registration/all functions

Name (delegate) _____ Companion _____

Children's Names and Ages _____

Employer _____

Address _____

City _____ Province/State _____ Code/Zip _____

Means of Transportation _____

Arrival Date and Time _____ Departure Date _____

Detach and mail directly to hotel

EDMONTON INN, Reservations
11830 Kingsway Avenue,
Edmonton, Alberta
T5G 0X5, Canada

Phone # 403-454-9521
Canada Toll Free # 1-800-661-7264
Telex # 037-2555

Please reserve the following accommodation for the International Association of Milk, Food and Environmental Sanitarians, Inc. Annual Meeting. August 5-9, 1984.

Name _____

Address _____

City _____ Province/State _____ Code/Zip _____

If sharing with: _____

Arrival Time and Date _____

Departure Date _____

Special Requirements _____

_____

Accommodations held only until 6:00 p.m. unless guaranteed.

Guaranteed by _____
(Company or American Express Credit Card)

Type and number of rooms desired

- ☐ Singles _____
- ☐ Doubles _____
- ☐ Twins _____
  (two beds)

Flat room rate of $54 Canadian

Free parking

No charge for children (Under 18) in parents room

New Members

David Bowerman
Bowerman's IBA, Inc.
Canadaigua, NY

Karen Scherer
Monticello, IA

Lim Seh Siow
Ang Mo Kio, Singapore

Joseph Stanley Bailey
USDA Res. Center
Athens, GA

Steve A. Bradford
Campbell Taggart, Inc.
Jackson, TN

G. V. Harvie
Environmental Health Dept.
Burnaby, BC, Canada

Rick Perrucci
Drexel Hill, PA

James R. Barnett
Strasburg, PA

Audrey Hostetter
Carlisle, PA

Ann Draughon
Univ. of Tennessee
Knoxville, TN

Paul E. Lyman
Campbell Taggart
Dallas, TX

Dale Appel
Frankfort, IN

Bob Nichols
Florida Dept. of Agric.
Marianna, FL

George A. Smith, Jr.
Lexington, MA

Paul Hill
Dairymen, Inc. - UHT
Savannah, GA

Curtis E. Dickerson
P&C Food Markets, Inc.
Syracuse, NY

Richard L. Githens
Borden, Inc.
Dayton, OH

Gabriel Lechevallier
Lake Oswego, OR

Abed Hamama
Univ. of Minnesota
St. Paul, MN

Genaro W. Garcia
Davis, CA

Richard Marier
La Ferme
Ville St. Laurent,
Quebec, Canada

Sally J. Lenhart
Oberlin, OH

Robert Richardson
General Mills, Inc.
Minneapolis, MN

Sam Thomas
Winger Dairies
Towner, ND

Nelson A. Cox, Jr.
Russell Res. Center
Athens, GA

Richard C. Swanson
Food & Drug Admin.
Rockville, MD

Dr. Charles H. White
Louisiana State Univ.
Baton Rouge, LA

Quentin H. Nelson
Foremost Dairies, Inc.
San Francisco, CA

Janet C. Kukulinsky
Foremost Dairies, Inc.
San Francisco, CA

Raad Abdul Karin Norris
Baghdad, Iraq

Ray Koeppel
Heritage Farms Dairy
Murfressboro, TN

Kenneth Crocker
Campbell Soup Co.
Camden, NJ

Earl Jenstad
BC Ministry of Agric. & Food
Surrey, BC
Canada

James L. Strange
Florida Dept. of Agric.
Tallahassee, FL

Barbara Pincomb
Scientific Laboratory Div.
Albuquerque, NM

Abstracts of papers in the July Journal of Food Protection

To receive the* Journal of Food Protection *in its entirety each month call 515-232-6699, ext. A.

Inhibition of Bacterial Histamine Production by Sorbate and other Antimicrobial Agents, Steve L. Taylor and Marci W. Speckhard, Food Research Institute, Department of Food Microbiology and Toxicology and Department of Food Science, University of Wisconsin, Madison, Wisconsin 53706

J. Food Prot. 47:508-511

Potassium sorbate at a concentration of 0.5% inhibited growth and histamine production by selected strains of *Proteus morganii* and *Klebsiella pneumoniae* in a trypticase-soy broth fortified with histidine (TSBH medium). At 32°C, the inhibition was effective for up to 120 h of incubation; at 10°C, the inhibition was observed through 216 h of incubation. Sodium hexametaphosphate and sodium polyphosphate did not inhibit growth of these histamine-producing bacteria at 32°C, but did slow the rate of histamine production at the 2% level. The extent of reduction of bacterial histamine production by sodium hexametaphosphate and sodium polyphosphate was most pronounced for *P. morganii*. Sodium chloride at levels up to 2.0% was ineffective in preventing bacterial growth and histamine production.

Comparison of *Aspergillus* Differential Medium and *Aspergillus flavus/parasiticus* Agar for Enumerating Total Yeasts and Molds and Potentially Aflatoxigenic Aspergilli in Peanuts, Corn Meal and Cowpeas, L. R. Beuchat, Department of Food Science, University of Georgia Agricultural Experiment Station, Experiment, Georgia 30212

J. Food Prot. 47:512-519

Aspergillus differential medium (ADM) and *Aspergillus flavus/parasiticus* agar (AFPA) were compared for enumerating total yeasts and molds as well as the *A. flavus* group in raw peanuts, corn meal and cowpeas. Colony counts were made after plates were incubated at 30 and 37°C; incubation times of 42-44 and 70-72 h were evaluated. Incubation at 30°C enhanced recovery of yeasts and molds compared to incubation at 37°C. Incubation for 42-44 h at 37°C on ADM or AFPA was optimum for detecting *A. flavus* in corn meal. Use of AFPA for detecting *A. flavus/parasiticus* may have some advantage over ADM, since orange-yellow color development of reverse colonies is quicker and more intense on AFPA.

Evaluation of Dry Medium Film (Petrifilm VRB) for Coliform Enumeration, Cynthia L. Nelson, Terrance L. Fox and F. F. Busta, Department of Food Science and Nutrition, University of Minnesota, 1334 Eckles Avenue, St. Paul, Minnesota 55108

J. Food Prot. 47:520-525

A new system, Petrifilm VRB, was compared to two commonly used methods for enumerating coliforms: (a) colony counts on violet red bile agar (VRBA) and (b) MPN determinations with lauryl sulfate tryptose broth (LST) and brilliant green lactose bile broth (BGLB). Petrifilm VRB consists of a bottom film coated with VRB nutrients and a top film coated with a cold-water-soluble gelling agent and a tetrazolium indicator dye. Gas bubbles from lactose fermentation produced around colonies differentiated coliforms from other gram-negative organisms. Coliforms from 120 raw milk samples were enumerated by the Petrifilm VRB, VRBA and MPN methodologies. Randomly selected colonies were chosen from each methodology for characterization. Counts determined with Petrifilm VRB were comparable to counts with VRBA, and both Petrifilm VRB and VRBA compared similarly to the MPN method. Data examined by plotting $\log_{10}$ coliform counts from Petrifilm VRB vs. $\log_{10}$ coliform counts from VRBA resulted in a regression line with a slope of 0.959 and an intercept of -0.076 which was close to the line of equality (slope of one and intercept of zero) for the two methods. No method selected or excluded any one type of microorganisms, and VRBA and Petrifilm VRB had equivalent repeatability.

Simplified Method for Microscale Production and Quantification of Aflatoxin in Broth, Wei-Yun J. Tsai, Jimmy D. Lambert and Lloyd B. Bullerman, Department of Food Science and Technology, University of Nebraska, Lincoln, Nebraska 68583

J. Food Prot. 47:526-529

A simplified method for aflatoxin production studies is described. The mold was cultured in 4-dram (15 ml) vials containing 5 ml of yeast extract sucrose broth, and aflatoxin levels were determined by direct spotting of the broth on thin layer chromatography (TLC) plates and quantitating by spectrodensitometry. Equivalent levels of aflatoxins were produced in vials as compared to flasks. When compared to conventional TLC after solvent extraction, direct spotting was rapid, economical and statistically equivalent. Heating broth cultures (121°C, 15 s) before TLC improved the release of aflatoxin from mycelial mats. Aflatoxins were unstable in YES broth during 3 months of frozen storage.

Evaluation of the Bacteriological Health Risk of 60-Day Aged Raw Milk Cheddar Cheese, Michael H. Brodsky, Ontario Ministry of Health, Laboratory Services Branch, Laboratory Services Branch, Box 9000, Terminal A, Toronto, Ontario, Canada M5W 1R5

J. Food Prot. 47:530-531

One hundred twenty-seven 60-d aged Cheddar cheese samples produced by 21 provincially inspected cheese plants were analyzed by 8 regional laboratories of the Ontario Ministry of Health. Coliforms were detected in 37 (31.2%) and fecal coliforms confirmed in 22 (18.3%) samples, with geometric mean counts per g of 92.5 and 79.3, respectively. *Staphylococcus aureus* was found in only two products at a level of >1000 per g. *Salmonella* spp. and *Campylobacter jejuni* were not isolated from any of the samples tested. *Yersinia enterocolitica* was isolated from one product; however, the isolate was bile esculin- and salicin-positive, and considered a non-pathogenic biotype. The pH of these aged Cheddars ranged between 4.98 and 5.50, with a mean of 5.26. Alkaline phosphatase activity was detected in 94 (79.7%) of the 118 samples tested. These results suggest that 60-d aged raw milk Cheddar cheese produced in Ontario does not pose a significant bacteriological health risk.

Effectiveness of a Betalains/Potassium Sorbate System versus Sodium Nitrite for Color Development and Control of Total Aerobes, *Clostridium perfringens* and *Clostridium sporogenes* in Chicken Frankfurters, K. Vareltzis, E. M. Buck and R. G. Labbe, Department of Food Science and Nuturition, University of Massachusetts, Amherst, Massachusetts 01003

J. Food Prot. 47:532-536

Effectiveness of a betalains/sorbate curing system versus a conventional nitrite system for color development and control of microbial growth in chicken frankfurters was tested. Normal heat processing involved in the manufacture of frankfurters was successful in reducing cell levels of indigenous aerobic mesophiles, and spore levels of inoculated *Clostridium perfringens* and *Clostridium sporogenes* by 1 to 2 log cycles. There were no significant differences in numbers of *C. perfringens* spores for either treatment after 9 d of storage at 4 or 20°C. The two curing systems tested were also equally effective in controlling growth of *C. sporogenes* when tested at 20°C over a 9-d storage period. The betalains/sorbate system proved to be more effective in inhibiting growth of aerobic mesophiles over the 9-d storage period at both 4 and 20°C. It is concluded that in chicken frankfurters under the conditions of this experiment, a betalains/sorbate curing system provided the same level of microbiological protection as a nitrite curing system.

Detachment of *Pseudomonas fluorescens* P26 from Beef Rinsed in Salt and Acid Solution, C. P. Appl and R. T. Marshall, Department of Food Science and Nutrition, University of Missouri-Columbia, Columbia, Missouri 65211

J. Food Prot. 47:537-541

The purpose of this study was to test the hypothesis that numbers of bacteria detached from meat could be increased by modification of the ionic environment surrounding both the meat and bacterial surfaces. Of five 0.1 M chloride salt solutions that were used to rinse cells of *Pseudomonas fluorescens* P26 from meat, KCl removed the highest average number of cells. These numbers were significantly greater than those for NH_4Cl and $MgCl_2$. Compared with water, the solution of 0.1 M KCl rinsed three times as many bacteria from cubes of inoculated meat shaken in solution for 1 min and there were one-half as many bacteria recovered from meat rinsed with KCl as from meat rinsed with water. The latter difference was significant, and we conclude that KCl assisted in detachment of the pseudomonads. However, no significant effect of 0.1 M KCl was observed when it was added to water that had been buffered to pH 4 and 5 with citrate-phosphate buffer. Instead, the buffered rinse caused a large loss in viability of the pseudomonads. This large loss in viability may have overshadowed the smaller effect of KCl.

Minimum Intestinal Inoculum for Nurmi Cultures and a New Method for Determining Competitive Exclusion of *Salmonella* from Chicks, B. Blanchfield, S. Stavric, T. Gleeson and H. Pivnick, Bureau of Microbial Hazards, Food Directorate, Health Protection Branch, Ottawa, Ontario, Canada K1A 0L2

J. Food Prot. 47:542-545

Protection of chicks against *Salmonella* infection was obtained by oral administration of Nurmi cultures. The Nurmi cultures were prepared by inoculating adult chicken intestinal material (10^{-1} to 10^{-11} g) into anaerobic liquid medium and incubating for 3 d at 37°C. Excellent protection was obtained with cultures initiated with as little as 10^{-7} g of fecal or cecal content; progressively less protection with 10^{-8} to 5×10^{-10} g; and none with cultures initiated with 10^{-10} g. Protection was based on challenge of treated chicks with nalidixic acid-resistant (Nal^+) *Salmonella* and enumeration of the Nal^+ organisms in the chick cecal content 7 d later. To simplify the enumeration, a swab-plate method was developed. The method saves time and materials and gives relatively accurate (± 1 $\log_{10}$) determinations of Nal^+ *Salmonella* over the range of 10^1 to 10^7 per g of cecal content.

Bacteriological Survey of Freshly Formed Cheddar Cheese, Michael H. Brodsky, Ontario Ministry of Health, Laboratory Services Branch, Box 9000, Terminal A, Toronto, Ontario, Canada M5W 1R5

J. Food Prot. 47:546-548

Two hundred-fifty freshly formed cheese samples produced by 32 provincially inspected cheese plants were analyzed by 7 regional laboratories of the Ontario Ministry of Health. Coliforms were detected in 61 (25.8%) and fecal coliforms confirmed in 46 (19.5%) of the 236 samples tested, with geometric mean counts per g of 133 and 136, respectively. The incidence of coliforms was highest in Cheddar cheeses made from pasteurized milk (29.7%) compared with the incidence of raw milk cheese (22.0%) and cheese made from milk which had been subjected to sub-pasteurization heat treatment (28.2%). Conversely, the incidence of fecal coliforms was lowest in pasteurized milk cheese (17.8%), followed by raw milk cheese (22.0%) and highest in heat-treated milk cheeses (25.6%). *Staphylococcus aureus* above the screening level of 1000 per g was not found in any of the 237 samples analyzed. *Salmonella* spp. were not detected in any of the 250 samples. These results suggest that producers of Cheddar cheese should have no difficulty in meeting the microbiological standards adopted by the Health Protection Branch, Health and Welfare Canada.

Distribution of *Vibrio cholerae* in the Apalachicola (Florida) Bay Estuary, A. DePaola, M.W. Presnell, R. E. Becker, M. L. Motes, Jr., S. R. Zywno, J. M. Musselman, J. Taylor and L. Williams, Fishery Research Branch, Food and Drug Administration, Dauphin Island, Alabama 36528; Northeast Technical Services Unit, Food and Drug Administration, Davisville, Rhode Island 02854; Department of Natural Resources, Apalachicola, Florida 32303; and Department of Environmental Regulation, Tallahasee, Florida 32301

J. Food Prot. 47:549-553

Vibrio cholerae non-O1 was found throughout the Apalachicola, FL, estuary. *V. cholerae* O1 was isolated primarily at the City of Apalachicola sewage treatment plant, Scipio Creek and the north shore of St. George Island. Highest concentrations of both serogroups occurred in August and November. Concentrations were lowest in February and increased substantially in May. A cholera toxin-like toxin was not detected in any of the *V. cholerae* cultures by the Y-1 mouse adrenal cell assay or the enzyme-linked immunosorbent assay (ELISA). However, 35% of the *V. cholerae* O1 and 22% of the *V. cholerae* non-O1 cultures selected for testing caused diarrhea in infant rabbits. The proportion of *V. cholerae* O1 and non-O1 isolates pathogenic to infant rabbits increased as water temperature decreased. Fecal coliforms appeared to be more useful than total coliforms as indicators of the numbers of *V. cholerae* in water, but neither of those National Shellfish Sanitation Program indicator groups ensured against the presence of pathogenic *V. cholerae* in shellfish-growing areas.

Inhibition of Pencillia and Aspergilli by Potassium Sorbate, Michael B. Liewen and Elmer H. Marth, Department of Food Science and The Food Research Institute, University of Wisconsin-Madison, Madison, Wisconsin 53706

J. Food Prot. 47:554-556

Cultures of molds from the genera *Penicillium* (25 isolates) and *Aspergillus* (18 isolates) were inoculated onto YM agar fortified with different concentrations of potassium sorbate to determine their abilities to grow in the presence of this compound. Molds were incubated for up to 30 d at 25 or 4°C. Nine of the penicillia grew in the presence of 3000 ppm or more of sorbate at both temperatures. All of these molds were isolated from sorbate-treated cheeses. None of the aspergilli grew in the presence of 2000 ppm or more of sorbate and only three strains grew in the presence of 1000 ppm of sorbate at 25°C. None of the aspergilli grew in the presence of 500 ppm of sorbate at 4°C.

Comparison of Three International Methods with APHA Method for Enumeration of *Escherichia coli* in Estuarine Waters and Shellfish, Miles L. Motes, Jr., Roland M. McPhearson, Jr. and Angelo DePaola, Jr., Fishery Research Branch, Food and Drug Administration, Dauphin Island, Alabama 36528

J. Food Prot. 47:557-561

Three international methods were evaluated for enumerating *Escherichia coli* in estuarine waters, oysters (*Crassostrea virginica*), mussels (*Mytilus edilus*) and clams (*Mercenaria mercenaria*). Results of the French most probable number (MPN) method, a modification of the MacKenzie, Taylor and Gilbert (1948) method, were obtained within 48 h and compared favorably with those obtained by the standard American Public Health Association (APHA) MPN procedure in all sample types. Results of the Australian Anderson and Baird-Parker plate count method, obtained within 24 h, were significantly lower than those obtained with the standard APHA procedure for all sample types. Results of the British roll tube method, a 24-h direct count method, compared favorably with the standard APHA procedure only for mussels and waters.

Immunoassays for Analysis of Mycotoxins, Fun Sun Chu, Food Research Institute and Department of Food Microbiology and Toxicology, University of Wisconsin, Madison, Wisconsin 53706

J. Food Prot. 47:562-569

During the past few years, several laboratories have prepared specific antibodies against aflatoxins B_1, M_1, B_{2a} and Q_1, ochratoxin A, T-2 toxin, and zearalenone. These antibodies were obtained from rabbits after immunizing with various mycotoxin-protein conjugates. With the availability of these antibodies, specific, simple and sensitive radioimmunoassay (RIA) and enzyme-linked immunosorbent assay (ELISA) procedures for monitoring mycotoxins and their metabolites in foods, feeds and body fluids have been developed. In this review, details are presented for the preparation of antibodies and the application of RIA and ELISA to determine aflatoxins B_1 and M_1, ochratoxin A and T-2 toxin in corn, peanuts, milk and other biological fluids. The sensitivity of ELISA for analysis of these mycotoxins in foods varied from 0.1 μg/L for aflatoxin M_1 in milk to 5 μg/kg of aflatoxin B_1 in peanuts. The advantages and disadvantages of ELISA for monitoring mycotoxins in foods and feeds are discussed. In addition, a description of recent progress on simplified clean-up procedures which may increase the sensitivity of immunoassays is presented.

Determining Safe Levels of Mycotoxins, Pat B. Hamilton, Department of Poultry Science, North Carolina State University, Raleigh, North Carolina 27695

J. Food Prot. 47:570-575

The establishing of safe levels of mycotoxins to date has been a legal rather than scientific exercise. This has resulted in levels which have varied in response to economic and political pressures. The data base for rationally determining safe levels is very small. This has resulted in subjective evaluations of the worth of different studies in attempts to deduce safe levels from experiments designed to demonstrate effects, and in assumed safe levels which vary from field experiences. Using physiological parameters other than growth as criteria of safety, known deleterious interactions of mycotoxins with other factors, and statistical corrections for inadequate numbers of animals tested, permit better agreement between safe levels determined from laboratory data and from field data. However, the number of animals required makes impractical the laboratory determination of truly safe levels. Well-conceived and executed epidemiological studies coupled with laboratory studies designed to elaborate underlying principles appear to be the best approach to determining safe levels of mycotoxins. Until safe levels are based on sound animal experimentation, the prudent person would assume there is no truly safe level and that increasing levels of mycotoxins carry increasing risk.

Calendar

1984

July 14-21, WORKSHOP ON RAPID METHODS AND AUTOMATION IN MICROBIOLOGY, at Kansas State University, Manhatten, KS. Dr. Daniel Fung, Dr. Nelson A. Cox and Dr. Millicent C. Goldschmidt will present lectures. The course will carry 7.2 Continuing Education Credits for the American Society for Microbiology. For more information contact: Dr. Daniel Fung, Call Hall, Kansas State University, Manhattan, KS 66506. 913-532-5654.

July 16-20, CANNERS TECHNICIANS MOLD COUNT SCHOOL to be held at Purdue University, West Lafayette, Indiana. For more information contact: J. V. Chambers, School Coordinator, Dept. of Food Science, Smith Hall 101D, Purdue University, West Lafayette, IN 47907. 317-494-8279.

July 29-August 2, 24TH ANNUAL MEETING OF THE HOSPITAL, INSTITUTION AND EDUCATIONAL FOOD SERVICE SOCIETY (HIEFSS), at the Riviera Hotel and Convention Center in Las Vegas, Nevada. The HIEFSS Expo '84 will be open on July 31 and August 1. For more information contact: Carolyn Isch, Asst. Exec. Dir., HIEFSS 4410 W. Roosevelt Rd., Hillside, IL 60162. 800-323-1908 or 312-440-2770.

Aug. 5-9, IAMFES ANNUAL MEETING, Edmonton Inn, Edmonton, Alberta, Canada. For more information contact: Peggy Marce, Alberta Association of Milk, Food & Environmental Sanitarians, PO Box 8446, Station F, Edmonton, Alberta, Canada T6H 5H3 or call IAMFES at 515-232-6699.

August 6-10, BIOTECHNOLOGY: MICROBIAL PRINCIPLES AND PROCESSES FOR FUELS, CHEMICALS AND INGREDIENTS, a Massachusetts Institute of Technology one week course. For more information contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139.

September 11, WASHINGTON MILK AND FOOD SANITARIANS ASSOCIATION ANNUAL MEETING to be held at the Holiday Inn, 128th, Everett, Washington. For more information contact: Lloyd Luedecke, Dept. of Food Science & Tech., Washington State Univ., NW 312 True Street, Pullman, WA 99163. 509-335-4016.

September 12-13, The FIFTH ANNUAL JOINT EDUCATIONAL CONFERENCE of the Wisconsin Association of Milk and Food Sanitarians, the Wisconsin Environmental Health Association, The Wisconsin Dairy Technology Society and the Wisconsin Association of Dairy Plant Field Representatives will be held at the Elisabeth Inn at Plover (Stevens Point), Wisconsin. *Please note that this is a change of location.* For more information contact: Ron Buege, West Allis Health Department, 7120 West National Ave., West Allis, WI 53214. 414-476-3770.

September 15-21, 68th ANNUAL SESSIONS OF THE INTERNATIONAL DAIRY FEDERATION, Prague, Czechoslovakia. For more information contact: Harold Wainess, Secretary U. S. National Committee of the IDF (USNAC), 464 Central Avenue, Northfield, IL 60093. 312-446-2402.

September 20-21, MINNESOTA SANITARIANS ASSOCIATION, INC. ANNUAL MEETING to be held at the Earl Brown Center for Continuing Education on the St. Paul Campus of the University of Minnesota. For more information contact: C. B. Schneider, President, Minnesota Sanitarians Association, Inc. 612-623-5335.

September 30-October 4, 69TH ANNUAL MEETING OF THE AMERICAN ASSOCIATION OF CEREAL CHEMISTS to be held at the Hyatt Regency and Amfac Hotels in Minneapolis, MN. For more information contact: Raymond J. Tarleton, AACC Headquarters, 3340 Pilot Knob Road, St. Paul, MN 55121. 612-454-7250.

October 3, OHIO ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS ANNUAL MEETING to be held at Duff's Restaurant, Columbus, OH. For more information contact: CDR Ronald H. Smith, USPHS, % State Training Branch, FDA, Room 8002, FOB, 550 Main Street, Cincinnati, OH 45202. 513-684-3771.

October 3-5, KANSAS ASSOCIATION OF SANITARIANS ANNUAL MEETING to be held at the Red Coach Inn, McPherson, KS. For more information contact: Dale Wing, 1014 Cody, Hays, KS 67601. 913-625-5663.

October 9-10, DAIRY INDUSTRY CONFERENCE, Hyatt/Long Beach, Long Beach, CA. For more information contact: John C. Bruhn or Shirley Rexroat, Dept. of Food Science & Technology, University of California, Davis, CA 95616. 916-752-2191.

October 14-17, LONDON INTERNATIONAL FROZEN FOOD TRADE FAIR. For more inforamtion contact: Sandra Paul, 212-752-8400.

October 15-17, ISSUES IN SENSORY EVALUATION - STABILITY AND QUALITY CONTROL - Palo Alto, California. Attendence is limited and there is a fee. For more information and registration contact: Tragon Corporation, 750 Welch Road, Suite 210, Palo Alto, CA 94304.

October 19-25, FOOD SANITATION INSTITUTE 27TH ANNUAL NATIONAL EDUCATIONAL CONFERENCE & EXPOSITION, Holiday Inn Surfside, Clearwater Beach, FL. For more information contact: Jean M. Day, Executive Director, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540. 813-586-5710.

October 23, ILLINOIS MILK, FOOD & ENVIRONMENTAL SANITARIANS ANNUAL MEETING, to be held at the Blue Moon Restaurant, Elgin, IL. For more information contact: Clem Honer, 1 South 760 Kenilworth Avenue, Glen Ellyn, IL 60137. 312-693-3200 (business). 312-858-9314 (home).

November 22-24, 14TH ANNUAL SYMPOSIUM ON THE ANALYTICAL CHEMISTRY OF POLLUTANTS, 3rd International Congress on Analytical Techniques on Environmental Chemistry-Expoquimia, Barcelona, Spain. For more information contact: Av. Reina Ma. Christina Palacio No. 1, Barcelona-4 Spain.

1985

May 8-10, SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSOCIATION meeting. To be held in Spearfish, South Dakota. For more information contact: Cathy Meyer, President S.D.E.H.A., PO Box 903, Mitchell, SD 57301. 605-996-6452.

May 20-23, FOODANZA '85, joint convention of the Australian and New Zealand Institutes of Food Science and Technology. To be held at the University of Canterbury, Christchurch, New Zealand. For more information contact: D. R. Hayes, Convention Secretary, 394-410 Blenheim Road, PO Box 6010, Christchurch, New Zealand.

May 21-23, INTERNATIONAL DAIRY FEDERATION SEMINAR, Progress in the Control of Bovine Mastitis, to be held at Bundesanstalt fur Milchforschung, D-2300 Kiel, FRG. For more information contact: Prof. Dr. W. Heeschen, Bundesanstalt fur Milchforschung, Institut fur Hygiene, Hermann-Weigmann-Strabe 1, P.O. Box 1649, D-2300 Kiel / FRG. Telephone: (0431) 609-392 or 609-1. Telex: 292966.

August 5-9, IAMFES ANNUAL MEETING to be held at the Hyatt Regency, Nashville, TN. For more information contact: Kathy R. Hathaway, IAMFES, Inc., P.O. Box 701, Ames, IA 50010. 515-232-6699.

ANALYTICAL LABORATORIES

- Food Microbiology
- Vitamin Analysis
- Antibiotic Residues
- Product Shelf-Life Studies
- Nutritional Studies
- PER, NPR
- Fats and Oils
- Proximate Analysis
- Dextrose Equivalents
- Nitrites Nitrates
- Aflatoxins
- Consulting

Contract Research - Liaison with Regulatory Agencies

Contact: John C. Fanaras

Telephone: (416) 438-6727

2000 Ellesmere Road, Unit #16
Scarborough, Ontario M1H 2W4
Canada

The dairyman who takes advantage of the MQA expert today may have an advantage over you tomorrow.

In the dairy business, more than most, survival and success come from working smart. And that means calling up every resource you've got.

The Surge MQA man is one such resource.

He's a graduate of the most intensive advanced-training program in the business. The Surge Master of Quality Assurance course.

He has taken apart and put together about everything that has anything to do with milk or milking. Not just Surge equipment, but whatever equipment you're using. More than keeping small problems from becoming big ones, he can help you make working equipment work better.

And when it comes to sanitation, he knows your business from the groundwater up. So he can tell you on the spot exactly which cleaners, acids, detergents and sanitizers will work best with your water supply.

The way we look at it, the Surge MQA man has earned his Masters in the dairy business. As the business gets more and more competitive in the years to come, he could come in mighty handy in helping you—or your neighbor—get ahead.

We can make your cows worth more.

SURGE

Babson Bros. Co., 2100 South York Road, Oak Brook, IL 60521