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Dairy and Food Sanitation®

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

NCIMS Informational Statements

Dairy Industry Committee Elects New Chairman

UC Davis Sensory Evaluation of Food Course April 7-11

The 3-A Story

ACDPI Conference March 16-19

American Academy of Microbiology Elects New Fellow

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Look for Registration Form and Program in the April Issue of this Journal

President's Message

All indications point to another successful year for your association. Kathy and her staff have increased advertising, and membership renewals have continued at a record rate. Roy and the Local Arrangements Committee have facilities and the program nearly complete as of January for our annual meeting in Minneapolis on August 3-7, 1986.

The program format will be similar to that for 1985 in Nashville with committee meetings starting on Sunday afternoon and continuing Monday morning, and the early-bird reception Sunday evening. The general session on Monday afternoon will be highlighted by the first Ivan Parkin Lectureship. It and the keynote address will be combined and given by Dr. J. C. Olson, retired, a long time member of IAMFES. His career in food microbiology at the University of Minnesota and with the Food and Drug Administration make him well qualified to speak to our entire membership.

The family outing on Monday evening will be a pig roast at the Minnesota Zoological Gardens with musical entertainment. Spouses and children have activities planned for them all three days, if they choose. Monday they will visit the Riverfront Area which features restoration of the old and plenty of new shops. Tuesday will be a tour of the highlights of Minneapolis and St. Paul along with lunch. Separate youth activities are planned for the day. Wednesday is slated for fun at Valley Fair, a theme and amusement park. Shuttle busses are available for shopping tours, also.

Many good presentations will be made by outstanding speakers in the food, dairy and environmental areas. You will see the topics and speakers in the program, which should be in the next issue of *Dairy and Food Sanitation*. Symposia on *Listeria* and *Salmonella* should be of interest to all members in food and dairy interests. Each is scheduled for half a day with four or more speakers. Panels to discuss actions in food safety situations and the safety of airline foods should be of interest, also. Dairy processors and field staff will be interested in results of the P.I. Count study, new tests for shelf life, latest FDA actions, and laboratory computerization.

Kathy keeps the Executive Board informed of financial and other matters, at least monthly. They have handled all of the challenges which have arisen, as a management staff, although frequently seeking our counsel.

The date for submission of abstracts has passed. If the numbers increased, an additional session may be needed.

Affiliates, don't forget to let the association office know the name of your official delegate. More than half of you should have received a telephone call asking about your progress and concerns for 1986.

We hope to see many of you in Minnesota in August.

Respectfully submitted,

Sidney E. Barnard, President
IAMFES

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Dairy and Food Sanitation

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The 3-A Story

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Much of the American-made dairy equipment bears the 3-A symbol. The egg industry has adapted several 3-A Standards to their use, identifying them as E-3A. Other food groups are exploring their potential use in their industries. Foreign manufacturers of dairy equipment want to know more about the 3-A program.

Most American dairy personnel are familiar with the 3-A logo. Few understand what the 3-A Sanitary Standards for dairy equipment are all about. Younger workers assume "3-A" has always been here. The significance of the 3-A symbol escapes them.

What *is* "3-A" all about? What are "3-A Standards"? Who develops them? Who enforces them? What do they cover? In addressing these issues, focus will be directed to the development and operation on the 3-Program. The technicalities of getting 3-A approval for a piece of dairy equipment will not be addressed in this report.

The commercial dairy industry was in its infancy at the turn of the century. There were some standards for dairy equipment but little uniformity among the manufacturing companies. Different regulatory codes and inspectors gave rise to varied interpretations of the few basic rules. Thus, the dairy equipment companies and their buyers had to cope with constant antagonism, duplication, frustration, and added operating expenses.

As the dairy industry developed, it became clear something had to be done. More stringent milk quality and safety standards emphasized the importance of proper sanitary care of processing lines and the ability to inspect all milk contact surfaces.

During the 1920's, the International Association of Milk Dealers (the "users," now known as the Milk Industry Foundation, or MIF) and the Dairy and Cream Machinery and Suppliers' Association (the "manufacturers" the forerunner of todays Dairy and Food Industry Supply Association, or DFISA) recognized the need to rectify a developing crisis in dairy sanitation. Their representatives worked with regulatory agents to define the problem and to formulate standards for cleanability of equipment used in the dairy industry. Representatives from the International Association of Dairy and Milk Inspectors (now known as the International Association of Milk, Food and Environmental Sanitarians, or IAMFES) joined these discussions.

The first standards were published in 1929. They related to interchangability of fittings for milk pipelines rather than addressing their cleanability. The cleanability concept developed during the 1930's. The products of those discussions became known as 3-A Sanitary Standards. The "3-A" designation came from the three Associations responsible for developing these recommendations - the Sanitarians (IAMFES), the equipment manufacturers (DFISA) and the "user" groups, represented by the Milk Industry Foundation. The term "3-A" stuck and continues to be used today. Each Association had its own Subcommittee on Sanitary Standards. They worked together to develop the final wording.

The modern concept of the 3-A Program was established in 1944 and the program has moved ahead steadily since that time. That was the year the Dairy Industry Committee (DIC) was formed. In 1944 also, the Surgeon General of the United States Public Health Service committed that agency to full cooperation in the 3-A Program. DIC consists of seven dairy processor organizations and one representing dairy equipment manufacturers. The seven include the American Butter Institute, National Cheese Institute, American Dry Milk Institute, Whey Products Institute, Milk Industry Foundation, International Association of Ice Cream Manufacturers and the Evaporated Milk Association. The eighth group, representing the manufacturers of dairy equipment, is the Dairy and Food Industry Supply Association.

The first equipment bearing the 3-A Symbol was exhibited at the 1954 Dairy Industry Exposition in Atlantic City. Additional 3-A Standards and 3-A Practices have been developed as needed since that time.

The 3-A Standards cover a single piece of equipment while the 3-A Practices relate to processing systems. The former can be awarded use of the 3-A Symbol, 3-A Practices do not qualify. However, any equipment used in a 3-A Practice for which there is a 3-A Standard must conform to that Standard.

The 3-A Sanitary Standards relate primarily to the cleanability of dairy equipment. The ultimate goal was and is to protect dairy products from contamination and to insure all milk contact surfaces can be cleaned-in-place satisfactorily or can be dismantled easily for manual cleaning. The program is strictly voluntary. There is no legal complusion for any manufacture to follow the 3-A recommendations nor is the buyer required to purchase only equipment bearing the 3-A symbol.

Today there are about 50 3-A Standards and Practices. More than eighty companies hold 250 authorizations to use the 3-A symbol on various pieces of dairy equipment. Older Standards are amended or modified as technology advances. Each change requires the same careful study by each of the three groups as is done in developing the original Standard.

Each 3-A Standard consists of six parts:

1. Scope of the Standard.
2. Definition of terms used in the Standard.
3. A description of permitted materials.
4. Details of the fabrication of the item.
5. Appendix.
6. Effective date.

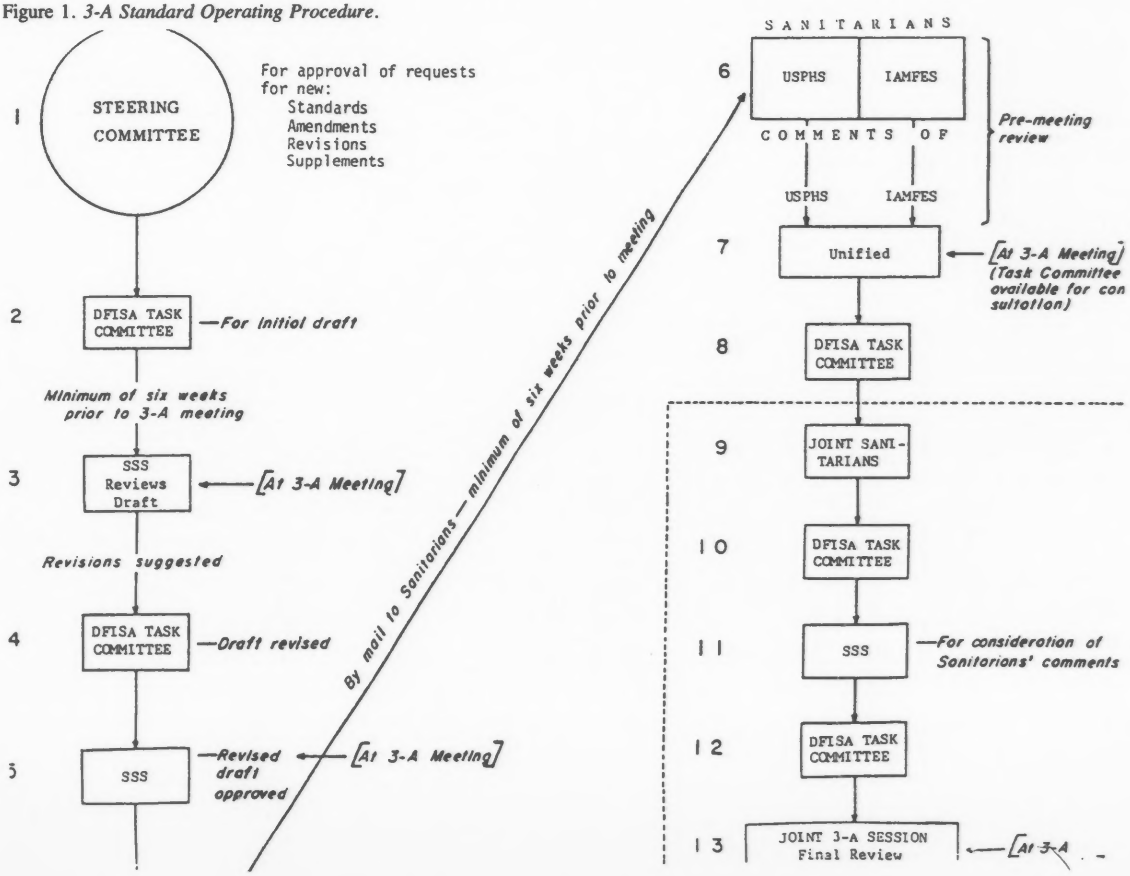
Each Standard has been developed through a uniform and detailed review of a written proposal. It must be totally acceptable to all three groups indicated previously. The accompanying diagram (Figure 1) outlines the basic procedure for gaining publication as a 3-A Standard. Before a Standard is finally approved, it must be accepted and signed by the Chairman of the Committee on Sanitary Procedures for IAMFES, the Chief of the Milk and Food Branch of United States Public Health Service/FDA, the Chairman of the Technical Committee of DFISA and the Chairman of the Sanitary Standards Subcommittee of DIC. Then, it will be printed in *Dairy and Food Sanitation* and copies will be available for general sale. The Standard becomes effective one year after all groups sign the document to indicate their approval.

Numerous advantages of the 3-A Program have been listed in earlier reviews, among them the following:

The Processor:

1. Knows they are in compliance with applicable sanitation codes.
2. Knows equipment bearing the 3-A Symbol can be cleaned satisfactorily.
3. Realizes lower cleaning costs and savings in labor.
4. Can expect inspections to be no problem when equipment complies with 3-A Standards for that item.

Figure 1. *3-A Standard Operating Procedure.*



The Equipment manufacturer sees:

1. Automatic acceptance of their product in a variety of markets.
2. Standardized equipment replacing custom-made items.
3. Advances study of design and materials which are important to the state of the art.
4. Design principles which can be used in new equipment even though no standards have been developed for that item.

The Inspector/Sanitarian benefits through:

1. Uniform requirements by public health officials.
2. Refined inspection procedures.
3. Sanitary principles are identified which can be applied to other food equipment.
4. More and more sanitary codes are based on 3-A concepts.
5. Confidence in equipment design - their people had a voice in the development of the standard.

In 1956, a 3-A Sanitary Standards Symbol Administrative Council (commonly referred to as "The 3-A Symbol Council") was formed as a distinct and separate entity completely outside the 3-A committees. The 3-A Symbol Council consists of 8 people - 4 from IAMFES and two each from DIC and DFISA. None receive pay for their services. These eight people, known as Symbol Trustees, authorize use of the 3-A Symbol and check possible abuses in the use of same. In practice, the Symbol Council:

1. Authorizes a manufacturer to display the 3-A Symbol on pieces of equipment which a company executive certifies as complying with all paragraphs of the standard. This executive signs the application for approval to use the symbol and initials each and every paragraph of the Standard signifying the product is in complete compliance with all provisions of that standard. A statement of the controls for the system must be provided. Company literature, pictures or drawings may be requested by the Council.
2. Publishes and circulates names of Symbol holders and equipment.
3. Supervises administration of the Symbol.
4. Annually, renews authorization for a company to use the Symbol.
5. Has no punitive power for non-compliance - other than revoking an authorization to use the Symbol.

The committees develop the standard; they do not authorize use of the 3-A Symbol. Only the Symbol Council can do that.

There is one other very important part of the 3-A Program. This one involves all dairy fieldmen and sanitarians in the dairy program. You should make it your responsibility to review equipment *in the field* for compliance with 3-A standards. This doesn't need to be a critical review of all equipment everytime one enters a milkhouse or milk plant. But each should be making periodic checks of the equipment used in the production and processing of our fluid milk supply.

Mistakes and misinterpretations of the Standards by manufacturers are possible and do occur. These need to be brought to the attention of the 3-A Symbol Council so corrections can be made. Therefore, look at 3-A equipment as a normal line of duty. If you find what *you* believe to be a discrepancy, let the Symbol Council know about it. Fieldmen and dairy inspection personnel play a very important role in the integrity of the 3-A Program. 3-A needs you, just as you need 3-A.

New technology will mandate new Standards to be developed by the 3-A Committees. Acceptable finishes for milk contact surfaces must be more clearly defined. New 3-A Practices must be established for developing processing systems. Among the areas to be addressed in the near future should be whey processing equipment, membrane filtration units, aseptic processing equipment - to name a few areas of current need.

At present, the 3-A Program relates only to dairy equipment. However, the egg industry has adopted or modified some of the Standards, labelling them E-3A Standards. Standards are used increasingly by the pharmaceutical industry, the beer and beverage industries, and the food processing industries. Other food industries are studying ways they might utilize the 3-A concept. Foreign manufacturers have shown considerable interest at our 3-A booth at recent DFISA Equipment Expositions

Cooperation among equipment manufacturers, dairy processors, and the sanitarians has produced a system of equipment evaluation that is advantageous to all. The 3-A Standards do *not* address the operating efficiency or reliability of any piece of dairy equipment, only that it be so constructed that it can be cleaned and sanitized using generally known procedures. "3-A" was a good idea fifty years ago. It is a good idea today. It will continue to serve the dairy and food industry in the years ahead.

DFISA provides the permanent Secretariat for the 3-A Program. 3-A Information can be obtained from: 3-A Secretary-Thomas M. Gilmore, Ph.D., 6245 Executive Blvd., Rockville, Maryland 20852. 301-984-1444.

Dairy and Food Sanitation, Vol. 6, No. 3, Pages 99-100 (March 1986)

IAMFES Farm Methods Committee

Farm Sanitation Chemical Advisory Subcommittee Report

Seventy-Second Annual Meeting
Nashville, Tennessee
1985

Current Practices

A large percentage of dairy farm sanitation products are manufactured and sold in originally designated end-use containers. These products meet manufacturers quality control specifications for purity and effectiveness and when used according to directions provide the dairy farmer an assurance that the product will perform as designed.

Recently the practice of delivering dairy sanitation products to the dairy farm in bulk has been initiated by some retailers. The market situation can be profiled as follows:

1. Dealer/distributor travels to various farm locations and dispenses from originally designated end-use containers into other containers supplied to or by the dairy farm. The containers supplied are not original-use containers and may have been previously used for pesticides, insecticides, herbicides, petroleum products, etc. Containers are not cleaned or reconditioned by any standard prior to refilling and may or may not bear the proper label directions or precautions for the chemical product.

2. Dealer/distributor has a large storage facility at place of business and refills or repackages in previously used containers recovered from the field. Again containers may have been previously used for pesticides, herbicides, insecticides, etc. and are not cleaned or reconditioned by any standard prior to refilling and may or may not bear the proper label directions or precautions for the chemical product.

3. Dairy farm has dedicated storage facility or end-use container which was filled, sealed and labelled by the manufacturer or distributor and that this storage facility is designed and constructed for storage of a specific chemical product.

A number of concerns exist when either practice listed as 1 or 2 above is implemented. These concerns include but are not necessarily limited to the following list:

1. *Lack of Product Purity* - The practice provides no assurance that the product meets a quality standard as intended by the manufacturer. Contamination of a dairy farm sanitation product through reuse of a container previously used for pesticide, insecticide, herbicide, petroleum, solvent or other chemical product could result in inactivation or neutralization of chemical rendering product unfit for intended use application.

2. *Potential Milk Contamination* - Use of a contaminated dairy sanitation product (by pesticide, insecticide, etc.) could result in improper cleaning and/or sanitizing of dairy equipment and/or potentially contaminate milk and/or manufactured milk products with chemical residues that would cause a human health risk.

3. *Hazards to Humans* - In addition to human health risks of contaminated milk and milk products, hazards to humans handling the chemical products are increased. Improper application or mixing of unidentified or mislabelled dairy sanitation products could release toxic gases or result in spontaneous combustion posing risks to dairy farm employees/workers.

4. *Hazards to Environment* - Improperly packaged chemical products due to inadequate closures, vent plugs, handles, or faulty total package integrity either in storage, transport or use poses a threat to persons directly handling the products as well as the community. This situation would include accidental spills or improper flushing of residual chemicals into city or rural water supplies and could result in contamination of drinking water.

5. *Zoning Ordinance Violations* - If dealer/distributor is repackaging or refilling at place of business and flushing effluents into existing sewage disposal, potential hazards to drinking water supplies could result.

6. *EPA Guideline Violations* - Products labelled as sanitizers must be packaged in end-use containers by registered establishments with approved labels or delivered to dedicated end-use storage facility which is designed constructed, maintained and labelled in accordance with Federal and State regulations. These end-use containers must be emptied and then discarded by burning or burying in an approved landfill. Reuse of these containers for any purpose is a strict violation of EPA guidelines.

7. *FDA Guideline Violations* - FDA considers teat dips and udderwashes as OTC drugs which must comply with GMP (Good Manufacturing Practices) guidelines. Reuse, refilling or transfer of contents from one container to another for resale is subject to the GMP requirements. Misuse of a teat dip or udderwash due to mistaken identity from improper labelling, or contamination of drug product from reuse of improperly cleaned, reclaimed containers could cause injury to animals. In addition, violations to Food Additive Regulations of FDA could result if product was contaminated.

8. *Public Milk Ordinance/Local Code Violations* - PMO states guidelines for production of milk and outlines requirements to insure wholesomeness of milk. Local regulatory agencies require identity of dairy sanitation products and posting of cleaning chart which reflects recommended dilution rate for product currently in use. Any change to the cleaning recommendations requires a change in the posted cleaning chart. Products not properly used could result in improper cleaning of dairy equipment which would adversely affect milk quality.

9. *Misrepresentation of Potential Risk* - Since produce integrity cannot be assured through previously described improper bulk handling practices, the dairy farmer cannot be assured that the product meets the manufacturers specifications for active ingredient strength. In addition, dealer/distributor may be unable to obtain adequate liability insurance for bulk handling of chemicals because practice is not well governed. This presents a potential risk for financial loss to the dairy farm/dairy industry due to physical injury or emotional stress to humans or animals from improperly applied or contaminated products.

In summary, the opinion of this subcommittee is that bulk handling of dairy farm sanitation products profiled above as 1 and 2 cannot be implemented with adequate safety to the dairy farm, its employees/workers, the rural farm community, and the milk product(s) produced. Further, that these practices pose specific hazards to humans and animals and in many cases are in violation of current law with respect to particular federal, state and local requirements and codes.

IAMFES Secretary Candidates

RON CASE

Ron Case is presently Corporate Quality Assurance Manager for Kraft Inc. in Glenview, Illinois. During his 12 years with Kraft Inc., he has had a variety of Quality Control positions, including Food Technologist and Corporate Laboratory Control Manager. Prior to coming to work in the food industry, he was a secondary school Science teacher in Kentucky.

Ron received his Bachelor's Degree from the University of Kentucky in Science Education and his Master's Degree from the University of Notre Dame in Chemistry. He has done additional graduate work at the University of Wisconsin in Food Safety.

An active member of IAMFES and the Illinois affiliate for 8 years, Ron has served on the laboratory committee and has been a speaker at both the state and international meetings.

As part of the APHA Technical Committee on "Standard Methods for the Examination of Dairy Products", he helped prepare the 15th edition and authored one chapter. He has been active in the Association of Official Analytical Chemists (AOAC) and has published papers on detection of antibiotics in milk.

He is currently serving on the joint committee of experts for the International Dairy Federation/International Standards Organization/AOAC on topics dealing with dairy analyses. He has been actively involved with the National Conference on Interstate Milk Shipments and has served on its Laboratory Committee since 1979.

PHIL HERMSEN

Upon completion of active duty with the U. S. Navy (1966-1970), Phil enrolled in college at the University of Wisconsin-Platteville graduating at the end of the 1972 year. For the last 13 years he has been with Associated Milk Producers, Inc., Mid-States Region. Current responsibilities and job title is Director of Quality Control & Standards.

Obviously many matters pertaining to quality and its job-related activities are involved in the day-to-day functions of the Quality Department. Phil has been a member of the International approximately ten years and has been Membership Chairman for three years. AMPI, as well, has been a sustaining member of the International.

On the local level, Phil has been involved with the Illinois Milk, Food and Environmental Sanitarians for the same length of time and has been Illinois Membership Chairman for the last three years. One of the first experiences he had with the Illinois chapter was being involved with the IAMFES meeting in Chicago (Arlington Heights - 1975) and being responsible for registration, as well as other meeting duties.

Currently, Phil is serving as Second Vice-President of the Illinois Sanitarians and is looking forward to meeting the challenge in Illinois as well as, nationally.

Phil is a member of the Chicago Dairy Technological Society, National Mastitis Council (Board of Directors), National Council of Interstate Milk Shipments and attends 3A Sanitary Standards meetings.

The AMPI in-house magazine publishes a quality column monthly put together by the Quality Department. He also contributes articles to a national dairy magazine.

Most of Phil's spare time is spent with his wife and two children (ages six and three).

Dr. Herbert V. Shuster

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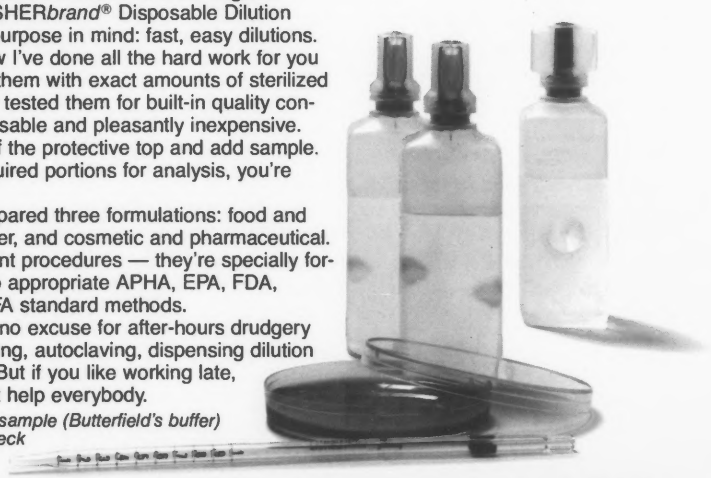

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Obituary

Harold E. (Tommy) Thompson, 67, of Fairfax, Virginia died January 23.

Prior to joining the DFISA staff, Thompson distinguished himself in a long career of public service, first in the Army Medical Corps and Sanitary Corps, then, for 3 years, with the Virginia Department of Health, and finally, for 31 years, as a commissioned officer in the U.S. Public Health Service (PHS).

When he took the DFISA position, it was a logical step for Thompson, since it meant moving from one side of the 3-A table - as a sanitarian - to the other side, as the staff director representing the equipment arm of the standards program. From 1954-1980 Thompson had been the PHS representative to the 3-A Committees, a position to which he brought considerable expertise as chief of the milk sanitation unit at PHS.

With several years behind him as the 3-A Secretary, Thompson saw the program in somewhat of a different light. He felt that both sanitarian and processor should have a stronger commitment to 3-A.

While Thompson felt occasionally frustrated by the slow and deliberate pace required to write and approve standards, he nevertheless remained steadfast in the belief of the program's long-term strengths.

Thompson's career in the PHS was one of accomplishment and dedication over the years. He played an important role in the 1966 investigation of Salmonellae in dry milk, worked on periodic revisions of the Grade A Pasteurized Milk Ordinances and Codes, and earned a reputation as an authority in the commercial processing of dairy products and milk sanitation procedures.

For the last 13 years of his federal service, Thompson was chief of the PHS milk sanitation branch in which he directed all milk and related foods sanitation. He received the PHS commendation Medal in 1970 for his contributions. He was elected president of the International Association of Milk, Food and Environmental Sanitarians in 1975-76.

At DFISA he administered 3-A, monitored the actions of federal regulatory agencies affecting suppliers, provided technical advice to member companies, and helped foster technological progress in dairy processing. His main emphasis was 3-A, where he oversaw the work of 40 task committees and the development of 40 Standards and 6 Accepted Practices. Task committees involve the volunteer service of more than 600 individuals from an estimated 100 companies.

Bess Thompson, Tommy's wife, is at home at 5123 Holden St., Fairfax, VA 22032.

Dairy Industry Committee Elects New Chairman

Robert F. Anderson, Executive Director of the American Butter Institute and the National Cheese Institute, has been elected Chairman of the Dairy Industry Committee. He succeeds Fred J. Greiner, retiring Executive Vice President of the Dairy and Food Industries Supply Association, who served as Chairman of DIC since 1965.

John F. Speer, President, Milk Industry Foundation and International Association of Ice Cream Manufacturers, was re-elected Secretary-Treasurer of the organization.

The Dairy Industry Committee is composed of official representatives from the major dairy trade associations: American Butter Institute, American Dry Milk Institute, Dairy and Food Industries Supply Association, Evaporated Milk Association, International Association of Ice Cream Manufacturers, Milk Industry Foundation, National Cheese Institute, and Whey Products Institute. DIC is active in the work of 3A Sanitary Standards, a dairy industry environmental task force, and acts as a forum for discussing other mutual concerns.

"Alamo City" to Host 1986 ACDPI Conference

Some 300 delegates from the U.S., Mexico, Canada, and select European countries are expected to attend the 1986 American Cultured Dairy Products Institute Annual Meeting/Cultures and Curds Clinic/ International Cultured Product Evaluation Sessions, according to Institute Vice President/Secretary Dr. C. Bronson Lane. Site for the March 16-19 trifaceted event will be the Palacio Del Rio Hilton, 200 South Alamo, San Antonio, Texas 78205.

Confirmed speakers for the Conference include: W. H. Gravele, Fraser and Beatty, Inc.; Chuck Prichard, Zippie Foods, Inc.; Warren Bailey, Alta-Dena Certified Dairy; Wes Shaffer, Gundlach Co.; Don Sullivan, Ketchum Advertising Co.; Judy Ball, The Kroger Co.; Dr. Joe O'Donnell, Dairy Research, Inc.; Dennis Crosby, Ingold Electrodes, Inc.; Dr. Alan Huggins, Marschall Products - Miles Laboratories, Inc.; George Weber, Wesman Foods; Dr. Jeffrey Ryan, Louisiana State University; Bill Born, Dean Foods Co.; Horst Fedder, International Flavors & Fragrances; Fran Lavicky, Nordica Int.; Tony Geluso, Vitex; Ed Custer and Dr. Charlie White, Mississippi State University; Bob Wight, Ziegler and Sons, Inc.; David Fry, Borden, Inc.; Dr. Ron Schmidt,

University of Florida; Dr. John Bruhn, University of California.

Buttermilks, sour creams, cottage cheeses, and yogurts submitted by manufacturers will be analyzed by experts during the product evaluation sessions and awards given for individual product excellence. Overall products winner will receive the coveted Neil C. Angevine Superior Quality Award at the March 18 banquet. The winner of the ACDPI Student Essay Contest will also be recognized at this event.

Additionally, the program includes a Chairman's Reception honoring Bill Ezell (Purity Dairies, Nashville, Tennessee) and a March 17 luncheon where the recipient of the 1986 ACDPI Research Award will be honored.

A tour of the H. E. B. Grocery Co. dairy processing plant in San Antonio is also on tap for the conferees.

For additional information contact: Dr. C. Bronson Lane, ACDPI, P. O. Box 7813, Orlando, Florida 32854. 305-628-1266.

Agreement Signed To Sell And Distribute Screening Test For Milk

Angenics Inc. announced that it has signed an agreement with Marschall Products, Miles Laboratories, Inc. to sell and distribute The SPOT TEST, Angenics' rapid antibiotic screening test for milk, in Western Europe, Canada, Australia and New Zealand.

Under terms of the agreement announced jointly by L. Robert Johnson, president of Angenics, and Verle Christensen, president of Marschall Products, Angenics will retain marketing rights for the antibiotic test in the United States and other selected markets. Marschall will market The SPOT TEST in Portugal, Spain, France, Italy, Austria, Switzerland, Belgium, West Germany, The Netherlands, Sweden, Norway, United Kingdom and Ireland, as well as Canada, Australia and New Zealand.

The SPOT TEST is a 6-minute assay which detects the presence of trace amounts of antibiotics in raw milk. The test uses innovative latex agglutination technology and monoclonal antibodies. Its advantages over other testing methods include speed and sensitivity without the use of radioactivity.

The SPOT TEST was introduced in the U.S. in 1984 and is currently in use at more than 220 dairy processing plants and milk receiving stations.

According to Angenics' president, L. Robert Johnson, the international marketing agreement with Marschall Products "enables us to expand our distribution of this field-proven antibiotic test program to Western Europe, Canada, Australia and New Zealand."

"We believe that Marschall Products, with its strong presence and excellent reputation for product availability and customer service in international markets, will underscore the high standards we've already established for The SPOT TEST here in the United States."

Verle Christensen, Marschall Products' president added that the agreement with Angenics "is a logical extension of Marschall's commitment to providing the worldwide dairy processing industry with quality ingredients and processing aids that incorporate the latest technological advancements."

Fellow Of "American Academy of Microbiology" Elected

Daniel Y.C. Fung, has been elected as a Fellow of the American Academy of Microbiology on December 18, 1985.

The American Academy of Microbiology is a component part of the American Society for Microbiology. Acting for the Society, the Academy shall promote programs of professional recognition and shall act to foster the highest professional and ethical standing of microbiologists.

Qualifications to membership as a Fellow include: 1) a doctor's degree, 2) 7 years postdoctorate experience in microbiology, 3) membership in good standing in at least one scientific society, and 4) evidence of high ethical standards and professional excellence and experience.

The principal criteria for election are excellence and originality of scientific performance in careers such as research, scholarly teaching, public health, industry or military service.

Fung is an applied microbiologist at KSU and has more than 150 publications to his credit.

Symposia Selected For 1986 ADSA Meeting

The Program Committee has selected 10 symposia for the 1986 American Dairy Science Association Meeting June 23-26 at the University of California, Davis.

Six of the topics are in the Production Division and four are in the Dairy Foods Division. They include:

- Alternative feed sources for dairy cattle;
- Immune function: relationship between nutrition

and disease control;

- Animal welfare;
- Biases in genetic evaluations;
- Dairy cattle fertility via artificial insemination;
- Mammary growth;
- Calcium and calcium binding proteins;
- Cheese ripening technology;
- Biotechnology in the dairy processing industry;
- Issues in dairy processing education.

UC Davis Extension Offers Course in Sensory Evaluation of Food

UC Davis Extension is offering a five-day course on "Sensory Evaluation of Food" April 7-11.

Designed as an introduction to experimental design and analysis for the sensory evaluation of food, this course focuses on human beings as flavor measurement machines, emphasizing how sensory systems function and the limitations they impose on sensory methodology.

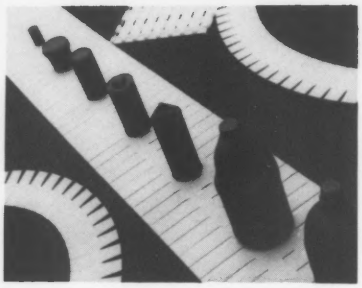
The course is intended for beginning sensory scientists with little or no statistical background and with elementary sensory experience; however, much of the sensory material is new so the course will act as an excellent update for the practicing sensory scientist.

The class meets April 7-11, from 9 a.m. to 5 p.m. Monday through Friday at the UC Davis Faculty Club. The course fee is $505.

To enroll or to obtain additional information call 800-752-0881. Davis/Dixon residents please call 752-0880.

New Product News

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



Dyna-Veyor PBT conveyors

Manufacturer Introduces PBT Line

• Dyna-Veyor, a manufacturer of plastic link conveyor belting and conveyor components, has introduced a PBT line. The manufacturer began using PBT chain in environments where chemicals were causing degradation in the acetal components.

For example, customers bottling or sterilizing with chlorine found that, in certain environments, the chemical was attacking the acetal, making it brittle, This could cause dimensional changes, and since a conveyor's links and sprockets must retain dimensional stability and tight tolerances to mesh and run smoothly, the dimensionally altered acetal parts could cause the system to shut down.

Dyna-Veyor also found that tensile strength fell off dramatically with exposure to chlorine, reducing both component strength and chain-pull capability of the acetal chains in these environments. Since the effects were irreversible, the weight of products moving on the conveyor would eventually break the links. Finding that PBT was substantially unaffected by exposure to the chlorine, the company began using VALOX® resin to replace acetal in its plastic links. PBT can offer alternative solutions to otherwise problem or marginal plastic conveyor applications.

VALOX PBT resin, made by General Electric Plastics, resists a variety of chemicals. Dyna-Veyor has found the resin's broad chemical resistance extends chain life in areas where acetal has had a limited life. PBT can be used in a pH range of 2-14, compared with acetal's 4-10 pH range. Many common food products fall below pH 4, including lemon juice, cranberry sauce, rhubarb, applesauce, cherries, sauerkraut, peaches, and orange juice. PBT also has better impact and wear resistance than lubricated acetals.

VALOX resin's higher melt temperature (232-267°C, compared with acetal's 175-181°C) enables chains to be used in higher heat applications. PBT chains can go through heat tunnels without deforming. Heat tunnels, which operate at temperatures approaching 325°F, are used to apply labels to cans and jars. PBT's higher melt temperature also allows its use in handling discharge lines from bake ovens.

In addition to heat, wear, impact, and chemical resistance, PBT also has good resistance to gamma radiation. Gamma radiation is widely used in Europe and Japan to sterilize food. This sterilization technique, which preserves food by killing insects and bacteria outright, is expected to gain popularity in the U.S., in light of recent bans on pesticides like EDB. Even brief exposure to gamma radiation can discolor some plastics and embrittle others.

Dyna-Veyor found that VALOX PBT resin is able to withstand 100-times more radiation than acetal without serious degradation of its properties. And, although irradiation has generally been accomplished through bulk handling methods, Dyna-Veyor's use of PBT chain will help the food and dairy industries adapt existing conveyor lines to the irradiation process without significant modification or expense.

Dyna-Veyor custom molds all of its high precision thermoplastic components. The company's chain designs have been in the marketplace since the early 1960s. Dyna-Veyor conveyors serve as a method for transporting clean products or for container conveyance for food processing, bottling, distilling, pharmaceutical, dairy, food service, assembly, and general industrial applications.

For more information on thermoplastic chains and components, contact Dyna-Veyor Inc., P.O. Box 96, Cranford, NJ 07016. 201-276-2880.

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For more information on VALOX PBT resin, contact General Electric Company, Plastics Group, Inquiry Handling Service, PR #73V-85, One Plastics Avenue, Pittsfield, MA 01201. 800-845-0600.

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on your Reader Service Page

Prep™ udder wash

Program Provides Help For Better Trained Managers

• "The NIFI Advantage in Foodservice Education", describes NIFI's program to professionalize management through home study, group programs and textbooks. Available free from NATIONAL INSTITUTE FOR THE FOODSERVICE INDUSTRY, 20 N. Wacker Drive, Suite 2620, Chicago, IL 60606. 312-782-1703.

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on your Reader Service Page

Prep™ Udder Wash Improved For Cost Efficiency

• *Prep*™ udder wash, a chlorhexidine-based teat and udder wash from Monarch Division of H.B. Fuller Company, has been improved to provide increased economy in performance.

Monarch sanitation scientists have re-formulated *Prep* udder wash to allow greater economy in use, while maintaining its germicidal efficacy. With its new dilution rate of one ounce to three gallons of water, *Prep* udder wash has increased its cost-efficiency in use by 50 percent.

A new surfactant system in *Prep* udder wash increases amount and stability of foam. This combination of surfactants used in the formulation of *Prep* udder wash is mild enough to be used in shampoo, yet maintain a high degree of detergency and soil removal.

Prep udder wash was developed as a companion product for use with Monarch's *Protek*™ teat dip. Together, *Prep* and *Protek* udder care products form the "Partners in Prevention," working in combination to help prevent the spread of mastitis-causing organisms.

The Monarch Division of H.B. Fuller Company is a supplier of sanitation chemicals to the dairy farm, dairy plant, and food processing industries. Monarch maintains plants in St. Paul, Minnesota; Geneva, New York; and Tulare, California; as well as Toronto, Canada.

H.B. Fuller Company is a manufacturer of specialty chemicals, including adhesives, sealants, coatings, paints, specialty waxes, and sanitation chemicals. Founded in St. Paul in 1887, the company has 53 plants and technical service centers in 30 U.S. cities, and operations in 28 countries around the world.

For more information contact: Andy Marti, H.B. Fuller Company, Marketing Department, 3530 Lexington Avenue North, St. Paul, MN 55112. 612-481-1588.

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YODY™ refrigeration system

New Refrigeration System Helps Save Electricity

• Cryodynamics, Inc. introduces a refrigeration system that produces the same cooling capacity of current refrigeration units, with less than half the input power.

The integrally complete refrigeration system, called YODY™, is about one-third the size of current refrigeration units. Installed on an insulated enclosure, YODY can provide uniform cooling for trailers, railway cars and transport containers at substantial cost savings.

YODY is a patented, hermetically sealed system. Its closed cycle operation does not need refrigerant replenishment. Closed cycle also means protection against contamination by dirt, dust, or chemical impurities. And its valve-free operation requires no lubrication or maintenance.

YODY works on a simplified Stirling cycle. The system consists of a small cryogenic refrigerator mounted on the outside of the trailer and a natural convection system (similar to a baseboard water heater) mounted on the top interior sidewalls. The convector is a finned aluminum tube enclosing an annular flow system. A small diesel generator powers the YODY.

The refrigerator liquifies a refrigerant gas mixture. The liquified coolant then flows the length of the outer annulus, vaporizing as it absorbs heat inside the trailer. The gas returns through an inner flow area where it is again liquified, and the cycle continues. Natural convection, where warm air rises and cool air falls, assures uniform cooling of the entire trailer payload.

The Cryodynamics M21 refrigerator in the YODY system draws approximately 7.5 kilowatts under full load. The system is self-balancing - producing more BTU's as heat increases. The complete unit weighing 520 pounds, measures 29 inches long, 14 1/2 inches wide and 20 inches high.

Optional equipment includes additional fans to help circulate air around unevenly stacked pallets, temperature recorders, heating elements, humidity controls, safety cutouts and outlet capability compatible to plug into stand-by power, both domestic and foreign.

Cryodynamics refrigerators have been tried and proven in military and aerospace applications for over twenty years. Military testing of the units far surpasses any environmental and operating conditions a commercial system would be subjected to, including temperature variations, vibration and 100% humidity.

YODY, the company mascot, is a large white polar bear, conjuring up visions of frigid Arctic air - an appropriate symbol for Cryodynamics.

For more information, or to arrange for a test run of a fully operational trailer, please contact: Dr. Stephen Malaker, Cryodynamics, Inc., 191 Mill Lane, Mountainside, NJ 07092. 201-654-7700.

Please circle No. 353
on your Reader Service Page

Therm-a-pat from Franke, Inc.

New Pre-Portioned Butter/Margarine Patty Dispenser Introduced

• Franke, Inc. Food Service Division introduces Therm-a-pat, a compact, self-contained thermoelectric, pre-portioned butter/margarine patty dispenser. The handy, refrigerated unit eliminates the problems of ice, trays and water while reducing waste through the reduction of handling. The magazines are easily loaded and designed for full time storage. The unit plugs into any 115 volt electric outlet and is available in two models capable of storing and dispensing either 180 or 270 patties respectively.

The Franke Therm-a-pat also offers an additional source of income to butter/margarine creameries and suppliers of preportioned patties through their customers.

For more information contact: Mr. Chris Van Vlack, Director of Marketing, Franke, Inc., Food Service Division, P.O. Box 288, Feasterville, PA 19047. 215-364-5800 or call toll free 800-523-6062.

Please circle No. 354
on your Reader Service Page

Poly-Stall™ dairy tie stanchion

Poly-Stall™ Allows Closer Monitoring of Cows

• Fos-Son's patented Poly-Stall™ dairy tie stanchion uses non-conducting materials to control stress-producing stray voltage, has flat mount water bowls and a modular curbless design.

Poly-Stall™ minimizes injuries and health problems while allowing closer monitoring of individual cows. It is Grade A dairy accepted for cleanliness, easily installed, sturdy but lightweight and it eliminates feed spill-through. Poly-Stall™ are sold as complete units or as separate headboards to adapt to existing facilities.

For more information contact: Fos-Son Corporation, Norwest Center, Suite 500, 400 First Street South, St. Cloud, MN 56301. 612-253-8711 or 1-800-626-0001 ext. 6065.

Please circle No. 355
on your Reader Service Page

Italian Cheese Manufacturing Catalog

New Pasta Filata Machinery Literature Available

• New literature on Italian Cheese Manufacturing has been announced by *Stainless Steel Fabricating*. Catalogues on the new 620E and 630E Mixers as well as the 720E Molder may be obtained by contacting *Stainless Steel Fabricating, Inc.*, P.O. Box 337, 202 Industrial Drive, Columbus, WI 53925. 414-623-3003.

For more information contact: James C. Fischer, BASIC CONCEPTS, INC., 11019 North Redwood, Mequon, WI 53092. 414-475-0800.

Please circle No. 356
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Test Kit Introduced For Determination of D-3-Hydroxybutyric Acid

• Boehringer Mannheim Biochemicals has recently introduced an enzymatic test kit for the determination of D-3-Hydroxybutyric Acid. This kit is suitable for the determination of D-3-Hydroxybutyric in foods and other materials, including biological samples. Its principal application will be as a quality control procedure for egg processing. The presence of D-3-Hydroxybutyric Acid has been used to detect fertilized eggs which have been incubated (incubator reject eggs). The use of such eggs for human consumption has been prohibited in the US and Canada, and although a number of procedures have been suggested, the enzymatic procedure appears to be the most satisfactory for routine Quality Control.

Boehringer Mannheim Biochemicals also has two other enzymatic test kits, Lactic and Succinic Acid, which have been used to detect microbial decomposition in eggs.

FOR RESEARCH USE ONLY. Not approved for use in *in vitro* human diagnostic procedures.

For more information, call their Enzymatic Test Kit Department at 800-428-5433 (in Indiana, call 317-849-9350 collect).

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New Idea Produces Continuous Readout of Oxygen Utilization

• A new fermenter-respirometer provides a continuous readout of oxygen utilization. It can also monitor carbon dioxide production without the use of D.O. probes. This new idea in the fermentation field produces a continuous readout of oxygen utilization during the fermentation process. The fully automatic fermenter-respirometer features dual 4-liter chambers which allows the use of one chamber for testing and the other for control.

The system, which is completely enclosed, combines a culture chamber, air pump, CO_2 scrubber and a sensitive gas volume transducer. Features of the instrument include airlift mixing, a water jacket - which permits testing at a full range ot temperatures, temperature and atmospheric pressure compensation, a foam detection device and fine bubble diffusion. Results are reproducible and the instrument has excellent accuracy and precision. It is suitable for laboratory and pilot-plant scale fermentation studies.

For more information contact: Tech-Line Instruments, Tri Campus Park, P.O. Box 1236, Fond du Lac, WI., 54935. 1-800-328-7518. In Wisconsin call 1-800-242-3505.

Please circle No. 358
on your Reader Service Page

New Flexible RUGGEDoor™ Saves Energy, Cuts Maintenance Costs

• Food processors, warehouses and other businesses faced with heavy motorized traffic through cooler or freezer doors can save energy and cut maintenance costs with a new Flexible RUGGEDoor from Chase Industries, Inc., Cincinnati.

Tested and accepted by the USDA for use with open food products, the Flexible RUGGEDoor provides secondary thermal-barrier sealing and remains pliant at temperatures as low as -30°F. The double-acting door panels consist of an internal frame of 32-ounce Hypalon-coated nylon sandwiched between two layers of a heavy duty, abrasion-resistant, two-ply "belting" material. All three layers are sewn back-to-back and secured with stainless steel rivets. The tough exterior panels form full-height impact panels to protect the door against any size vehicle or load.

The Flexible RUGGEDoor uses Chase's top-mounted AirGard™ gravity hinge for easy opening and automatic closing. There are no side or bottom hinges to damage or maintain, the full width-in-clear of the opening is available for load passage, and it is impossible to "forget" to close the door.

For safety, the Flexible RUGGEDoor can accommodate windows as large as 33% of the entire panel area. For an effective thermal seal, doors are equipped with Hypalon balloon jamb edges and Hypalon wipers at the top and bottom. The standard 3″ overlap can be adapted (with a taper overlap design) for negative pressure applications.

For additional details on the Flexible RUGGEDoor and Chase's full line of AirGard doors, contact: Chase Industries, Inc., 8100 Reading Road, Cincinnati, OH 45222. 800-543-4455. In Ohio, 513-821-3939.

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Clean-in-Place (CIP) Management System

• The Tenor CIP Management System offers an innovative approach to controlling and documenting the events that occur during the cleaning cycle of food and chemical processing equipment.

The system comprises the Tenor series 100 industrial control computer, an ASCII terminal, a line printer, and a specialized software program that controls the sequential events used in the processing industries.

The Tenor CIP Management System also monitors and documents the real time events that occur by providing a printout of the elapsed time in step, recorded temperature of solutions, concentration of solutions, level of solutions in tanks, the time, day and date of the beginning and end of the cleaning cycle, and activation of the single step or cycle reset function. Additional parameters of the cleaning cycle can be documented as required by the application.

The series 100 computer is a powerful control and data logging device that offers a new dimension in process control capabilities by providing digital I/0, analog I/0, RTD and thermocouple inputs, multi-tasking routines and printer interfacing.

For complete information concerning the Tenor CIP Management System or any other Tenor product, call or write Patricia Yoblin, Sales Manager, Tenor Co. Inc., 17020 W. Rogers Drive, New Berlin, WI 53151. 414-782-3800.

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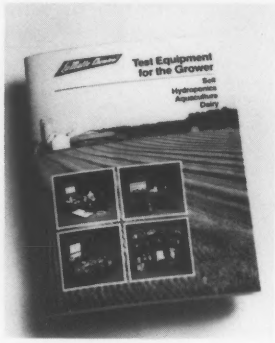

LaMotte Chemical Catalog

New Test Equipment For The Grower

• A new 64-page catalog presents new analysis products available to the grower. Features include portable test kits for dairy sanitizers, agricultural soils, greenhouse soils, turf grass soils, plant tissue, hydroponic solutions, fish farming and water test kits for the farm manager. In this catalog LaMotte Chemical introduces several new reagent systems and improved color matching equipment for on-site testing. A variety of kits are offered from sophisticated electronic analysis outfits to simplified single-parameter test kits. Also included are twenty pages of labware and apparatus for the analyst.

For more information contact: LaMotte Chemical Products Company, P. O. Box 329, Chestertown, MD 21620. 301-778-3100.

Please circle No. 242
on your Reader Service Page

Letters to the Editor

Dear Ms. Hathaway:

The October 1985 issue of *Dairy and Food Sanitation,* p. 375 contains an article entitled "U.S. Standards for Cheeses" by Dick H. Kleyn, Ph.D. The article contains several errors which should be corrected. Specifically on page 376, Dr. Kleyn states "Cheddar cheese serves as a good example to use in gaining insight on a typical Standard of Identity for cheese; the following information being drawn from the Code of Federal Regulations:" The article goes on to quote several sections of 21CFR 133.113. Unfortunately, the sections quoted are the old standard of identity which was in effect prior to July 1, 1985. A review of recent developments shows that on January 21, 1983, FDA published a final rule (48 *Federal Register* 2736) amending the standards of identity for cheddar cheese (133.113), blue cheese (133.106), cheddar cheese for manufacturing (133.114), low sodium cheddar cheese (133.116), Edam cheese (133.138), Gouda cheese (133.142), Gruyere cheese (133.149), Limburger cheese (133.152), Provolone cheese (133.181), Samsoe cheese (133.185), Swiss and emmentaler cheese (133.195), and Swiss cheese for manufacturing (133.196), with an effective date of July 1, 1985.

In his references, Dr. Kleyn cited the 1979 Code of Federal Regulations, Title 21 Parts 100-169; apparently this was the source of error. Had Dr. Kleyn used the 1983, 1984, or 1985 editions he would have noted there were two Parts 133.113 for cheddar cheese, together with the notation referencing the *Federal Register* publications and effective date of the revised standard of identity.

In amending these standards FDA listed various ingredients of the cheeses as optional ingredients. For example, the amended standard for cheddar cheese (133.113) lists the following as optional ingredients: (1) dairy ingredients (milk, nonfat milk, or cream), (2) clotting enzymes, (3) coloring, (4) calcium chloride, (5) enzymes used in curing or flavor development, (6) Antimycotic agents, and (7) hydrogen peroxide. The standard of identity requires that: "The common or usual name of each of the ingredients used in the food shall be declared on the label as required by the applicable sections of part 101 of this chapter; except that:

(1) Enzymes of animal, plant, or microbial origin may be declared as enzymes; and

(2) The dairy ingredients may be declared, in descending order of predominance, by the use of the terms "milkfat'' and "nonfat milk" or "nonfat milk" and "milkfat" as appropriate."

Therefore, cheddar cheese now requires an ingredient statement on its label.

The change would also require that, *whenever cheddar cheese is used as an ingredient, the ingredients of the cheddar cheese must also be listed* as provided for in 21CFR 101.4(b)(2):

"An ingredient which itself contains two or more ingredients and which has an established common or usual name...or conforms to a definition and standard of identity...shall be designated in the statement of ingredients on the label of such food by either of the following alternatives:

(i) By declaring the established common or usual name of the ingredient followed by a parenthetical listing of all ingredients contained therein in descending order of predominance except that, if it is a food subject to a definition and standard of identity...only the ingredients required to be declared by the definition and standard of identity need be listed; or

(ii) By incorporating into the statement of ingredients in descending order of predominance in the finished food, the common or usual name of every component of the ingredient without listing the ingredient itself."

Thus, when cheddar cheese is used as an ingredient its presence may be declared either as "cheddar cheese (nonfat milk, milkfat, enzymes, artificial color, calcium chloride)" or alternatively by simply listing the individual ingredients of the cheese in their proper order of predominance within the ingredients list without making reference to "cheddar cheese."

On page 376 there is a reference to the development of a standard of identity for peanut butter. For those having an interest in the final outcome, I would include the reference for the standard of identity at 21CFR part 164.150.

Under the "critical steps in the development or amendment of a Standard of Identity," an important industry option is omitted. This would be the obtaining of a "temporary marketing permit" as provided for in 21CFR part 130.17. In this regulation the FDA "recognizes that before petitions to amend food standards can be submitted, appropriate investigations of potential advances in food technology sometimes require tests in interstate markets of the advantages to, and acceptance by consumers of experimental packs of food, varying from the applicable definitions and standards of identity prescribed under section 401 of the Act." The regulations go on to enumerate the type of information to be filed with the request. A recent example of the use of a temporary marketing permit, together with a proposal resulting from the permit, is found in the standard of identity for grated cheese 21CFR 113.146, where FDA has proposed amending

the standard to provide for the use of safe and suitable anticaking agents including powdered cellulose. Comments on the proposal were to be filed by December 30, 1985.

On page 378, there is a discussion of the grade standards for cheeses. These grade standards are published by the USDA, Agricultural Marketing Service at 7CFR Part 58. This should have been included in the list of references on page 379. Reference #4 should be listed as Code of Federal Regulations, Title 21, Parts 100-169. Other sections of Title 21 containing information on FDA regulated food products include Parts 1-99 (color additives) and Parts 170-199 (food additives).

Sincerely,

Allen Matthys
Director, Regulatory Affairs
National Food Processors Assn.
1401 New York Ave, NW
Washington, DC 20005

Dear Ms. Hathaway:

The Dairy and Food Sanitation, Volume 5, Number 12, article entitled, "Using Risk Assessment as a Method of Determining Inspection Frequencies" by Briley and Klaus fails, in my opinion, to support its conclusion. The numerical risk assessment technique which was explored and categorized very well failed to document measurable improvement in food service sanitation scores in all frequency intervals save one. Score improvement was only found when establishments were inspected at frequencies less than two months.

I believe the authors failed to identify the correct variable in the study, i.e., frequency of inspection. A clear correlation between increased inspection frequency and improvement in sanitation scores was borne out by their study. The numerical risk assessment techniques, on the other hand, failed as a program variable. In the authors own words, "There was no significant increase or decrease in the operational quality of establishments inspected at longer intervals" (>2 months).

Thank you for the opportunity to comment.

Very truly yours,

J. Douglas Park, R.S., M.P.H.
Food Service Specialist
Section of Food Service Sanitation
Division of Environmental Health
P.O. Box 30035
Lansing, MI 48909

Food Science Facts
For The Sanitarian

Robert B. Gravani
Cornell University
Ithaca, NY

THE pH OF FOODS (CON'D)

The pH of a food is commonly determined with an electronic pH meter. pH meters are usually equipped with a glass membrane, measuring electrode and a reference or calomel electrode. They can also come with a single, combination electrode. The instrument manufacturers' manual should be consulted before any pH determinations are made. Factors that will influence the pH value obtained include the calibration of instrument, the procedure for operating the pH meter, the temperature of the sample, and the physical characteristics of the food product.

The physical characteristics of the food usually determines the most appropriate method of sample preparation.

- Liquid and moist foods - if the product is homogeneous, pH can be determined by immersing the tip of the electrode(s) into the sample and insuring adequate contact. The pH can then be read directly from the meter.
- Semisolid foods; liquid and solid foods - product should be blended to a uniform consistency and then the pH can be determined. If the product is too thick, a small amount of distilled water can be added to aid blending; then determine pH.
- Moist solid surfaces - the pH of the surface of fish or meat can be easily determined by firmly pressing the electrodes to the surface and reading the pH from the instrument. (This technique will not work for combination electrodes because the reference function does not contact the surface of the product.)
- Oily products - separate the oil from the solid product; blend the solid into a paste; if necessary, add a small amount of distilled water to aid blending; then determine pH.

An excellent reference relating to the procedures for determining the pH of foods can be found in the US Good Manufacturing Practices for Acidified Foods (21 CFR Part 114).

In addition to using pH meters to determine the intensity or degree of acidity of a food, colorimetric methods can also be used. Colorimetric methods can be used instead of pH meters if the food is pH 4.0 or lower.

Indicator papers or solutions can be used and both involve the use of indicator dyes that gradually change color over limited pH ranges.

Indicator paper works as follows:

A paper tape treated with dye is dipped into the sample solution. Depending on its pH, the tape will change color and an approximate pH can be determined by comparison with a standard color chart.

The approximate pH range of some selected fresh, fermented and commercially canned foods are given for reference purposes in the table below.

pH Range of a Few Selected Fresh, Fermented and Commercially Canned Foods.

FOOD	APPROXIMATE pH RANGE
Apples	2.9-3.5
Apple Juice	3.3-3.5
Apple Sauce	3.4-3.5
Apricots	3.5-4.0
Asparagus	5.0-6.1
Bananas	4.5-5.2
Beans	
Baked	4.8-5.5
Green	4.9-5.5
Lima	5.4-6.5
Soy	6.0-6.6
Beans, With Pork	5.1-5.8
Beef	5.3-6.2
Beef, Corned, Hash	5.5-6.0
Beers	4.0-5.0
Beets, Whole	4.9-5.8
Blackberries	3.0-4.2
Blueberries	3.2-3.6
Boysenberries	3.0-3.3
Bread	
White	5.0-6.0
Date and Nut	5.1-5.6
Broccoli	5.2-6.0
Brussel Sprouts	6.3-6.6
Butter	6.1-6.4

FOOD	APPROXIMATE pH RANGE
Cabbage	5.2-6.3
Cantaloupe	6.2-6.5
Carrots	4.9-6.3
Catfish	6.6-7.0
Cauliflower	6.0-6.7
Celery	5.7-6.0
Cheese (most)	5.0-6.1
Camembert	6.1-7.0
Cottage	4.1-5.4
Parmesan	5.2-5.3
Roquefort	4.7-4.8
Cherries	3.2-4.7
Chicken	5.5-6.4
Chicken With Noodles	6.2-6.7
Chop Suey	5.4-5.6
Cider	2.9-3.3
Clams	5.9-7.1
Cod Fish (canned)	6.0-6.1
Corn	
On the Cob	5.9-6.8
Cream Style	5.9-6.5
Whole Grain	
Brine Packed	5.8-6.5
Vacuum-Packed	6.0-6.4
Crab	6.8-8.0
Crab Apples - Spiced	3.3-3.7
Cranberry	
Juice	2.5-2.7
Sauce	2.3
Currant Juice	3.0
Dates	6.2-6.4
Duck	6.0-6.1
Dry Sausages	4.4-5.6
Egg White	7.6-9.5
Egg Yolk	6.0-6.3
Fermented Vegetables	3.9-5.1
Figs	4.9-5.0
Frankfurters	6.2
Fruit Cocktail	3.6-4.0
Ginger Ale	2.0-4.0
Gooseberries	2.8-3.1
Grapefruit	
Juice	2.9-3.4
Pulp	3.4
Sections	3.0-3.5
Grapes	3.3-4.5
Haddock	6.2-6.7
Halibut	5.5-5.8
Ham, Spiced	6.0-6.3
Hominey, Lye	6.9-7.9
Honey	6.0-6.8
Huckleberries	2.8-2.9
Jam, Fruit	3.5-4.0
Jellies, Fruit	3.0-3.5
Lemons	2.2-2.4
Juice	2.2-2.6
Lettuce	6.0-6.4
Limes	1.8-2.0
Juice	2.2-2.4
Loganberries	2.7-3.5
Mackerel	5.9-6.2

FOOD	APPROXIMATE pH RANGE
Maple Syrup	6.5-7.0
Mayonnaise	3.8-4.0
Milk	
Cow; Whole	6.0-6.8
Evaporated	5.9-6.3
Molasses	5.0-5.4
Mushrooms	6.0-6.5
Olives, Ripe	5.9-7.3
Onions	5.3-5.8
Oranges	2.8-4.0
Juice	3.0-4.0
Oysters	5.9-6.7
Peaches	3.1-4.2
Pears	3.4-4.7
Peas	5.6-6.8
Pickles	
Dill	2.6-3.8
Sour	3.0-3.5
Sweet	2.5-3.0
Pimentos	4.3-5.2
Pineapple	
Crushed	3.2-4.0
Sliced	3.5-4.1
Juice	3.4-3.7
Plums	2.8-4.6
Pork	5.3-6.4
Potatoes	
White, Whole	5.4-6.3
Sweet	5.3-5.6
Potato Salad	3.9-4.6
Prune Juice	3.7-4.3
Pumpkin	5.2-5.5
Raspberries	2.9-3.7
Rhubarb	2.9-3.3
Salmon	6.1-6.5
Sardines	5.7-6.6
Sauerkraut	3.1-3.7
Juice	3.3-3.4
Scallops	6.8-7.1
Shrimp	6.8-8.2
Soda Crackers	6.5-8.5
Soups	
Bean	5.7-5.8
Beef Broth	6.0-6.2
Chicken Noodle	5.5-6.5
Clam Chowder	5.6-5.9
Duck	5.0-5.7
Mushroom	6.3-6.7
Noodle	5.6-5.8
Oyster	6.5-6.9
Pea	5.7-6.2
Tomato	4.2-5.2
Turtle	5.2-5.3
Vegetable	4.7-5.6
Spinach	4.8-6.8
Squash	5.0-5.3
Strawberries	3.0-4.2
Tomatoes	3.7-4.9
Juice	3.9-4.7
Tuna	5.9-6.1
Turkey	5.6-6.0

FOOD	APPROXIMATE pH RANGE
Turnips	5.2-5.6
Turnip Greens	5.4-5.6
Vegetable	
Juice	3.9-4.3
Mixed	5.4-5.6
Vinegar	2.4-3.4
Walnuts	5.4-5.5
Water	
Distilled, CO_2	6.8-7.0
Mineral	6.2-9.4
Sea	8.0-8.4
Whiting	6.2-7.1
Wines	2.3-3.8
Yogurt	3.8-4.2

How to Measure the Mastitis Shape of Your Herd

The monthly DHI somatic cell counting (SCC) program is the best way for a dairyman to measure the subclinical mastitis level in his herd, which is the major loss from mastitis in most herds. DHI uses a SCC scoring method of 0 through 9. Each increase of one SCC score (for example from 3 to 4) results in an estimated 400 pounds milk production loss per lactation.

Goals: For the entire herd keep the average SCC score below 4.0 and 90 percent or more of the cows with a SCC score of 5 or below. Look at first lactation animals. Keep their average score 3.0 or below and 70 percent of them with a score of 3.0 or less. Check mastitis prevention procedures if there is an increase in heifers scoring SCC 4.0 or greater.

Bulk tank somatic cell (leucocyte) counts also can be used to monitor subclinical mastitis. A recent study found herds with 500,000 SCC had 16 percent of their quarters infected with mastitis and 6 percent milk loss. One million SCC herds averaged 32 percent quarters infected and 18 percent milk loss. Milk loss was in comparison to herds at 200,000 SCC.

Goals: Maintain the bulk tank SCC consistently below 200,000 cells per milliliter. If a WMT score is reported, it should be 5 or below.

Clinical mastitis is another indication of the mastitis status of a herd. However, keep in mind that how observant milkers are can play a big role in the number of clinical cases of mastitis.

Goals: Average less than one clinical case of mastitis per cow per year. In a 100-cow herd, this would be less than eight cows with clinical mastitis each month.

Elevated bacteria counts usually result from a problem in cleaning equipment or cows, or in cooling the milk properly. However, in a few instances, *Streptococcus agalactia* have caused high bacterial counts. After checking possible cleaning and cooling problems, check cows for *Strep. ag.*

Goals: Maintain bacteria counts of less than 10,000 per milliliter.

After beginning a good mastitis control program, a dairyman will make some progress in one year, but may not see the full benefit for three or more years. It will take the culling of some cows before the mastitis prevelance and therefore, the SCC will be reduced to an extremely low level.

This article is one of a continuing series made available by the National Mastitis Council. For additional information, contact the NMC, 1840 Wilson Blvd., Arlington, VA 22201.

LISTERIOSIS OUTBREAK ASSOCIATED WITH MEXICAN-STYLE CHEESE - CALIFORNIA

Between January 1, and June 14, 1985, 86 cases of *Listeria monocytogenes* infection were identified in Los Angeles and Orange Counties, California. Fifty-eight of the cases were among mother-infant pairs. Twenty-nine deaths have occurred: eight neonatal deaths, 13 stillbirths, and eight non-neonatal deaths. An increased occurrence of listeriosis was first noted at the Los Angeles County-University of Southern California Medical Center; all cases were in pregnant Hispanics, and all appeared to be community-acquired. A systematic review of laboratory records at hospitals in Los Angeles and Orange County identified additional cases throughout the area.

An analysis of Los Angeles County cases showed that 45 (63%) of the *Listeria* cases were among mother-newborn pairs. Most (70%) of these women had a prior febrile illness or were febrile on admission to the hospital. Forty-two of the neonatal patients had onset of disease within 24 hours of birth, and all isolates available for testing were serotype 4b. Three of the neonatal patients had late onset disease; only one of the two isolates available for testing was serotype 4b.

The mothers ranged in age from 15 years to 43 years (mean 28 years). The mean gestational age was 33 weeks. Forty-three (96%) of these pairs were Hispanic; one was white; and one was Asian.

A case-control study was conducted among the Los Angeles County Hispanic patients who had early onset; mothers with listeriosis were more likely to have consumed Mexican-style fresh cheeses than age-matched controls, Hispanic women who had delivered at the same hospital within 10 days of their matched case (odds ratio: 5.5; 95% confidence interval: 1.2-24.8). Consumption of cheese from one particular manufacturer, Jalisco Products, Inc., was significantly associated with risk of disease (odds ratio: 7.5; 95% confidence interval: 1.4-94.6).

Samples of Mexican-style cheeses from three different manufacturers purchased from markets in Los Angeles were cultured at CDC; four packages of Jalisco cheese products grew *L. monocytogenes* serotype 4b. The four positive cheese samples were of two varieties, queso fresco and cotija. All four contaminated samples had different expiration dates - ranging from June 28, to August 16, 1985 - suggesting a continuing problem with the manufacturer's cheese products.

On June 13, the manufacturer instituted a voluntary recall of the implicated cheese products. Television, radio, and newspaper announcements were made warning the public against ingestion of Jalisco brand cheese products, as well as Guadalajara, Jimenez, and LaVaquita brands manufactured in the Jalisco plant. Currently, the California State Department of Food and Agriculture and the U.S. Food and Drug Administration are conducting studies of the dairy herds, physical plant, and cheese manufacturing processes.

Eighty percent of the cheese made by this manufacturer is distributed to Los Angeles and Orange Counties. However, Jalisco cheese products are distributed to at least 16 other states and most areas of California.

Editorial Note: Listeriosis is a bacterial disease causing meningitis and sepsis, especially in immuno-compromised hosts. Pregnant women may also transmit the infection to their infants, resulting in abortion or early neonatal sepsis. The usual incidence of sporadic listeriosis is 2-3 per million population per year. Epidemics of listeriosis may also occur; recent outbreaks have been associated with ingestion of cabbage and pasteurized milk.

Listeriosis of the newborn may be preventable by recognition and prompt treatment of maternal listeriosis. Pregnant women who have consumed the implicated cheese and who develop fever or gastro-intestinal symptoms should contact their physicians promptly. Because the cheese is distributed in at least 16 states, physicians throughout the country should consider listeriosis as a diagnosis in symptomatic, pregnant Hispanic women. *MMWR-6-21-85*

FDA INTERPRETATION-MOLD IN CHEESE

The question of the safety of cheese from which mold has been removed is one that recurs frequently. Recently, the FDA issued an interpretation based on that question. The key points are summarized below:

Question: Is cheese from which mold has been removed considered sound and safe for human consumption?

Discussion: The term "moldy" refers to the presence on cheese of typical contaminating molds, generally species of *Penicillium, Aspergillus, Fusarium, Cladosporium* and *Alternaria*. It does not refer to the presence of molds, principally *Penicillium roqueforti* and *P. caseicolum,* which are intentionally added to curd or milk in order to produce such "mold-ripened" cheeses as roquefort, blue, gorgonzola, brie and camembert.

Many of the common contaminant molds are psychrotrophic and grow at refrigeration temperatures. Temperatures around 40°F favor the growth of *Pencillium* sp. over most of the other molds.

All types of cheeses are susceptible to mold growth which may be more than an aesthetic problem. Some common mold species found on cheese produce toxic metabolites under some conditions. These mycotoxins have caused cancer and other adverse effects in experimental animals.

Molds are aerobic and usually grow on the surface of cheese, but may penetrate to the inside along air passages such as holes in swiss-type cheese. Mycotoxins, if produced, are produced near the surface, closely associated with the mold filaments. Mycotoxins can migrate into cheese if the cheese is stored for long periods at room temperature. Conversely, mycotoxin production and migration is greatly reduced at refrigeration temperatures, at least in the case of *Aspergillus* sp.

In summary, under certain circumstances, some moldy cheese may be restored to a sound and safe condition by carefully cutting off and discarding:

- a one-half inch thick layer if the cheese became moldy while under refrigeration (<45°F).
- an inch thick layer if the cheese became moldy at higher temperatures.

The cutting must be done to minimize the possibility of contaminating the newly exposed cheese surface.

Cheese that is too small for the required cutting, which has a high moisture content (cottage cheese, etc.), or has mold filaments deeply penetrating along the holes or eyes cannot be made sound and safe.

Washing or scraping the surface does not remove mycotoxins.

Answers: Cheese from which mold has been properly removed is considered sound and safe.

The FDA interpretation highlighted above contains many literature citations that may be of interest. For further information, contact the Bureau of Community Sanitation and Food Protection, (518) 474-3291. NYSDMFS Newsletter Spring '85.

Training Aids

For a list of leaflets and posters suitable for use in foodhandler training classes, offered for sale by Charles Felix Associates, write: Charles Felix Associates, P.O. Box 1581, Leesburg, VA 22075. 703-777-4453.

Catalog

"Schools, Publications & Audio-Visuals," a free catalog of materials available for sale from the Food Processors Institute may be obtained by writing: FPI, 1401 New York Ave., N.W., Washington, DC 20005. 202-393-0890.

The Spring issue of the Newsletter published by the New York Affiliate carries these commentaries for their members:

HOW A COLD SPREADS...

Researchers have recently discovered evidence of a phenomenon of disease transmission that public health sanitarians have suspected for decades - that hands may be the culprits in the spread of most colds. Teams from the University of Virginia and the University of Wisconsin have developed a body of scientific evidence which suggests that many viruses that cause the common cold are spread chiefly by hand contamination and self inoculation rather than by coughing or sneezing.

Because viruses reside principally in the nasal passages and because most people have the habit of touching or rubbing the nose, the cold viruses travel from nose to hand.

They then may be deposited on household objects, like drinking glasses, or more frequently be passed directly by hand to hand contact to another person. If that person has the habit most of us have, of rubbing his nose or eyes, he will then likely inoculate himself and "catch" the other's cold.

The researchers have found that it is hard to pass cold viruses on by way of coughing, sneezing or kissing. Similarly they have found that the incidence of colds illness can be cut down by the use of a new chemically treated version of Kleenex. Indeed, experiments also support evidence that preventive hygiene - keeping one's hands clean and wiping the nose frequently with regular facial tissue - may be nearly as effective as using the new antiviral Kleenex.

Cold viruses have been found to survive for hours on contaminated objects. In a study led by Dr. Jack Gwaltney of the University of Virginia a total of 114 objects were sampled in homes where family members had rhinovirus colds. Seven (6%) objects were positive for rhinovirus. The virus-positive objects were found in five different families and included three dolls, two drinking glasses, a pair of glasses, and a door knob. In another study, respiratory syncytial virus survived for up to 6 hours on artificially contaminated countertops.

Although all of this is still in the realm of hypothesis, the evidence nevertheless favors the presumption that the sanitarian has always had that a little cleanliness - like washing the hands frequently and keeping easily contaminated objects clean - couldn't hurt. *(E.N.D./November-December 1984)*

TRICHINOSIS - SUFFOLK COUNTY

The Suffolk County Health Department and the New York State Department of Agriculture and Markets investigated a trichinosis outbreak in late January that may have contributed to the death of a 62-year-old man. Two confirmed cases were reported by local hospitals. The two cases were linked to a local market where the victims claim to have purchased ground beef not pork. The victims admitted testing the raw ground beef while making patties. Both victims were admitted to the hospital on 1/23/58 and were from different households.

Since trichinosis is not transmitted through beef, the hypothesis is that the beef had been contaminated with pork - either through improper cleaning of a meat grinder or through mislabeling of a "meatloaf mix" consisting of pork and beef.

According to the Centers for Disease Control, six percent of ground beef samples taken from 12 states in a 1975 study contained some pork. Several samples of beef from the market and the freezers of the victims did not contain pork according to the Agriculture and Markets Lab.

Pork is not inspected for trichina and some ground beef is contaminated with pork due to failure to properly clean meat grinders or other equipment between grindings of pork and other meats.

APPROVED CHEMICAL SANITIZERS

Household laundry bleaches are generally not approved for use as sanitizers on dairy farms. An approved sanitizer must have an Environmental Protection Agency (EPA) Registration Number and have directions on the label for preparing a sanitizing solution.

The use of an unapproved product as a sanitizer could result in a five-point debit on an Interstate Milk Shipper rating.

Book Review

The Management of Quality: Preparing for a Competitive Future. John T. Hagan. The American Society for Quality Control, Milwaukee, WI. 51 pages. 1984.

Quality must be an integral part of all Company operations. John Hagan's "The Management of Quality" is a sensational, short, and easy to read description of a Corporate-Wide Total Quality Commitment. Divided into three parts: Quality Management Today, Tomorrow and Getting Started, this book describes a bold new approach to quality management.

Part one includes the principles of quality management as they affect all areas within a company and how these principles can be used to achieve administrative quality improvement through performance measurements and corrective action. Mr. Hogan describes Quality Assurance's role in Marketing, Engineering, Manufacturing, Purchasing, Quality Administration, Finance and Strategic Business Planning. Briefly, an effective role for Quality Assurance in the following functional areas includes:

a) Marketing

- A clearly defined, contributing role for all new product developments.
- Assurance of adequate control of customer contracts, sales literature, and user documents.
- Established responsibility and adequate budget for customer complaint handling, returned-goods control, field repairs, and required service to the distribution system.

b) Engineering

- A clearly defined and contributing role during design reviews and qualification testings.
- Established responsibilities for inspection and calibration services.
- Assuring adequate internal controls for drawing releases, change control, and support to manufacturing.

c) Manufacturing

- Planning and conducting of product acceptance, clearly integrating all inspections and tests with the manufacturing process.
- Assurance of adequate manufacturing capabilities, operator support plans, equipment controls, and control of nonconforming material, design changes, and variations to the manufacturing plan.
- Concurrent planned support for all new manufacturing operations, including the installation and start-up of new facilities or equipment.

d) Purchasing

- Planning and conduct of incoming inspections and tests, supplier quality ratings, and necessary corrective action.
- Assurance of adequate commitment to the control of supplier quality by Purchasing and Engineering.
- First article inspection in support of all new or changing supplier business.

e) Quality Administration

- Planning and conducting necessary product acceptance inspections and tests to assure that only a conforming product is delivered to customers.
- Providing a quality measurement and corrective action program to assure that problems are identified and resolved.
- Preparing reports, audits, education, product safety and Company-wide quality improvement efforts as necessary to support the overall quality management program.

f) Finance

- Quality costs measurement: costs of appraising quality, prevention practices and failures (both internal and external).

g) Strategic Planning

- Interacting Company goals with quality goals.
- Long range quality goals.

Part two of Mr. Hogan's book includes a description of the new role for the quality assurance professional in the 1980's. This new and expanded role includes: to provide assurance that all today's "basics" are being accomplished; to provide new programs to meet the needs of an expanded role of quality; and to become the prime Company resource for educating and guiding all other functions in the new era of quality. The personal commitment of the Company's CEO is stressed. Every Company function must take joint responsibility for quality. Quality professionals are not policemen, they are educators, promoters and salesmen. Quality Assurance must promote user benefits, product differences and support product claims. The management of quality must become equal to the management of schedule and cost.

Part three stresses that quality is hard work and must be a Company-wide effort. All Company functional areas have an effect on product quality.

This excellent short publication provides a concise explanation of the things companies need to do to manage quality in todays competitive world. Every quality professional should have a copy of this book.

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112	132	152	172	192	212	232	252	272	292	312	332	352
113	133	153	173	193	213	233	253	273	293	313	333	353
114	134	154	174	194	214	234	254	274	294	314	334	354
115	135	155	175	195	215	235	255	275	295	315	335	355
116	136	156	176	196	216	236	256	276	296	316	336	356
117	137	157	177	197	217	237	257	277	297	317	337	357
118	138	158	178	198	218	238	258	278	298	318	338	358
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Acceptability of Bacon Stored Six Weeks at 4 or -23°C, C. N. Huhtanen and F. B. Talley, Eastern Regional Research Center, Philadelphia, Pennsylvania 19118

J. Food Prot. 49:180-182

Bacon was obtained from production lines of two local processing plants, H and M. The slices from 8 bellies from each plant were sequentially rearranged to form composite portions representative of each belly; these were analyzed for moisture-phase NaCl and for acceptability by a panel of judges using a 9-point hedonic scale. Samples were tasted shortly after processing and again after 6 weeks of storage at 4 or -23°C. The moisture-phase NaCl content ranged from 4.62 to 7.80% (c.v. = 18.2%) for bacon from plant H; the range for bacon from plant M was 3.25 to 10.05% (c.v. = 37.7%). The belly from plant M with the highest moisture-phase NaCl content also gave the lowest hedonic score of the bacon samples tasted before storage. The average hedonic scores for bacon from the two plants were different ($p<0.05$). There were no significant differences due to storage condition for bacon from plant M, but bacon stored at 4°C from plant H had lower ($p<0.05$) average scores than the bacon sampled shortly after processing or that kept 6 weeks at -23°. Storage at 4°C caused a significant ($p<0.01$) reduction in hedonic score in one belly from each plant.

Physicochemical Properties of Heat-Stable Proteases from Psychrotrophic Pseudomonads, T. R. Patel, D. M. Jackman, G. J. Williams and F. M. Bartlett, Department of Biochemistry, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3X9

J. Food Prot. 49:183-188

Four purified heat-stable proteases from psychrotrophic pseudomonads were characterized and compared with other similar purified proteases. Amino acid compositions, hydrophobicities, Difference Index (DI) values, heat-stabilities, metal ion contents and N-terminal amino acids of these proteases were examined. Some similarities as well as differences in their amino acid compositions were observed. All were inactivated by EDTA-treatment and the apoenzymes were reactivated with either Ca, Mg or Mn ions. Proteases T25, T20, T16 and T13 contained 16, 8, 4 and 5 g atom per mol of Ca, respectively. Except for protease T20 which showed 4 g atom per mol of Mg, the other proteases showed less than 1 g atom per mol of the element. The Mn content of the proteases was negligible (less than 0.1 g atom per mol). The presence of exogenous Ca afforded protection to the protease activity in the partially purified enzymes when subjected to heat treatment. Heated samples of proteases when stored in cold regained activity indicating renaturation of the proteins. Threonine was tentatively identified as the N-terminal amino acid in the four purified proteases. Similarities and differences observed between purified proteases are discussed.

Determination of Irradiation D-Values for *Aeromonas hydrophila,* Samuel A. Palumbo, Ronald K. Jenkins, Robert L. Buchanan and Donald W. Thayer, Eastern Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture, 600 East Mermaid Lane, Philadelphia, Pennsylvania 19118

J. Food Prot. 49:189-191

This study examined the radiation resistance of *Aeromonas hydrophila,* a psychrotrophic pathogen of emerging importance. Five strains of *Aeromonas hydrophila* (three clinical and two food isolates) were irradiated in a Cesium-137 source at doses up to 150 Krads. The bacterium was irradiated in growth broth, phosphate buffer, ground bluefish or ground beef. Surviving bacteria were counted on nutrient agar or starch ampicillin agar. Radiation resistance was expressed as D-values (dose in Krads to yield a 10-fold decrease in viable number) and ranged from 14 to 22 Krads at 2 ± 1°C for most variables studied. Decreasing the temperature during irradiation increased the radiation resistance (raised the D-values). The results of this study indicate that a pasteurizing dose of ionizing radiation of 150 Krads is sufficient to kill the levels of *Aeromonas hydrophila* found in retail fresh foods.

Compositional and Selected Functional Properties of Whey Protein Concentrates and Lactose-Hydrolyzed Whey Protein Concentrates, Ronald H. Schmidt, David E. Smith, Vernal S. Packard and Howard A. Morris, Department of Food Science and Nutrition, University of Minnesota, St. Paul, Minnesota 55108

J. Food Prot. 49:192-195

Commercial whey protein concentrate (WPC) products, manufactured by ultrafiltration with and without lactose hydrolysis, were compared for proximate composition, mineral and trace mineral composition and for protein solubility and viscosity parameters. Protein concentration ranged from 30.5 to 52.7%, while ash content ranged from 5.9 to 12.0%. Extent of lactose hydrolysis in lactose-hydrolyzed WPCs was estimated at 60 to 75% of the initial lactose level. Protein solubility of 10% protein dispersions of the WPC samples ranged from 90 to 100% and was not affected by heating WPC dispersions at 65°C for 30 min or by increased centrifugation force in solubility determination from 40,000 × *g* to 100,000 × *g*. All WPC dispersions exhibited pseudoplastic flow behavior as indicated by flow behavior indices (n) of less than 1.0. WPC dispersions possessed a low viscosity as indicated by consistency index (k) data, and k values decreased slightly after heating. Lactose hydrolysis had no apparent effect on solubility or viscosity properties of the WPC dispersions. Alteration of electrophoretic mobility of polyacrylamide gel electrophoresis was observed for α-lactalbumin in lactose-hydrolyzed WPC samples.

Relaying to Decrease the Concentration of Oyster-Associated Pathogens, David W. Cook and R. D. Ellender, Microbiology Section, Gulf Coast Research Laboratory, Ocean Springs, Mississippi 39564, and Department of Biological Sciences, University of Southern Mississippi, Hattiesburg, Mississippi 39406

J. Food Prot. 49:196-202

Oysters experimentally contaminated with indicator bacteria, *Salmonella* and poliovirus were used in relaying studies designed to measure microbial elimination under a variety of environmental conditions. Two factors, level of microorganism in the oyster and temperature of the water, were important in determining the length of time necessary to purge the contaminating organisms. Oysters under physiological stress cleansed at a slower rate than did healthy oysters. Based on the expected level of pathogen contamination in naturally polluted oysters, healthy relaid oysters were capable of cleansing in a 7-d period provided the temperature was above 10°C. These results were verified by following the elimination of indicator bacteria and poliovirus in commercially relaid oysters. Fecal indicator bacteria and enteric pathogenic bacteria were eliminated at similar rates but fecal coliform levels did not correlate with virus elimination. Relaying waters may contain some indicator bacteria and this study suggested that fecal coliforms may not be useful as end-point indicators for this method of oyster purification.

Survival of *Clostridium perfringens* and Aerobic Bacteria in Ground Beef Patties during Microwave and Conventional Cookery, L. Wright-Rudolph, H. W. Walker and F. C. Parrish, Jr., Department of Food Technology and Animal Science, Iowa State University, Ames, Iowa 50011

J. Food Prot. 49:203-206

Conventional oven cookery was more effective than microwave oven cookery for reducing numbers of aerobic microorganisms and *Clostridium perfringens* in ground beef patties when the meat was heated to approximately the same internal temperatures of 65-71°C for rare or 77-93°C for well done. Reductions in numbers of *C. perfringens* during microwave cookery of patties inoculated with 10^5 vegetative cells/g ranged from 0.75 to 1.48/g (log values); for conventional cookery, these reduction values ranged from 3.51 to 8.06/g (log values). Recovery of heat-stressed cells of *C. perfringens* was equally efficient in Trypton-Sulfite-Cycloserine agar and Sulfite-Polymyxin-Sulfadiazine agar.

Microbiological and Sensory Tests of Beef Treated with Acetic and Formic Acids, M. F. Bell, R. T. Marshall and M. E. Anderson, Department of Food Science and Nutrition, University of Missouri-Columbia, Columbia, Missouri 65211 and U.S. Department of Agriculture, Agricultural Research Service, 113 Eckles Hall, University of Missouri, Columbia, Missouri 65211

J. Food Prot. 49:207-210

One-centimeter cubes of the semimembranosus and adductor muscles of beef were inoculated with 5.2 × 10^6 of *Salmonella typhimurium, Shigella sonnei, Yersinia enterocolitica, Escherichia coli, Pseudomonas aeruginosa* or *Streptococcus faecalis*. Exposure of the meat by dipping in 1.2% acetic acid for 10 s reduced averge numbers recoverable of these bacteria by 65%. *E. coli* was the most resistant, losing 46% of its viable cells. One-half of the acetic acid was replaced with 0.046% formic acid without loss in effectiveness. The rate of increase in antimicrobial effects of the treatment declined with time. Discoloration of the meat occurred after dipping in both 1.2% acetic acid, and 0.6% acetic plus 0.046% formic acids for 10 s. In triangle tests of flavor, panelists failed to differentiate samples of baked ground beef treated (before grinding) with 0.6% acetic acid and 0.046% formic acid from controls dipped in water ($P<0.05$). However, the same type of test showed a significant flavor difference between meat dipped in 1.2% acetic acid or distilled water.

Prerigor Versus Chilled Boning of Beef Carcass Sides on the Rail: Measurement of Time, Effort, Yield, and Space Requirements, Clayton F. Brasington, Dennis M. Stiffler and Raymond A. Stermer, Texas A&M University, College Station, Texas 77843

J. Food Prot. 49:211-215

Twenty-four mixed-breed heifers were slaughtered in groups of four. Their slaughter ages were from 18 to 20 months and the hot carcass weights ranged from 218 to 277 kg. A time study of on-the-rail boning of prerigor "hot" and chilled sides showed that chilled sides required 30% more time to process. Boning of chilled sides was more difficult and demanded about 49% more effort than the boning of hot sides. The yield of boneless meat was 0.51% greater when removed hot than the boneless meat removed after 24 h in a 0°C cooler. The shrink and cutting loss for chilled-boned sides was 2.46% with 2.19% shrink during overnight storage in the chill cooler and 0.27% cutting loss. It is suggested that hot-boned meat be transferred to further processing immediately or rapidly chilled to below 8°C to maintain the microbiological integrity. The space requirements for storing carcasses and boxed meat is 81% less when the conventional cold-boning process is replaced by the accelerated hot-boning process.

Microanalytical Quality of Ground and Unground Marioram, Sage and Thyme, Ground Allspice, Black Pepper and Paprika, John S. Gecan, Ruth Bandler, Larry E. Glaze and John C. Atkinson, Division of Microbiology and Division of Mathematics, Food and Drug Administration, Washington, D.C. 20204

J. Food Prot. 49:216-221

A 3-year national retail market survey was made to determine the sanitary quality of ground and unground marjoram, sage and thyme, and ground allspice, black pepper and paprika. The official methods of the Association of Official Analytical Chemists were used to count light filth such as insect fragments, rodent hair fragments, feather barbules, mites, thrips and aphids. Insect fragments were the most frequently encountered defect, with count means ranging from 7.8 for 10 g of ground allspice to 287.7 for 10 g of ground thyme. The percent of samples containing insect fragments ranged from 70.8 to 99.6 for ground allspice and ground thyme, respectively. Other counts ranged as follows: rodent hair fragments, 0 to 200 (for 10 g of ground sage); feather barbules, 0 to 60 (for 10 g of ground sage); mites, 0 to 999 (for 25 g of unground thyme); thrips, 0 to 99 (for 25 g of unground thyme); aphids, 0 to 116 (for 10 g of ground sage). Howard mold counts of paprika ranged from 0 to 99%, with a mean of 2.8%.

Effect of Processing, Packaging and Various Antioxidants on Lipid Oxidation of Restructured Pork, Robert S. Miles, Floyd K. McKeith, Peter J. Bechtel and Jan Novakofski, Meat Science Laboratory, Department of Animal Sciences, University of Illinois-Urbana, Illinois 61801

J. Food Prot. 49:222-225

Effects of processing (prerigor vs. postrigor), packaging (vacuum vs. PVC overwrap) and various antioxidants [sodium tripolyphosphate (STP); butylated hydroxyanisole (BHA); butylated hydroxytolulene (BHT) plus citric acid (BBC); α-tocopherol (Toc); and ascorbyl palmitate plus α-tocopherol (APT)] on the oxidation of restructured pork chops after storage at 4°C were evaluated. Three barrows were slaughtered on separate days and were used as replicates in the experiment. One side of each carcass was boned within 1 h postmortem (prerigor) and the remaining side was boned after 24 h at 4°C (postrigor). Restructured chops were formulated to contain 25% fat and six 4.5-kg batches were randomly allotted to the six antioxidant treatments: (a) 0% NaCl (NSC); (b) 0.5% NaCl (SC); (c) 0.5% NaCl + 0.5% STP; (d) 0.5% NaCl + BBC; (e) 0.5% NaCl + Toc; and (f) 0.5% NaCl + APT. Batches were stuffed in a fibrous casing, frozen for 2 h and sliced (19 mm). The sliced chops were randomly allotted to vacuum and PVC overwrap packaging treatments and evaluated for discoloration and TBA value on days 0, 4, 8, 12 and 16. Vacuum packaging reduced discoloration scores and lowered TBA values ($P<0.01$) on days 8, 12 and 16. TBA values for all antioxidant treatments differed from the SC treatment on days 12 and 16 ($P<0.05$). These data indicate that antioxidants and/or vacuum packaging are effective methods of controlling discoloration and oxidation of restructured pork during storage; however, processing time postmortem did not affect ($P>0.05$) the rate of lipid oxidation.

A Method for Recovery of Poliovirus 1 from a Variety of Foods, Robert Sullivan, James T. Peeler and Edward P. Larkin, Center for Food Safety and Applied Nutrition, U.S. Public Health Service, Food and Drug Administration, Cincinnati, Ohio 45226

J. Food Prot. 49:226-228

A method was developed for the recovery of low numbers of plaque-forming units (PFU) of inoculated poliovirus type 1 from seven different foods. Viruses were eluted at pH 9.0 from 25-g food test portions, concentrated at pH 4.5, and eluted at pH 7.5. The final eluates were assayed for PFU in African green monkey kidney (BGM) cell monolayers. The average virus input ranged from 55 to 79 PFU per unit portion. The average percent recoveries were as follows: potato salad, 61; radishes, 54; celery, 45; mushrooms, 44; carrots, 42; clams, 38; and oysters, 35. Three control products were negative for each food.

A Survey of the Microbiological Quality of Processed Cheese Products, Donald W. Warburton, Pearl I. Peterkin and Karl F. Weiss, Bureau of Microbial Hazards, Food Directorate, Health Protection Branch, Health and Welfare Canada, Tunney's Pasture, Ottawa, Ontario, Canada K1A 0L2

J. Food Prot. 49:229-230

A study done in 1980 to 1981 assessed the overall bacteriological quality of three varieties of domestic and imported processed cheese products. All of the 78 lots tested had counts of <1.8 *Escherichia coli* and coliforms/g, and had no staphylococcal thermonuclease activity. Domestic products had significantly higher levels of aerobic sporeformers than imported products ($\alpha = 0.05$), whereas the differences in levels of anaerobic sporeformers in these products were not significant. Results of this study indicated that good manufacturing practices were used during the processing of these products.

Effect of Pyruvate on Recovery of Fungi from Foods, John A. Koburger, Food Science and Human Nutrition Department, University of Florida, Gainesville, Florida 32611

J. Food Prot. 49:231-232

The addition of 0.5% sodium pyruvate to antibiotic-supplemented plate count agar significantly increased the recovery of fungi from 50 food samples. Both yeasts and molds responded to the addition of pyruvate, with an overall increase in recovery of 8.0%.

Growth and Death of Selected Microorganisms in Ultrafiltered Milk, Patricia Haggerty and Norman N. Potter, Department of Food Science, Cornell University, Ithaca, New York 14853

J. Food Prot. 49:233-235

Studies were made to compare the growth and death of *Staphylococcus aureus*, *Streptococcus faecalis* and *Escherichia coli* in skim milk concentrated by ultrafiltration to that in unconcentrated skim milk. Skim milk was volume concentrated to 2× in laboratory-scale stirred UF cells. Behavior of the organisms was analyzed in four inoculated milk samples: 2× retentate, 1× water-diluted retentate, milk equivalent (retentate plus permeate) and unconcentrated skim milk. Growth of each organism and of total aerobes did not vary in the four milk samples at either 7 or 13°C. For *S. faecalis* and *E. coli*, D-values for samples heated to 62.7°C did not significantly differ in the four milk samples ($p > 0.01$). The D-value of *S. aureus* in water-diluted retentate was slightly but significantly lower than those in the other three milk samples ($p < 0.01$), possibly due to the lowered lactose level in this sample.

Comparison of Particulate Air Samplers for Detection of Airborne *Aspergillus flavus* Spores, J. Clayton Silas, Mark A. Harrison, John A. Carpenter and James B. Floyd, Food Science Department, University of Georgia, Athens, Georgia 30602

J. Food Prot. 49:236-238

Four air samplers (Millipore, all-glass impinger, Andersen and absorbent cotton) were evaluated for their ability to collect airborne grain particles contaminated with *Aspergillus flavus* spores. Corn dust containing 6.4×10^6 spores/g was aerosolized within a containment system. Each device sampled 100 L of air, thus exchanging the air in the chamber two times. Spores were enumerated from all sampling matrices using *Aspergillus flavus/parasiticus* agar. The efficiencies of the Millipore and the cotton samplers were almost identical, while that of the all-glass impinger was less. Measurement of particle size with the Andersen sampler revealed that these spores were associated with particles of various sizes.

Immunologic and Allergic Properties of Cows' Milk Proteins in Humans, Steve L. Taylor, Food Research Institute, University of Wisconsin-Madison, 1925 Willow Drive, Madison, Wisconsin 53706

J. Food Prot. 49:239-250

Cows' milk is an important component of the diet especially during infancy. Yet, cows' milk can elicit allergic and other sensitivity reactions in some individuals. Cows' milk allergy (CMA) results from an abnormal immunologic reaction to cows' milk proteins. IgE responses are definitely involved in CMA. Immune complexes and tissue lymphocytes may also play a role in some forms of CMA, but further evidence is needed to firmly establish this possibility. The presence of circulating antibodies to cows' milk proteins of the IgG, IgA and IgM classes is not clinically significant. Such antibodies are found in both normal and allergic individuals. β-Lactoglobulin and casein are the most common cows' milk allergens, although other cows' milk proteins may play important roles in some cases. Partial digestion of cows' milk proteins may enhance their allergenicity, whereas complete hydrolysis abolishes their allergenicity. Heating can also alter the allergenicity of the cows' milk proteins, but rather severe heating is required. More research will be necessary to develop hypoallergenic processing methods for cows' milk.

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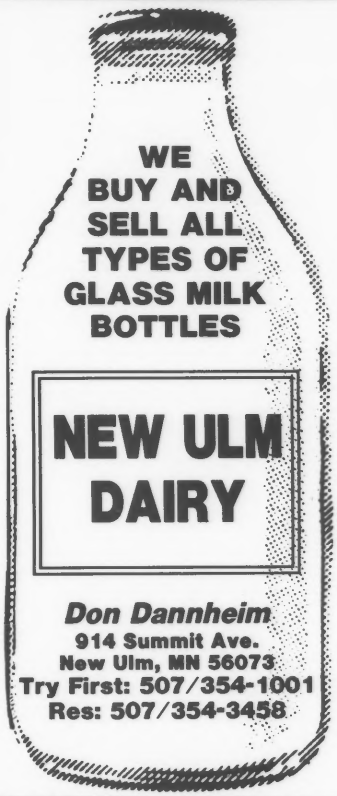

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Calendar

1986

March 4-5, VIRGINIA ASSOCIATION OF SANITARIANS AND DAIRY FIELDMEN'S ANNUAL MEETING, to be held at Virginia Polytechnic Institute & State University. For more information contact: W. J. Farley, Rt. 1, Box 247, Staunton, VA 24401.

March 9-11, FOOD SANITATION EDUCATIONAL EXPERIENCE WORKSHOP, Orlando, FL. For more information contact: Harold Rowe at 813-586-5710 or write: Jean Day, Registrar, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540.

March 10-12, IDAHO ENVIRONMENTAL HEALTH ASSOCIATION ANNUAL MEETING, to be held at Boise State University, Boise, Idaho. For more information contact: Nancy Bowser, 1455 N. Orchard, Boise, Idaho.

March 12-13, THIRD ANNUAL CHEESE RESEARCH AND TECHNOLOGY CONFERENCE, to be held at the Dane County Forum and Sheraton Inn and Conference Center, Madison, WI. For more information contact: Norman F. Olson, Professor, Department of Food Science, UW-Madison, 107 Babcock Hall, 1605 Linden Drive, Madison, WI 53706. 608-263-2001.

March 16-19, AMERICAN CULTURED DAIRY PRODUCTS INSTITUTE ANNUAL MEETING AND CONFERENCE, to be held at Hilton Palacio Del Rio, San Antonio, TX. For more information contact: Dr. C. Bronson Lane, ACDPI, P. O. Box 7813, Orlando, Florida 32854. 202-223-1931.

March 19, INDIANA DAIRY INDUSTRY CONFERENCE, to be held at Stewart Center, Purdue University, West Lafayette, IN. For more information contact: James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN. 47907. 317-494-8279.

March 19, ONTARIO FOOD PROTECTION ASSN. TECHNICAL SEMINAR, Sanitation Through Design, to be held at the Airport Holiday Inn, Rexdale, Ontario, Canada. For more information contact the OFPA, PO Box 79, Streetsville, Ontario L5M 2B7.

March 19-21, MICHIGAN ENVIRONMENTAL HEALTH ASSOCIATION, to be held at Hilton Shanty Creek, Bellaire, Michigan. For more information contact: Ike Volkers, Division Environmental Health, PO Box 30035, Lansing, MI. 517-373-1373.

March 24-28, MID-WEST WORKSHOP IN MILK AND FOOD SANITATION, to be held at Ohio State University. For more information contact: John Lindamood, Department of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH. 43210.

March 25 & 26, WESTERN FOOD INDUSTRY CONFERENCE, to be held at University of California, Davis, CA. 95616. For more information contact: J. C. Bruhn or Shirley Rexroat, Department of Food Science & Technology, University of California, Davis, CA. 95616. 916-752-2191.

March 26-28, MISSOURI MILK, FOOD AND ENVIRONMENTAL HEALTH ASSOCIATION ANNUAL MEETING, to be held at the Ramada Inn, Columbia, MO. For more information contact: John Norris, Division Health, Box 570, Jefferson City, MO 65101. 314-751-3696.

April 2, OHIO ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS ANNUAL MEETING, to be held in Columbus, OH. For more information contact: Donald L. Barrett, 6727 Deepwood Ct., Reynoldsburg, OH 43068. 614-222-6195.

April 7-9, BAKING PRODUCTION TECHNOLOGY REGIONAL SEMINAR. For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

April 7-11, SENSORY EVALUATION OF FOOD. For more information call: 800-752-0881. Davis/Dixon residents please call 752-0880.

April 14-15, ADVANCED PEST CONTROL SEMINAR. For more information contact: Shirley Grunder, Sanitation Education Department, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

April 14-18, STATISTICAL QUALITY CONTROL SHORT COURSES, Statistical Methods Applied to Productivity Improvement and Quality Control - For the Food Processing Industry, to be held at the University of California, Davis, CA. For more information contact: Robert C. Pearl, Food Science & Technology Dept., University of California, Davis, CA 95616. 916-752-0980.

April 14-18, FRUIT AND FRUIT TECHNOLOGY RESEARCH INSTITUTE INTERNATIONAL CONFERENCE to be held at the CSIR Conference Centre, South Africa. For more information contact: Symposium Secretariat S.341, CSIR, P.O. Box 395, Pretoria 0001, South Africa. Telephone: 012 869211 x 2063. Telex: 3-630 SA.

April 15-17, FLAVOR WORKSHOP II. For more information contact: Gary Reineccius, University of Minnesota, Dept of Food Science, 1334 Eckles Ave., St. Paul, MN 55108. 612-373-1438.

April 21, AIMFES ANNUAL SPRING SEMINAR at the Holiday Inn in Rolling Meadows, IL. For more information contact: Clem Honer, 1 S. 760 Kenilworth Ave., Glen Ellyn, IL 60137. 312-693-3200.

April 21-23, FOOD ANTIOXIDANTS SYMPOSIUM: INTERNATIONAL PERSPECTIVES to be held at the Loew L'Enfant Plaza Hotel, Washington, D.C. Preregistration deadline: March 14, 1986. For more information contact: Ms. Elaine Auld, International Life Sciences Institute - Nutrition Foundation, 1126 Sixteenth Street, N.W. Suite 111, Washington, DC. 20036. 202-659-0074/872-0778.

April 21-May 2, REFRIGERATION TECHNOLOGY. For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

April 22-23, FLORIDA ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS MEETING, to be held at the International Inn, Orlando, FL. For more information contact: Dr. Franklin Barber, 1584 Cumberland Ct., Fort Myers, FL 33907.

April 23, SANITATION WORKSHOP FOR THE FOOD PROCESSING AND FOOD SERVICE INDUSTRIES, to be held at Inn at the Park, Anaheim, CA. For more information contact: Kathryn Boor, Food Science and Technology, University of California, Davis, CA 95616. 916-752-1478.

April 27-30, AOAC SPRING TRAINING WORKSHOP, to be held at the Stouffer Madison Hotel, Seattle, WA. For more information contact: Mike Wehr, Oregon Dept. of Agriculture. 503-378-3793.

April 28-29, MOLD MONITORING AND CONTROL SEMINAR. For more information contact: Shirley Grunder, Sanitation Education Department, 1213 Bakers Way, Manhattan, KS 66502.

April 28-30, FOOD INDUSTRY CERTIFICATION/RECERTIFICATION PESTICIDE UPDATE WORKSHOP & EXPOSITION for all midwestern states, Matteson, Illinois. For more information contact: Harold Rowe at 813-586-5710 or write: Jean Day, Registrar, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540.

April 28-30, PIZZA TECHNOLOGY. For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

April 29-May 1, WORKSHOP ON TRACE ANALYSIS OF FOODS. For more information contact: G. Reineccius, Department of Food Science and Nutrition, University of Minnesota, 1334 Eckles Avenue, St. Paul, MN 55108. 612-373-1438.

April 30-May 2, SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSOCIATION ANNUAL MEETING. For more information contact: Stanley A. Swagoshi, South Dakota Department of Health, 1320 So. Minnesota, Suite A, Sioux Falls, SD 57105. 605-339-7113.

April 30-May 2, PIZZA TECHNOLOGY LAB. For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

May 4-9, FOOD SANITATION EXECUTIVE LEADERSHIP INSTITUTE, University of Illinois, Champaign, Illinois. For more information contact: Harold Rowe at 813-586-5710 or write: Jean Day, Registrar, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540.

May 5-7, 6TH INTERNATIONAL FOOD & WINE SHOW, to be held at the Civic Auditorium and Brooks Hall, San Francisco, CA. For more information contact: Sandra Call, National Fairs Inc., 1902 Van Ness Avenue, San Francisco, CA 94109. 415-474-2300.

May 12-15, ASEPTIC PROCESSING AND PACKAGING WORKSHOP, to be held at Purdue University, West Lafayette, IN. For

more information contact: James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907. 317-494-8279.

May 12-15, 3-A SANITARY STANDARDS COMMITTEE ANNUAL MEETING, to be held in Kansas City, MO. For more information contact: Lisa M. Devery, Dairy and Food Industries Supply Association, Inc., 6245 Executive Boulevard, Rockville MA 20852. 301-984-1444.

May 12-14, PENNSYLVANIA DAIRY SANITARIANS ASSOCIATION MEETING, to be held at Pennsylvania State University. For more information contact: Sidney Barnard, Pennsylvania State University, 8 Borland Lab, University Park, PA 16802. 814-863-3915.

May 12-16, APPLICATION AND TROUBLESHOOTING MICROPROCESSOR CONTROL CIRCUITS. For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

May 26-31, 2ND WORLD CONGRESS FOODBORNE INFECTIONS AND INTOXICATIONS will take place in Berlin (West) at the International Congress Centre (ICC). For more information contact: FAO/WHO Collaborating Centre for Research and Training in Food Hygiene and Zoonoses, Institute of Veterinary Medicine (Robert von Ostertag-Institute), Thielallee 88-92, D-1000 Berlin 33.

June 2-3, TEXAS ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL PROTECTION ANNUAL MEETING, to be held at the Executive Plaza, Austin, TX. For more information contact: Kirmon Smith, Texas Department of Health, 1100 W. 49th, Austin, TX 78756. 512-458-7111.

June 9-20, COOKIE TECHNOLOGY. For more information contact: Bev Martin, Research Department, American Institute of Baking, 1213 Bakers Way, Manhattan KS 66502.

June 16-19, BASIC FOOD PLANT MICROBIOLOGY. For more information contact: Shirley Grunder, Sanitation Education Department, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

June 23-27, CRACKER TECHNOLOGY. For more information contact: Bev Martin, Research Department, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

June 29-July 2, 29TH CONFERENCE OF THE CANADIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY, to be held in Calgary, Alberta, Canada. For more information contact: Terry Smyrl, Ph.D., Alberta Horticultural Research Center, Brooks, Alberta, Canada, T0J 0J0. 403-362-3391.

June 30-July 3, SPECIALITY INGREDIENT AND PROCESSING (COOKIE). For more information contact: Bev Martin, Research Department, American Institute of Baking, 1213 Bakers Way, Manhattan KS 66502.

July 12-19, SIXTH INTERNATIONAL WORKSHOP ON RAPID METHODS AND AUTOMATION IN MICROBIOLOGY, to be held at Kansas State University. For more information concerning Program contents contact: Daniel Y.C. Fung, Call Hall, Kansas State University, Manhattan, KS. 66506. 913-532-5654. For registration information contact: Joe Pittle, Conference Center, Wareham building, Anderson Avenue, Manhattan, KS 66502. 913-532-5575.

July 14-18, TECHNOLOGIA DE PRODUCTION DE PAN (BREAD PRODUCTION FOR SPANISH SPEAKING BAKERS). For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

July 14-18, IN-STORE BAKERY TRAINING-FROZEN DOUGH OPERATIONS. For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

July 15-19, PURDUE CANNERS TECHNICIANS MOLD COUNT SCHOOL. For more information contact: Dr. James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907. 317-494-8279.

July 21-25, PRINCIPLES OF BAKERY PRODUCTION-BREAD OR CAKE. For more information contact: Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

AUGUST 3-7, IAMFES ANNUAL MEETING to be held at the Radisson South, Minneapolis, MN. For more information contact: Kathy R. Hathaway, IAMFES, Inc., P.O. Box 701, Ames, IA 50010. 515-232-6699.

AUGUST 10-15, 1986 ANNUAL MEETING OF THE SOCIETY FOR INDUSTRIAL MICROBIOLOGY to be held at the Sheraton-Palace Hotel, San Francisco, CA. For more information contact: Mrs. Ann Kulback - SIM Business Secretary, SIM Headquarters, P.O. Box 12534, Arlington, VA 22209. 703-941-5373.

October 21-22, CALIFORNIA ASSOCIATION OF DAIRY AND MILK SANITARIANS ANNUAL MEETING, to be held at Holiday Inn Downtown, Fresno, CA. For more information contact: Richard C. Harrell, 1554 West 120th St., Los Angeles, CA 90047. 213-757-9719.

November 1-6, FOOD SANITATION 29TH ANNUAL NATIONAL EDUCATIONAL CONFERENCE & EXPOSITION, Scottsdale, Arizona. For more information contact: Harold Rowe at 813-586-5710 or write: Jean Day, Registrar, Food Sanitation Institute, 1019 Highland Ave., Largo, FL 33540.

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AUGUST 2-6, IAMFES ANNUAL MEETING to be held at the Disneyland Hotel, Anaheim, CA. For more information contact: Kathy R. Hathaway, IAMFES, Inc., P.O. Box 701, Ames, IA 50010. 515-232-6699

September 23-25, WYOMING PUBLIC HEALTH SANITARIANS ASSOCIATION ANNUAL MEETING, to be held at the Holiday Inn, Thermopolis, WY 82443. For more information contact: William George, 118 1/2 N. 11th, Worland, WY 82401. 307-347-2617.

September 26-30, DFISA's FOOD & DAIRY EXPO '87, to be held at McCormick Place, Chicago, IL. For more information contact: DFISA, 6245 Executive Boulevard, Rockville, MA 20852. 301-984-1444.

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