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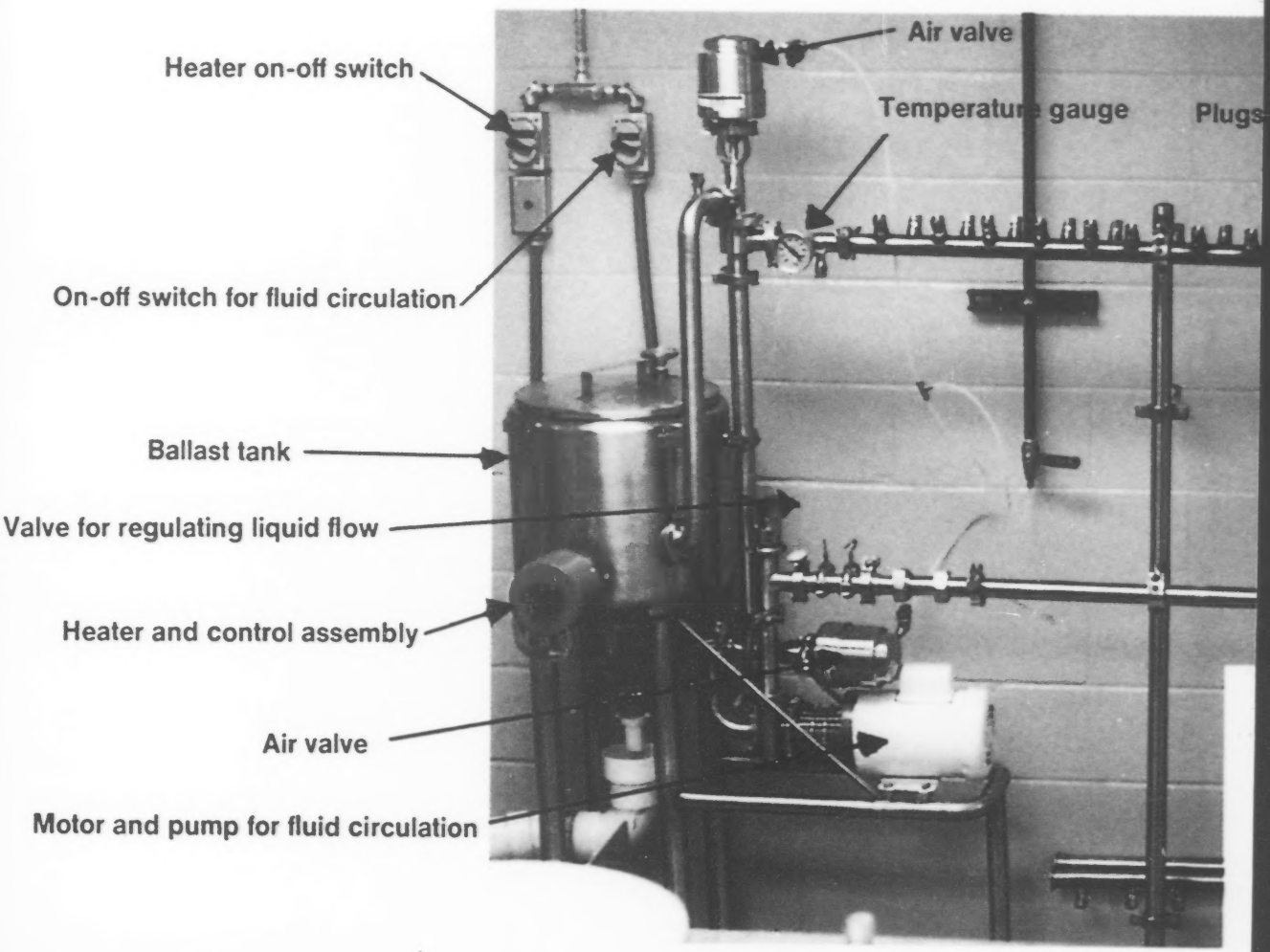
DAIRY, FOOD AND ENVIRONMENTAL

SANITATION

JANUARY 1993



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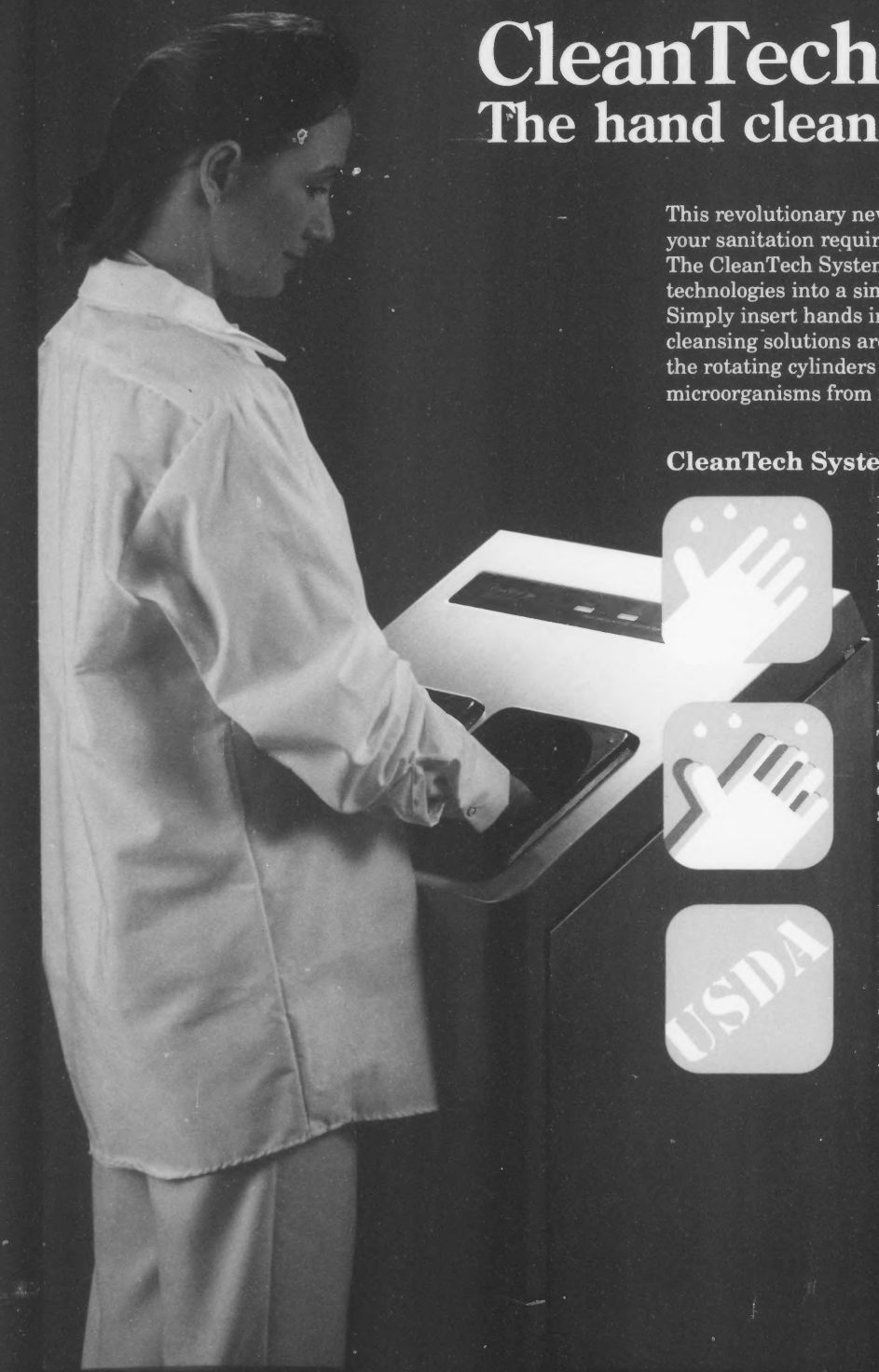

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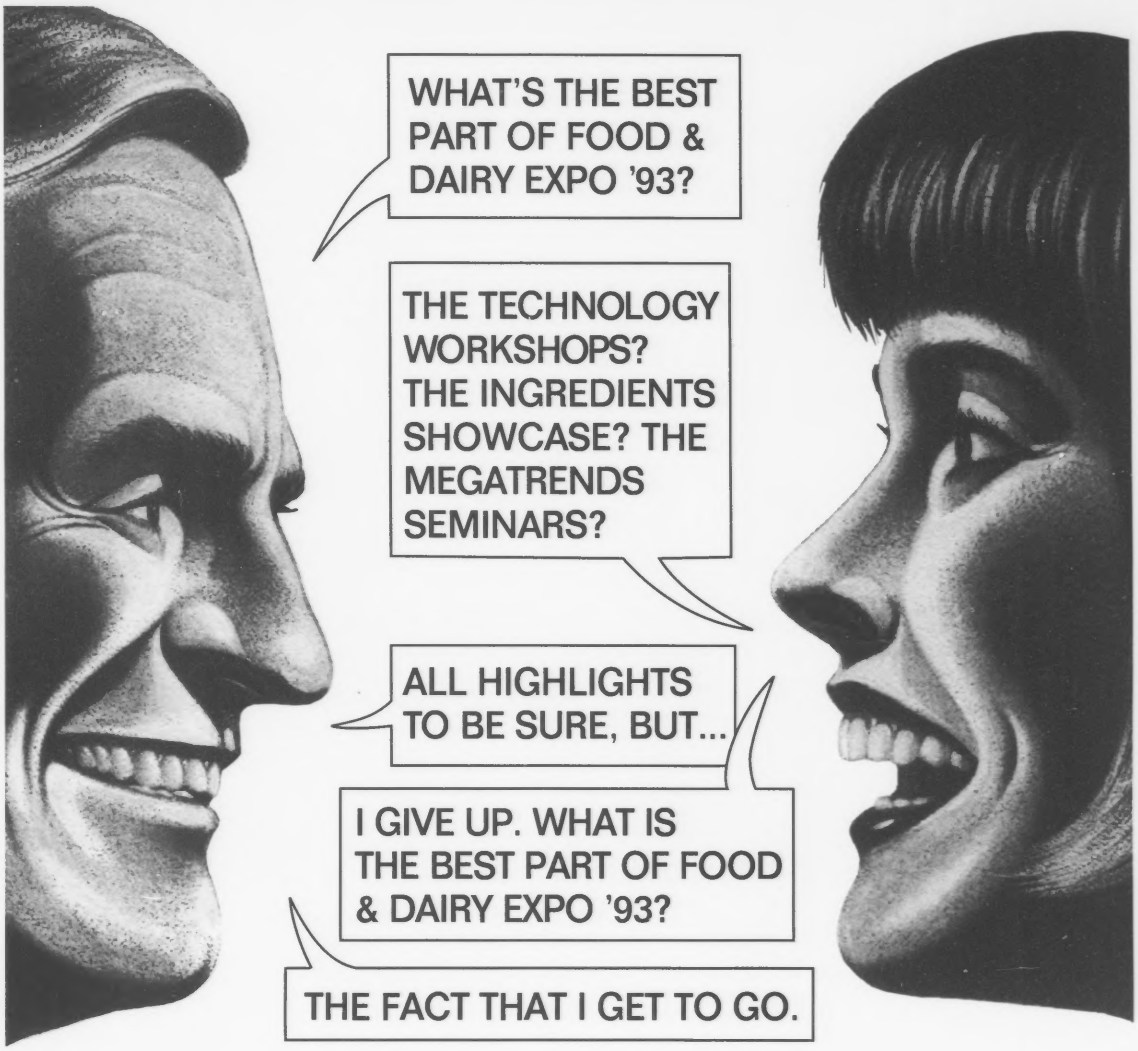

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ABOUT THE COVER . . . . *Tubular Flow System. Photo courtesy of Diversey Corporation, International Biocide Laboratory, Livonia, MI.*

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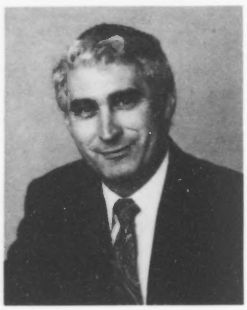
Thoughts From the President . . .



By
Michael P. Doyle
IAMFES President

Putting Food Safety Issues in Perspective

Recently I received an urgent request from a professional society to comment on a press release put out by a major medical association about two articles that would be published in an upcoming issue of the medical association's journal. One article dealt with an outbreak of salmonellosis associated with eating mozzarella cheese. The other was about an outbreak of shigellosis in which sandwiches prepared by a mass caterer and served on an airline were the vehicle.

Both outbreaks were thoroughly investigated and the team of researchers convincingly identified the problem foods. Clearly, the scientists did commendable work. They found in both outbreaks that there were breaches in good manufacturing practices in the sanitary handling of foods. These outbreaks exemplified what can happen if failures in safe food handling practices occur.

Contributing factors to the cheese-related outbreak, however, were highly unusual and did not represent practices typically used in the cheese industry. The plant that manufactured the *Salmonella*-contaminated cheese was in the process of bankruptcy proceedings and subsequently reduced plant sanitation as a cost-saving measure. This was a highly irregular occurrence because cheese normally is produced in plants which employ good manufacturing practices. These practices include a regimented sanitation program designed to prevent dissemination of foodborne pathogens. Furthermore, cheese manufacturing plants are inspected one to four times per year by state public health personnel to assure that good manufacturing practices are in place and being employed.

Some of the comments appearing in the news release were troubling because they essentially damned an entire industry for the apparent misconduct of one manufacturer using insanitary practices. For example, the lead sentence of the release stated, "Add cheese to the list of those foods to be watched closely for *Salmonella* contamination . . ." An invited editorial of the article by a noted researcher of travelers' diarrhea was cited as categorizing cheese as an "occasionally unsafe food."

Not mentioned in the release was that more than 6 billion pounds of cheese are produced commercially in the U. S. annually, and in the past 35 years only 6 documented outbreaks have been associated with commercially-manufactured cheese made in the U. S. from cow's milk. Considering the large volume of cheese consumed and the small number of reported outbreaks, it appears that commercially-manufactured cheese made in the U.S. from cow's milk is among the safest of foods.

It is the responsibility of food safety professionals not only to inform the public of food safety-related problems that occur but also to report the relative safety of similar products in the marketplace. The consumer is confused and hungry for sound, factual information. It is the duty of professional societies and all of us who communicate food safety information to provide the best data available from all perspectives so that the consumer can make an informed decision about what foods to eat.

On My Mind . . .

By
Steven K. Halstead, CAE
IAMFES
Executive Manager

...is perception versus reality

The Strategic Long Range Planning Task Force met on the Thursday following the close of our 1992 Annual Meeting. Roughly 25 people spent the entire day reviewing and discussing every conceivable aspect of IAMFES. The process was under the watchful, insightful eye of our facilitator, David Domsch from the Lawrence-Leiter and Company consulting group. Another part of David's job was to keep notes on the meeting and to produce a report. (David took his notes on newsprint paper with a magic marker, which he taped to the walls. By the end of the day, newsprint, two sheets high, encircled the room!)

In late October, we received the first draft of the report with instructions to go through the draft, correct any errors and typos, and suggest ways of clarifying the presentation.

Even though I had been at the meeting and heard virtually everything that was in the report, somehow it seem different to see it in print. As though it was more important. As though it was more real.

I was faced with a dilemma. As I worked through the draft, I was supposed to make corrections. The typos were easy. The difficult part was when I came across things that were accurately reported, but incorrect. When reality and the perception did not match.

Let me give you two examples.

"The cost (of the Annual Meeting) is too high, even some speakers we would like to have at the meeting can't afford to attend the meeting."

For 1993, our fee for members who pre-register is $145. For that, they receive a free wine and cheese reception, a free breakfast, a free lunch, and a free banquet. I invite you to compare that value with any other national meeting.

Granted, this does not take into account the cost of getting to the meeting, the hotel cost, and the meal expenses while at the meeting. While there is little we can do to control any of those costs, we would still invite you to compare the costs in attending our meeting with those of any other national meeting. I think you will agree that ours are as cheap, if not cheaper, than the others.

"We have a low membership participation."

Something on the order of 18% of our membership attended our annual meeting in Toronto. At the 1992 Annual Meeting of the American Society of Association Executives--my professional association--a good deal less than 10% attended. At any given meeting of my local Lions club, less than half the members attend and we have one of the best attendance records in the district!

If you add in the number of people who write articles for the journals, participate in the committees, task forces, and professional development groups or participate in their local affiliate, our participation rates would be much greater. While I would agree that we have too many members who just receive the journals, and while I would like to see more participation, I think that our members are pretty involved with their association.

In a sense, this will be a reality check for us.

None of the above is to imply that the persons who made these comments are wrong. Where perceptions are concerned, there is no "right and wrong." Rather, when the perception varies with reality, there is an opportunity for us to educate the membership in an effort to change their perception to reflect the reality.

Beginning in January, we are having Lawrence-Leiter conduct a telephone survey of randomly selected members and non-members. Many of the questions we will be asking will seek to determine perceptions about IAMFES. In a sense, this will be a reality check for us. It will then be our job to analyze these points and proceed to act upon them.

If you receive one of the survey calls, please be as honest and open as you can possibly be. More than at any other point in time, we need your input.

Dairy, Food and Environmental Sanitation, Vol. 13, No. 1, Pages 8-10 (January 1993)

Milk and Dairy Beef Quality Assurance Program: Where Are We Now?

G. M. Jones and B. R. Eastwood
Virginia Tech and USDA-ES
Blacksburg, Virginia and Washington, D.C.

Recent reports in the public media and results of two Food and Drug Administration (FDA) surveys, as well as a congressional hearing and a General Accounting Office (GAO) report, have created considerable criticism and public outcry over the presence of animal drug residues in milk. The GAO study suggested that FDA was unable to assure the American consumer that milk was free from potentially harmful drug residues and claimed that FDA has not determined "safe" milk residue levels for many of the drugs used extra label. One farm magazine has stated that "the public can have little faith in FDA's claim that milk is safe..." (7). One FDA survey found low level residues in 80% of the milk sampled. Consequently, FDA is undertaking the first-ever nationwide program for direct federal monitoring of the U.S. milk supply, where they will test 250 locations regularly for the presence of eight sulfa and three tetracycline drugs.

Source of Adulteration

A summary of the national residue avoidance program indicated drug violations in dairy cattle were much greater than found in poultry, swine, or beef cattle (5). Most residues were antibiotics or sulfas. The most common causes were: (1) Not following withdrawal times, (2) Residues occurred although withdrawal times were followed, (3) Dry cow therapy, and (4) Intrauterine infusion. A survey of violator and random herds for causes of residues in market calves concluded that over 80% of residues occurred in bull calves less than 14 days of age. Death losses were greater in violator herds, where a majority of farms fed colostrum milk but fed it improperly. In the case of milk residues, Jones and Seymour (8) cite FDA surveys that the major source of contamination is improper use of antibiotics for the control of mastitis in dairy cows. A large percentage of drug residues in beef carcasses has been attributed to culled dairy cows that had been treated for mastitis (4).

Another study has indicated the most common reasons for antibiotic residues include: (1) Failure to withhold milk for the proper length of time, (2) Accidental transfer of milk from treated cows to bulk tanks, and (3) Prolonged excretion of the drug from treated cows (3). Seymour et al (13) found antibiotic residues in over 20% of cows at the end of the label discard time. Penicillin was shown to persist from 48 hours to 16 days after administration. Many of the label discard times were established by determining elimination of residues in milk from treating healthy, normal cows rather than using diseased cattle. Penicillin was eliminated slower from mastitic cows than healthy ones (2).

A recent Canadian study compared 94 antibiotic residue violator herds with 94 negative herds for differences in dairy management practices. Factors significantly associated with occurrence of drug violations included (10):

1. Greater use of part-time employees for milking,
2. A greater percentage milked cows in milking parlors than tie stall/pipeline barns,
3. Lower use of antibiotic residue test kits on farms.

Other areas of difference between violator and random herds included: less use of teat dip and dry cow therapy, and failure to use separate milking equipment for milking treated cows by violator herds. A greater number of violator herds had treated cows within the five days preceding the violation, especially for mastitis. Fewer managers of violator herds believed that a doubling of the therapeutic dose required a longer withholding time. From this study, it would appear that violator herds used fewer good management practices for the control of mastitis, treated a greater number of cows with antibiotics, and had less knowledge about mastitis control in general. Of those herds that had recently administered drugs to cows, 77% had administered intramammary infusions and 48% had treated extra-label.

Unfortunately, many drugs do not have detection tests that have been approved, especially drugs not approved for use in lactating dairy cattle. The GAO study claimed that FDA testing methods had the capacity of detecting only a few of the 53 drugs approved for use in dairy cattle and these methods did not screen for drugs not approved or drugs used only "extra-label".

In 1984, it was estimated that antibiotic contaminated milk cost the U.S. dairy industry 50 million dollars (11). The consumer's perception that milk has not been contaminated with antibiotics/drugs is important and is second only to their concerns over herbicides and pesticides (1). In addition, antibiotics markedly interfere with the manufacture of cultured dairy products and cheese, and an estimated 5 to 10% of the population has an allergic reaction when exposed to even low concentrations of antibiotics, especially penicillin (6, 9).

The authors are Assistant Director, Agriculture & Natural Resources, Virginia Cooperative Extension Service, and Program Leader, Dairy, USDA Extension Service.

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Dairy Quality Assurance Program

There is an urgent need for the dairy industry to develop a plan that reduces the presence of drug residues in milk and dairy beef, without which dairy producers could further jeopardize consumer confidence in the safety of these foods. There is a need to increase the level of education and understanding within the industry (12). Efforts should be directed toward a quality assurance program that more certainly prevents entry of drug adulterated milk and milk products into the food chain. The American Veterinary Medical Association and the National Milk Producers Federation have developed such a quality assurance program, with input from the American Association of Bovine Practitioners. The 10 points incorporated in this approach are:

1. Practice healthy herd management including housing and sanitation, nutrition, reproduction, vaccination and parasite control, introduction of disease, and mastitis prevention.
2. Establish a valid veterinarian/client/patient relationship.
3. Use only FDA-approved over-the-counter or prescription drugs, with veterinarian's guidance.
4. Make sure all drugs you use have labels that comply with state and/or federal labeling requirements.
5. Store all drugs correctly.
6. Administer all drugs properly and identify all treated animals.
7. Maintain and use proper treatment record on all treated animals.
8. Use drug residue screening tests.
9. Implement employee/family awareness of proper drug use to avoid marketing adulterated products.
10. Complete the quality assurance checklist annually.

One question to the dairy industry is how to reach dairy farmers and educate them about drug residues. The 1986 summary of the national residue avoidance program concluded that some controversy exists as to the value of penalizing dairy producers who ship milk containing drug residues (5). Some believe enforcement is counterproductive to the educational effort. A Wisconsin survey identified punishment of violators as the second most important way to reduce illegal drug residues. Drug use information was preferred. A comment from Illinois indicated that mild (undefined in the report) regulatory penalties are likely the most expedient method to lower the violative residue rates.

Objectives

1. To reduce drug residues in the nation's milk supply.
2. To improve the nation's dairy farmers' basic skills and understanding of the use of drugs and practices for residue prevention.
3. To change the behavior and attitudes of dairy farmers and farm workers toward the impact of drug residues on consumers' perceptions of dairy products.
4. To encourage Extension workers to promote educational programs on production of drug free milk and to provide an evaluation of the accomplishments of these programs. The program will improve their capabilities to plan, administer, implement, and evaluate client focus programs (dairy producer, veterinarian) and will allow statewide coordination of these efforts.

Procedures

Representatives from the animal drug industry, dairy industry, veterinary profession, and government (FDA, FSIS, USDA-ES) have formed a consortium to implement the milk and dairy beef residue prevention and quality assurance program developed jointly by American Veterinary Medical Association and National Milk Producers Federation. An Extension committee developed a training model for delivery of the information in support of the Quality Assurance Program. The model and support materials (Extension fact sheets, hard copies for visuals) were presented to appropriate specialists from each state, with the intention that they would present the information to county Extension agents, milk inspectors, and milk marketing coop/milk plant field reps, who would, in turn, provide education training to dairy farms and farm labor. Separate programs may be developed for delivery to practicing veterinarians. State specialists (dairy and veterinarians) will provide technical support to the program.

1. Develop a model training program that can be delivered to dairy producers, hired milkers, and veterinarians. This program will include "best management practices" to avoid drug contamination of the milk supply, including treatment guidelines and use of residue tests. The training model was presented at six regional workshops (northeast, southeast, two in the midwest, southwest, and western United States). New Extension fact sheets were developed. Educational programs will be developed to support the dairy industry's 10 point quality assurance program. Appropriate visual aids also were developed. Regional training will be provided for Extension dairy and veterinary specialists, state regulatory officials, and milk marketing coop/milk plant quality control supervisors. This model was developed so that these personnel could present training sessions either on a state or county level and this program supplied them with support materials.
2. The model program also will provide training in the use and availability of the Food Animal Residue Avoidance Databank (FARAD). FARAD provides information specific to points 3, 4, 6, and 8 of the 10 point Quality Assurance Program. FARAD provides a list of all FDA approved drugs for use in dairy cattle, and advises veterinarians about withholding time when extra-label use is preferred. Dose and routine administration information is available for each approved drug. FARAD has added a listing of drug residue screening tests and their sensitivity. The use of FARAD and interpretation of information provided was presented as a part of the training model. FARAD provides the most current information on use of antibiotics or drugs and prevention of residues.

This model program is a national cooperative effort to eliminate the problems and concerns of the dairy industry toward the detrimental impact of antibiotic and drug residues. The 10 point Quality Assurance Program was developed by the American Veterinary Medical Association and the National Milk Producers Association with input from the American Association of Bovine Practitioners. It also involves cooperation from FDA, USDA's Food Safety and

Inspection Service, State Departments of Agriculture, and the National Conference on Interstate Milk Shipments. The education committee includes veterinarians, dairy production specialists, and dairy processing specialists from eight cooperating states (G. M. Jones, Virginia, Chairman; R. H. Bennett, California; F. W. Bodyfelt, Oregon; A. N. Bringe, Wisconsin; A. L. Craigmill, California; B. R. Eastwood, USDA; S. Emanuele, New Jersey; L. J. Hutchinson, Pennsylvania; V. Packard, Minnesota; and S. F. Sundlof, Florida).

Participants at the six Milk and Dairy Beef Quality Assurance Program Workshops compiled a list of causes of drug residues shown in Table 1.

Table 1. Sources of antibiotic residues in milk as identified by participants at Quality Assurance Workshops.

Failure to observe recommended label withdrawal time
Unknown withholding times
Irregular withholding times
Prolonged drug retention or physiological variation in clearance times
Multiple dosing
Many people allowed to handle or dispense drugs
Improper milking or segregation of treated cows
Not discarding milk from all four quarters
Misunderstanding label instructions
Purchase of treated cows or cows with unknown history
Using drugs extra-label whose withholding differs from label
Drug use not according to label
Extended usage or excessive dosage of approve drugs
Lack of advice on withdrawal period
Use of drugs that can't be detected
Magic formulas (wonder working yellow)
Improper use or interpretation of drug tests
Poor records of treatment
Failure to identify treated animals
Contaminated milking equipment or leaky valves in pipelines
Milker or producer mistakes- accidental transfer into bulk tank
Communication problems with hired milkers
Language barrier
Withholding milk from treated quarters only
Early calving, short dry periods or dry treatment used too near calving
Use of dry cow therapy to lactating cows
Calves fed treated milk
Treatment of new born calves
Moldy feed
Feed mixers contaminated with hog feed
Unapproved cleaning compounds
Intrauterine treatments
Sabotage

Participants at the six Quality Assurance Program Workshops also discussed methods for encouraging dairy farmers' participation in the program. The following suggestions were made:

Producer incentives
    Coop/plant quality payments
    Certification program to retain Grade A permit
    Rewards, e.g., milk house sign
State organizing committees
    Incorporate with other meetings, e.g., DHIA
    Veterinarian or handler meetings with producers
Producer meetings: veterinarians, field reps, Extension
Small focus group discussions
Target new producers and violators during past two years
CEU credits for veterinarians
Newsletters (Extension, handlers, market administrators)
    Producers
    Veterinarians, state conferences
Training session for veterinarians
Media campaign through farm press
Flyer or newsletter mailed by regulatory agency
Milk coop annual meeting agenda
Milk check stuffers or fliers
One-on-one from field reps
Extension Service
    Newsletters or flyers
Insurance companies to help with program cost or reduced rates for participation
Uniformity among states in program and screening test interpretations
Participation scorecard by county

Program Evaluation

Indicators of the effectiveness of this program will be the number of states that participate and develop training programs for their dairy producers. The success of the program will be measured by the subsequent number of drug violations that occur in participating states. After the training model and support materials have been delivered to the states, the education committee will develop mail questionnaires that extension agents can mail to producer participants and Extension veterinarians can mail to practicing veterinarians. This survey will monitor participation in educational programs and practices which producers implement as a result of the training programs.

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Mastering Milk Quality Basics of Dairy Sanitation

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Introduction

In today's competitive environment, quality milk bonuses are becoming increasingly more lucrative. Subsequently, cooperatives are employing tougher standards for determining milk quality. More and more cooperatives are using bacteria tests such as the Preliminary Incubation Count (PI count) to reveal more about the quality of the milk they are purchasing from dairy farmers. Because milk cooperative standards have toughened as premium bonuses have increased, dairy farmers are forced to be more conscious of the milking equipment cleaning procedures they follow if they wish to obtain their bonuses.

Understanding the requirements of the Clean In Place (CIP) procedure and the importance of implementing all four equipment cleaning cycles increases the dairy farmer's confidence in maintaining low bacteria counts. It also provides the self-assurance needed to troubleshoot elevated counts and consistently produce quality milk. The steps involved in mastering milk quality are the same as they have always been, only now it is becoming much more difficult to take a short cut on the way to milk quality.

Requirements of C.I.P. Cleaning

The three basics steps of any cleaning process are to lift the soil from the surface, to break the soil down into smaller parts and to disperse the soil. In the manual cleaning process, the brush is used to lift the soil, "elbow grease" is used to break it down and sudsing detergent is used to disperse the soil load. However, these elements are not present in the CIP process and the mechanics of the system must be relied on to properly clean the pipeline. CIP cleaning has certain mechanical requirements that are essential for successfully and effectively removing milk soil. Those requirements are time, temperature, volume, detergent/chemical balance, velocity and drainage.

Time

The length of time that each cycle circulates in the CIP process dictates how effectively the chemicals perform. Inadequate contact time on equipment surfaces can result in milk soil buildups.

During the **wash cycle**, the detergent solution should circulate for **ten minutes**. If the wash cycle greatly exceeds ten minutes, water temperature may drop to a level that may cause the soil to redeposit. If the wash cycle falls short of the required ten minutes, the chemical may not have enough contact time on the equipment surface to properly clean.

The recommended circulation time for the **acid rinse** is **five minutes**. Again, this time frame should be maintained to provide the chemical enough contact time on the surface to effectively lower the pH of the equipment, neutralizing the potential negative effects of chlorine and alkaline residues, and prevent water spotting. It also is recommended that the **sanitize cycle** run for at least **five minutes** to provide the chemical enough contact time to kill bacteria.

Temperature

The temperature of the water used in each cycle also will dictate how effectively the chemicals work. During the wash cycle, temperature is especially important because chlorinated-alkaline detergents do not work as well in low water temperatures. If water temperature is not maintained, buildups can occur.

The water temperature during the pre-wash rinse should fall between 95° F (35° C) and 110° F (43° C). This temperature will help remove the bulk of the soil load and warm the equipment surface for the wash cycle maximizing the efficiency of cleaning during the detergent cycle.

During the wash cycle, the water temperature ideally should begin at approximately 160° F (70° C) and end at no less than 120° F (50° C). Proteins can be baked onto equipment surfaces at temperatures exceeding 170° F (77° C) and butterfat will begin to solidify below 93° F (34° C). Excessive heat may also dissipate the chlorine in liquid CIP detergents, potentially minimizing protein removal.

The water temperature for the acid rinse should fall between 95° F (35° C) and 110° F (43° C). Temperatures should not exceed 140° F (60° C) because extremely hot temperatures can cause the acid rinse solution to evaporate quickly resulting in mineral deposits.

The sanitize cycle can use warm or cold water depending on the product used. Consult the label for proper use directions.

Volume

The amount of water used during each cycle influences how well the system cleans and dictates how much chemical is used. During all cycles, the wash vat should never be empty before return water re-enters the vat and the system should never be allowed to suck air. A table of equipment capacities should be made available by the equipment manufacturer from which the proper amount of water can be calculated. Insufficient amounts of water will only allow for minimal wash solution contact with the equipment surfaces, potentially leading to fat, mineral or protein buildups.

Detergent/Chemical Balance

Detergent/chemical balance refers to using the proper dilution rate for the appropriate chemical during the appropriate cycle. During each cycle, label directions should be followed to attain the proper concentration of chemical. Hard water situations require the use of more chemical than soft water due to the negative effects hardness minerals have on the cleaning action of the detergents.

During the wash cycle, the detergent dilution rate should be strong enough to deliver a minimum pH of between 10 and 11.5 to emulsify fats. The same dilution rate also should provide between 50 and 80 ppm of chlorine for peptizing proteins.

During the acid rinse cycle, the pH of the diluted solution should be between 3 and 4 at the beginning of the cycle and no greater than 6.0 at the end.

If a liquid chlorine product is used during the sanitize cycle, the solution should be diluted to provide at least 100 ppm of active chlorine.

The term detergent balance, also refers to using a detergent that is properly formulated to provide the correct balance of alkalinity to properly saponify and emulsify milk fats, chlorine to peptize milk proteins and sequestration agents to "tie up" milk and water minerals that may interfere with the detergents cleaning ability or cause mineral build-ups that could lead to milkstone formulation.

Some chemical manufacturer representatives and dairy consultants have test kits capable of measuring key characteristics of cleaners and sanitizers to determine if products possess the ability to remove milk soils.

Velocity

Because the physical scrubbing action and elbow grease in the manual process are missing in CIP cleaning, it is essential for adequate velocity to be generated within the system. Velocity substitutes for both the brush and elbow grease in the CIP process, scrubbing the equipment surface as well as lifting and carrying the soil load out of the pipeline.

Velocity is generated by using air injectors to admit air into the system at timed intervals. The air admission forms slugs of water that scrub the surface and remove the soil. Air injectors may also minimize and/or reduce the amount of water required to wash the system. The reduction in water required will result in less chemical needed to clean.

Drainage

To prevent milk soil from redepositing, the pipeline needs to be adequately sloped and secondary drains are required. Secondary drains and adequate line slope ensure proper and rapid drainage allowing the system to be completely flushed before the soil can redeposit. Also, the use of diverter valves guarantees the rinse water is not recirculated through the system during the pre-wash rinse.

CIP CLEANING CYCLES

Maintaining the requirements of CIP cleaning is essential for effectively removing the soil load from the milking system. However, using all four CIP cleaning cycles while maintaining these requirements will assure that only quality milk is produced.

Pre-Wash Rinse

A clear, clean potable, tepid 95° F (35° C) to 110° F (43° C) water rinse should be flushed through the system to remove the bulk of the soil load. A pre-wash rinse will also serve to warm the equipment surface for better cleaning action during the wash cycle. Proper water temperature will aid in effectively cleaning and sanitizing the system. Keep in mind, proteins can be baked onto equipment surfaces at temperatures exceeding 120° F (50° C) and fats will begin to solidify at 93° F (34° C) during this cycle.

A recommended procedure is to dump the initial rinse water directly down the drain. This will prevent recirculation of the heavy soil load and can be performed automatically with a diverter valve. If diverters are not installed, the importance of the recommended temperatures is increased.

Wash Cycle

A hot, 160° F (70° C) solution of a chlorinated-alkaline cleaner should be circulated for ten minutes. Chlorine will aid in soil removal by peptizing proteins while the high alkalinity (pH of 10 or higher) emulsifies fats. Water temperatures should be maintained above the optimum 120° F (50° C) to prevent redeposition of milk soils.

Acid Rinse

An acid rinse should be applied using water with a temperature of 95° F (35° C) to 110° F (43° C). Daily acid rinses will neutralize chlorine and alkaline residues prolonging the life of rubber goods; prevent mineral deposits, water spotting and filming which helps prevent milkstones; and reduce the pH of the equipment which inhibits bacterial growth. The reduced pH from the acid rinse will allow chlorine sanitizers to perform more effectively.

Sanitize Cycle

The Pasteurized Milk Ordinance (PMO) states that a sanitize cycle must be circulated through the system prior to milking to lower bacterial levels on equipment. This cycle should be completed thirty minutes before milking. Water temperature for the sanitize cycle will vary depending on the product used. If a liquid chlorine product is used to sanitize the system, a minimum of 100 ppm of active chlorine is recommended. It is also recommended that only EPA registered products be used to sanitize milking equipment.

Conclusion

As mentioned, the steps for mastering milk quality have not changed, but their importance has grown tremendously in recent years. Producing milk with low bacteria counts is the result of employing proven techniques and keeping a close eye on the mechanical requirements of the cleaning system. Following the proper cleaning cycles and making sure the requirements are met during each cycle will reward the dairy farmer with quality milk that passes the strictest standards. As a result, the cooperative will reward the quality milk producer with a big bonus check and the producer will have the feeling that he has done his best to provide the consumer with a high quality product.

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Growth and Survival of *Listeria monocytogenes*, *Salmonella* species, and *Staphylococcus aureus* in the Presence of Sodium Chloride: A Review

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Abstract

Under optimal conditions, growth of *Listeria monocytogenes*, *Salmonella* species, and *Staphylococcus aureus* was inhibited by 10, 6 to 8, and ca. 16% NaCl, respectively. As conditions, e.g. temperature, pH, size of inoculum and availability of nutrients, departed from optimal for the bacteria, less NaCl was required to inhibit their growth. Survival of the three pathogens in the presence of < 20% NaCl was quite variable, depending on kind and strain of pathogen, substrate, temperature, and concentration of NaCl. Generally, as the concentration of NaCl in solution dropped below 20%, time of survival was lengthened (and sometimes growth occurred); as the temperature decreased, survival time increased, and as the pH decreased, survival time decreased. However, all these factors (and possibly others) worked together to govern survival time of the pathogens in a given environment. When NaCl in solution exceeded 20%, salmonellae and staphylococci survived only days and in some instances several weeks. Data for *L. monocytogenes* are limited but suggest survival for > 5 d. Brines of some concern are those that may be used in making Feta cheese since *S. aureus* can grow in a 12% NaCl solution at 21°C and *L. monocytogenes*, *S. aureus* and *Salmonella* species can grow in a 6% NaCl solution. Although refrigeration might control growth of *Salmonella* species and *S. aureus*, it will not prevent growth of *L. monocytogenes* in 6% NaCl brine.

Introduction

In 1991, a regulatory agency detected *Listeria monocytogenes* in Mozzarella cheese. Since *L. monocytogenes* is unlikely to survive the process used to make Mozzarella cheese (7), it was suspected that post-processing contamination had occurred. Investigations at the factory revealed that the brine solution used to salt the cheese was the source of *L. monocytogenes*. A rack consisting of stainless steel pipes was immersed in the brine. Some of the pipes were not completely sealed and cheese residue and other debris had entered and accumulated in the pipes. It was also here that *L. monocytogenes* became established, grew (it is a psychrotroph so it grew even though it was in a refrigerated environment), and contaminated the brine.

This incident raised questions about the responses to NaCl of *L. monocytogenes* and other pathogens that in the past have caused problems associated with cheese. Thus this review was prepared to, in part, answer the questions.

The review begins by considering, in separate sections, growth and survival of *L. monocytogenes* in various solutions of NaCl. Some of this information is of recent origin and deals with behavior of the pathogen in brine solutions associated with some types of cheese. Unfortunately, behavior in highly concentrated solutions of NaCl has not been studied.

Next the discussion moves on to *Salmonella* species; again growth and survival are dealt with separately. Much of the information about salt-tolerance of salmonellae comes from work done sometime ago because of concern about their behavior in salted and cured meats.

Finally, information about growth and survival of *Staphylococcus aureus* is considered in a single section. With *S. aureus* the concern has been primarily about growth and enterotoxin production in substrates with high concentrations of NaCl.

LISTERIA MONOCYTOGENES

Growth

According to the most recent edition of Bergey's Manual of Systematic Bacteriology (32), *Listeria monocytogenes* can grow in nutrient broth containing up to 10% (w/v) NaCl. This appears to be based on results obtained earlier by Larsen (18). More recently, Genigeorgis (9) indicated that one strain of *L. monocytogenes* grew during extended incubation at 8 to 30°C in brain heat infusion broth (pH ca. 5.0) containing up to and including 12% NaCl. *Listeria ivanovii*, *Listeria seeligeri* and *Listeria innocua* grew under identical conditions in the presence of up to and including 10% NaCl.

Growth of *L. monocytogenes* in the presence of 8 to 9% NaCl is accompanied by morphological changes characterized by elongated and deformed cells. When grown at 37°C on an agar medium with 8 to 9% NaCl, *L. monocytogenes* produced star-shaped colonies that had a rough surface, irregular border and straight or coiled protrusions. Incubation at 22 or 10°C resulted in smooth colonies with regular borders (5,6).

Lang et al. (17) found that growth of *L. monocytogenes* in tryptose broth containing 6% NaCl was markedly influenced by pH. Tryptose broth with 0 or 6% NaCl was adjusted to pH 5.0, 5.6, 6.2, and 6.8 with HCl; inoculated to contain ca. 500 *L. monocytogenes*/ml; and incubated at 13°C. Generation times in the salt-free medium at pH 5.0, 5.6, 6.2, and 6.8 were 13.1, 4.4, 3.5, and 2.9 h, respectively. Values when the medium contained NaCl were 7.8, 7.2, 5.0, and 6.3 h. Borovian (3) reported that *L. monocytogenes* grew at 10°C in a culture medium adjusted to pH 4.5 and 6.0 and containing $\leq$ 4.0 and $\leq$ 7.0% NaCl, respectively.

Conner et al. (8) determined growth of *L. monocytogenes* in cabbage juice supplemented with $\leq$ 5 NaCl. Two strains of the bacterium grew at 30°C and pH 6.1 in cabbage juice with 1% NaCl but failed to grow in the presence of $\geq$ 1.5% NaCl. Populations of both strains in cabbage juice with $\leq$ 5% NaCl and at pH 6.1 decreased by ca. 90% in 70 d at 5°C.

Growth of *L. monocytogenes* at 4 and 22°C in skim milk and whey with 6% added NaCl was determined by Papageorgiou and Marth (25). At 4°C, after a lag period of 5 to 10 d, the pathogen grew and attained a maximum population of 10^7-10^8/ml after 55 d of storage. Generation times were between 37.5 and 49.4 h for two strains (Scott A and California) of *L. monocytogenes* during growth in both substrates at 4°C. Increasing the incubation temperature to 22°C resulted in lag periods of 6 to 12 h and generation times of 3.6 to 4.4 h. Somewhat higher maximum populations developed in salted whey ($\log_{10}$ 8.02 and 8.10/ml) than in salted skim milk ($\log_{10}$ 7.70 and 7.89/ml). Under optimum conditions, *L. monocytogenes* grows at temperatures from 1 or 2°C to 42-43°C. The minimum pH for growth under otherwise optimum conditions is 4.4 to 4.6.

Survival

Studies, done at ambient temperatures showed that *L. monocytogenes* persisted for at least 150 d in pure NaCl (37) and 545 d in a solution containing 0.85% NaCl (27). Stenberg and Hammainen (38) reported that 10 strains of *L. monocytogenes* survived >1 year at 20-24°C in nutrient broth containing 10% NaCl and 1% dextrose. The pathogen also survived 34-68 d and 24 d in the medium when it contained 12 and 24% NaCl, respectively. Shahamat et al. (35) found that *L. monocytogenes* was activated at 37°C after 14, 9, and 4 d in trypticase soy broth containing 10.5, 13, and 25.5% NaCl, respectively. Survival times in the medium with 25.5% NaCl increased to 24 d at 22°C and to > 132 d at 4°C.

Stenberg and Hammainen (38) placed livers, hearts, and kidneys from *Listeria*-infected mice in solutions of NaCl which were held at 4°C. Survival of the pathogen was 238-246 d, 88-112 d, and 27 d, respectively, in solutions containing 3, 6, and 12% NaCl. A study by Kukharkova et al. (16) showed that *L. monocytogenes* survived more than 60 d in meat in a 30% NaCl brine held at 4°C. According to von Sielaff (37), *L. monocytogenes* was detected after 100 d in infected beef that was immersed in a solution of 22% NaCl and stored at 15-20°C.

Breer (4) and Terplan (39) reported isolating *L. monocytogenes* from commercial cheese brine solutions. In one instance, the pathogen was detected in brine tanks 4 d after soft/semi-soft cheeses were removed from the salt brine.

Migration of *L. monocytogenes* into brine during salting of contaminated cheese has been demonstrated. Ryser and Marth (29) brine-salted brick cheese containing 10^3-10^4 *L. monocytogenes*/g at 10°C. Cold enrichment of membrane filters through which 50-ml portions of 22% NaCl brine were filtered indicated that the pathogen leached from cheese into the brine during 24 h of brining. Furthermore, viable listeriae were detected in brine for at least 5 d (no further testing) after cheese was removed from the brine.

Papageorgiou and Marth (24) determined the viability of *L. monocytogenes* in the brine solutions in which Feta cheese containing the pathogen was salted and stored. After 1 d of salting, a 12% NaCl brine solution contained an average *Listeria* population of 2.63 $\log_{10}$/g, which again indicates that the pathogen leached from cheese into the brine solution. No growth of *L. monocytogenes* occurred in the 12% NaCl brine despite ample migration of cheese nutrients into the brine as well as a favorable temperature and pH. After transferring Feta cheese to a 6% NaCl salt brine solution, the pathogen again migrated from cheese into the brine and grew rapidly so that similar populations (ca. 10^6/g or ml) appeared in both cheese and brine solution after 6 d at 22°C. Although numbers of listeriae decreased in both cheese and brine during 90 d of refrigerated storage, the pathogen was inactivated slower in the brine than in cheese. The population in brine after 90 d was nearly 10^5/ml.

Papageorgiou and Marth (25) inoculated *L. monocytogenes* into skim milk and whey each containing 12% NaCl. White pickled cheeses often are ripened in such salted skim milk or whey. The populations of two strains of *L. monocytogenes* decreased less than 10-fold during 130 d at 4°C. One strain (Scott A) persisted > 130 d in both salted skim milk and whey held at 22°C but strain California survived 80 and 105 d, respectively, in salted skim milk and whey.

SALMONELLA SPECIES

Growth

According to Karaffa-Korbutt (14), growth of *Salmonella bovis-morbificans*, *Salmonella enteritidis*, *Salmonella schottmuelleri*, *Salmonella typhi*, and *Salmonella typhimurium* in a culture medium was inhibited by 9, 6 to 8, 6 to 7, 8 to 10, and 7% NaCl, respectively. Koelensmid and Rhee (15) observed rapid growth at 20°C and pH 5.8 by *Salmonella bredeney*, *Salmonella dublin*, *Salmonella newport*, and *S. typhimurium* when a meat-based medium contained 4, 5, or 6 but not 7% NaCl. Severens and Tanner (34), by a series of transfers in a NaCl-containing medium, were able to increase the highest concentration of NaCl permitting growth of *Salmonella pullorum* and *S. typhi* from 3 to 6%.

Growth of *Salmonella heidelberg, S. typhimurium*, and *Salmonella derby* in shake cultures of nutrient broth containing 0 to 8% NaCl was determined at 8, 12, 22, and 37°C (20). In addition, growth of *S. heidelberg* in the presence of 0 to 9% NaCl at 39, 41, 43, and 45°C also was tested. At 8°C, *S. heidelberg* grew when 1 or 2% NaCl were present, *S. typhimurium* grew with 1% added NaCl, and *S. derby* failed to grow when 1 or 2% NaCl was added to the medium. At 12°C, the three serovars grew in the medium with up to 4% NaCl, whereas at 22°C, growth occurred in the presence of 5 to 8% NaCl. Growth occurred in the presence of 7 to 8% NaCl when incubation was at 37°C.

From a practical viewpoint, foods with a low content of NaCl may not support growth of salmonellae at low storage temperatures. However, if the storage temperature is raised, these bacteria may be able to grow even if some NaCl is present. This also was noted by researchers (1) during studies designed to examine the interaction of pH, temperature, atmosphere, and NaCl content on growth of *S. typhimurium* in a glucose mineral salts medium. It was observed that growth decreased at higher (up to 5%) NaCl concentrations under aerobic conditions, and that anaerobic incubation repressed the amount of growth when compared to that obtained with aerobic incubation. However, anaerobiosis provided some protection against the effects of high (up to 5%) concentrations of NaCl.

Under optimum conditions, salmonellae can grow at temperatures from 6.5 to 7 to 45 to 47°C. The minimum pH value for growth under otherwise optimum conditions is 4.5 to 4.7.

Survival

Cells of *Salmonella anatum* were harvested from nutrient agar, suspended in nutrient broth containing different amounts of NaCl, and stored at room temperature. Cells survived for > 92 d, between 56 and 70 d, > 56 d, and 42 but not 56 d in nutrient broth containing 5, 10, or 20% NaCl or that was saturated with NaCl, respectively (19). A similar trial with *S. typhimurium* resulted in survival of > 92 d, 70 but not 92 d, 28 but not 42 d, and 28 but not 42 d.

Swine livers that were naturally infected or experimentally contaminated with *Salmonella choloera-suis* were completely covered with NaCl and stored at 8°C. Survival of *S. cholera-suis* exceeded 105 d. Similar livers were placed in a brine consisting of 2 kg NaCl, 20-30 g saltpeter, 20-80 g sugar all in 8 liters of water (ca. 20% NaCl) and held at 8°C. *S. cholera-suis* survived for more than 180 d (12).

Meat obtained from a young calf that died of an experimental infection with *S. dublin* was processed into standard biltong (strips of air dried lean meat). Ten days afterward the NaCl content of the biltong had increased from 5 to 10 to 20% and the moisture content had decreased from 40 to 15 to 20%. Survival of *S. dublin* in the biltong, which probably was held at room temperature, exceeded 180 d (40).

Calf livers naturally infected or experimentally infected with *S. enteritidis* were covered with NaCl and store at 8°C. *S. enteritidis* survived for more than 90 d. Similar livers were placed in a brine containing 20% NaCl and stored at 8°C. In this instance, survival of *S. enteritidis* exceeded 120 d (12). A similar trial was done with *S. schottmuelleri* and survival was more than 120 d in livers receiving either treatment (12).

Butter, presumably of normal salt content, was inoculated separately with *S. enteritidis, Salmonella newington, S. newport*, and *S. typhimurium* and then was stored at 4 and 20°C. At 4°C, survival was 105, 105, 91, and 63 d and at 20°C it was 42, 63, 42, and 63 d for the salmonellae in the order listed in the previous sentence (36). In another trial, butter was inoculated separately with *S. bovis-morbificans, S. cholera-suis, S. dublin, S. enteritidis, S. schottmuelleri, S. typhi*, and *S. typhimurium*. During storage of the butter at 3°C survival of the bacteria in the order just listed was > 112 d, 90 but not 98 d, > 112 d, > 112 d, > 112 d, 108 but not 126 d, and > 112 d. When butter was held at 15°C, survival was > 98 d, 38 but not 68 d, > 98 d, > 98 d, > 98 d, > 108 d, and > 98 d (28). Comparable results also were obtained by Pfuhl (26) and Berry (2).

Different *Salmonella* species were inoculated into nutrient broth (pH 6.8) and ham jelly (gelatin surrounding pasteurized canned hams) both containing various concentrations of NaCl (15). Inoculated materials were held at 5 and 20°C. Results are summarized in Table 1. The data indicate (a) survival tended to be greater at 5 than at 20°C, (b) survival also tended to be greater in ham jelly than in nutrient broth regardless of the storage temperature, and (c) behavior of the four species of *Salmonella* tested was quite comparable.

Koelensmid and van Rhee (15) also prepared a medium which consisted of equal parts of gelatin from canned hams and a cold meat infusion. The pH was adjusted to 5.4, 5.8, and 6.35; 4 to 7% NaCl was added; several *Salmonella* species were added individually; and the preparations were held at 5 or 20°C. Results are summarized in Table 2. It is evident from the data that survival of *Salmonella* species was from 7 to 16 d at pH 5.4 regardless of the amount of salt that was in the medium or the temperature of storage.

Various amounts of NaCl were added to 20-h-old broth cultures of *Salmonella* species. The cultures were then stored at 4 to 7°C or 18 to 22°C. With storage at 4 to 7°C, survival was 118 d for *S. dublin* in 20% NaCl, > 120 d for *S. enteritidis* in 15% NaCl, and > 120 d, for *Salmonella manhattan* in 15% NaCl. When storage was at 18 to 22°C, survival times were < 29 d, < 81 d, and < 81 d, respectively.

In yet another study, Weichel (41) added NaCl (up to 15%) and salmonellae to nutrient broth, which was then held at 0 to 4°C or 37°C. Survival of *S. enteritidis* and *S. typhimurium* in the presence of 15% NaCl was 77 d at 0 to 4°C and 5 but not 8 d at 37°C. Another study by the same author involved adding salt (5 to 25%) directly to 24-h-old nutrient broth cultures of salmonellae, which then were stored at 0 to 4°C or 15 to 18°C. At 0 to 4°C and 25% NaCl, *S. enteritidis, S. schottmuellri*, and *S. typhimurium* all survived > 88 d, but at 15 to 18°C and 25% NaCl survival of the three species was reduced to 29 but not 34 d.

Schwerin (31) added salmonellae to nutrient broth which was saturated with NaCl and then incubated the cultures at 37°C. Under these conditions, *S. cholerae-suis, S. dublin, S. newington*, and *S. typhimurium* all survived 4 but not 5 d.

STAPHYLOCOCCUS AUREUS - GROWTH AND SURVIVAL

Nunheimer and Fabian (23) observed that 15 to 17.5% NaCl in broth was inhibitory to *Staphylococcus aureus* at 35 to 37°C, whereas 20 to 25% NaCl was germicidal. Good growth of *S. aureus*, according to Genigeorgis and Sadler (10), occurred at 37°C in brain heart infusion broth with 16% NaCl and at pH 6.9. However, when the broth was at pH 5.1 and contained 16% NaCl, no viable cells of *S. aureus* remained after 10 d at 37° C. According to data by Hojvat and Jackson (13), *S. aureus* grew in broth with 12% NaCl which was held between 20 and 35°C. Minor and Marth (22) demonstrated that the combination of 7.5% NaCl and a pH of < 5 caused inactivation of *S. aureus* at 37°C. Conditions allowing enterotoxin production differ somewhat from those that permit growth of *S. aureus*. Production of enterotoxin in culture media required 7 d at 9°C, 3 d at 15°C, and 12 h at 37°C (33). Few, if any, differences were observed by Scheusner and Harmon (30) between temperatures at which enterotoxins A, B, C, and D were produced in brain heart infusion broth on a shaker. Temperatures below 20°C or above 46°C delayed onset of enterotoxin production beyond 3 d or inhibited it completely. Enterotoxin could be produced (if other conditions are satisfactory) at pH values near 5.0.

Hojvat and Jackson (13) noted that *S. aureus* grew at 20 and 35°C in broth containing 12% NaCl but did not produce enterotoxin at < 35°C when broths contained 4 and 8% NaCl or at 4 to 35°C when broth contained 12% NaCl. NaCl at up to 10% in brain heat infusion broth, according to McLean et al. (21), had only minimal effects on growth of *S. aureus*, whereas > 3% NaCl reduced production of enterotoxin B. According to Genigeorgis et al. (11), enterotoxin C was produced by *S. aureus* (initial population 10^8/ml) in a medium with 0, 4, and 8% NaCl and at pH values in the range of 4.0 to 9.3, 4.4 to 9.4, and 4.5 to 8.6, respectively. The pH range changed to 5.5 to 7.3 when the NaCl concentration was increased to 10% and the initial population was maintained at 10^8/ml. Reducing the initial population to 10^6/ml and maintaining 10% NaCl narrowed the pH range for enterotoxin production to 6.4 to 7.3.

Under optimum conditions, *S. aureus* can grow at temperatures from 5 to 7 to 46°C and at pH values from 4.0 to 9.8.

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Updates . . .

Dairy Quality and Safety Committee Farm Methods 1992 Supplementary Report

APPLICATION TO INSTALL OR MODIFY A MILKING SYSTEM

The form, "Application to Install or Modify a Milking System" is available for use by regulatory agencies, field service personnel, installer/dealers and dairy producers for gathering, organizing and evaluating information on new or used milking systems.

The purpose of this form is to collect as much information as possible regarding the milking system to be installed or modified. This information should be evaluated using 3-A Recommended Practices, specific regulatory requirements and industry accepted practices.

It is intended that this form is legible, protected from moisture and posted in the producer's milkroom for future reference. It is also intended to be submitted to the regulatory agency for review and acceptance prior to installation.

The proper use of this form will enhance compliance and contribute to an orderly installation process which will benefit all parties. This, in turn, should result in a safer, higher quality milk supply.

Copies of the form may be obtained without charge from Steven T. Sims, Committee Chairman, 200 C Street, SW, Washington, DC 20204; (202)205 -9175 or Joseph Scolaro, 27 Providence Road, Millbury, MA 01527; (617)865-6911.

APPLICATION TO INSTALL OR MODIFY A MILKING SYSTEM

Date: _____

I. Name of Producer: _____ Phone: ( ) _____
Address: _____ State: _____ Zip: _____
Producers Regulatory License or Permit # _____
Milk Dealer or Buyer: _____

I HEREBY MAKE APPLICATION FOR PERMISSION TO INSTALL OR MODIFY A MILKING SYSTEM TO BE CLEANED IN PLACE, THIS EQUIPMENT WILL CONFORM TO, OR EXCEED ACCEPTED PRACTICES #606-03

II. INSTRUCTIONS:
A) All blanks that apply to this installation must be completed.
B) This application must be accompanied by a detailed legible drawing of the milking system showing the following: 1) High Point, 2) Direction of Milk Flow, 3) Receiver(s) or Transfer Station, 4) Air Injector(s), 5) Inspection Point(s), 6) Wash Vat(s), 7) Bulk Milk Tank(s) 8) Pre- Milk Cooler(s).

III. FABRICATION OF MILKING SYSTEM:
A) Milk Line:
1) Material(s) _____ , 2) Diameter _____ in. , 3) Length _____ ft.
4) Welded _____ , 5) Gasketed _____ , 6) Number of Slopes _____
7) Slope _____ in. per 10 ft., 8) Highline _____ , 9) Maximum Height From Floor _____ in., 10) Low Line _____

B) Receiver:
1) Number of Inlets ___ , 2) Size of Milk Inlet(s) ___ in., 3) Size of Vacuum Inlet ___ in.
4) Sanitary Trap - Yes ___ No ___

C) Auxiliary Milking Equipment

	Number	Brand
1) Milk Weighing Devices		
2) Automatic Take-Off		
3) Automatic Backflush		
4) End of Milking Indicators		
5) Milk Filtration		

6) Transfer Station: Vacuum _____ Electric _____
7) Other (specify) _____

D) Vacuum System:

	Material	Diameter	Length
1) Main Vacuum Supply Line		____ in.	____ ft.
2) Vacuum Pulsator Line		____ in	____ ft.

3) Automatic Drains in Vacuum Pulsator Lines Yes ___ No ___
4) Number of Milker Units _____
5) Vacuum Pump(s): Brand(s) _____ Model(s) _____ hp. _____
6) Total Vacuum Pump Capacity _____ CFM/ASME at 15"Hg.
7) Vacuum Regulator Brand _____ Model _____
8) Number of Distribution Tank(s) _____ 9) Other _____

E) Milk Cooling and Storage System:
1) Pre-Cooler: Brand(s) _____ Type _____ Number _____
2) Type of Coolant(s) _____
3) Bulk Milk Tank: Brand _____ Model _____ Serial # _____
Milk Capacity _____ gallons Cooling Capacity BTU/HR _____

F) Cleaning and Sanitizing System:
1) Automatic ___ Manual ___ 2) Automatic Pre-Rinse Diverter Valve _____
3) Wash Procedure: Pre-Rinse _____ gallons
Wash Cycle _____ gallons Time _____ Minutes
Acid/Post Rinse _____ gallons
Sanitize _____ gallons
NOTE: "Water temperature of the wash cycle must be maintained at 120°F or higher."
4) Milker Units Cleaned-in-Place (Parlor) Yes ___ No ___

G) Water Heating Equipment:
1) Type of Heater Electric ___ Gas ___ Other _____
2) Capacity of Heater _____ gallons 3) Recovery Rate Gal/HR/100° Rise _____ gallons
4) Additional Water Heating _____ Type _____

H) Manually Cleaned Components: (Circle all that apply)
Diverter Plug(s), Manual Shut-Off Valve(s), Bulk Milk Tank Outlet Valve(s). List other components in this system: _____

I) Physical Separation of Wash System (Lines) From:
1) Milking System During Milking Yes ___ No ___
2) Bulk Milk Tank During Milk Storage Yes ___ No ___

IV. A CLEANING PROGRAM INCLUDING WATER HARDNESS, DETERGENT AND SANITIZER MUST BE POSTED IN THE MILK ROOM . The posted chart shall be legible and protected to provide a degree of permanency. If procedure is changed in any way, a new program must be postec

V. ANY FUTURE MODIFICATION OF THIS EQUIPMENT MUST HAVE PRIOR WRITTEN APPROVAL

Owner or Authorized Representative (signature): _____

Installer/Dealer (signature, address, tel.no.) _____

OFFICIAL ACTION

PLAN APPROVAL

Fieldman - signature: _____ Date: _____

Regional Sanitarian - signature: _____ Date: _____

INSTALLATION APPROVAL

Regional Sanitarian - signature: _____ Date: _____

Mastitis Council Heads for Kansas City

The National Mastitis Council 32nd Annual Meeting will be held February 15-17, 1993 at the Ritz-Carlton Hotel in Kansas City, Missouri. The conference will highlight the latest technical and applied information relating to udder health, milking management, milk quality, and milk safety. The program is directed toward veterinarians, producers, researchers, extension agents, suppliers, regulatory officials, field representatives, and quality control personnel.

The conference begins with committee meetings (open to all registered attendees) on Monday, February 15. Three limited-enrollment short courses will be offered that evening. Short course topics include: 1) Understanding and Analyzing Milking Systems; 2) Udder Health Management Programs; and 3) Effective Quality Assurance Programs.

The General Session begins Tuesday, February 16, at 11:00 a.m. and concludes the next day at 12:15 p.m. Session themes include: *Staphylococcus aureus* Mastitis: How Goes the Battle?; Genetics: A New Tool to Combat Mastitis; Controlling Environmental Mastitis; Recent Research in the Dairy Barn; Current Residue Avoidance Issues; and Mastitis Research: The Cutting Edge. The NMC Technology Transfer Session, featuring educational exhibits on mastitis control and quality milk production, will be held Tuesday.

Registration fees are $75 for NMC members and $110 for non-members. NMC student members may register for $15. Short course fees are $35. Proceedings from the meeting will be available for purchase in late February. To order a copy of the proceedings, contact: Nasco, 901 Janesville Ave., Fort Atkinson, WI 53538; phone: (800)558-9595 or (414)563-2446. (Place orders after the meeting).

For additional information, contact the National Mastitis Council, 1840 Wilson Blvd., Suite 400, Arlington, VA 22201; phone: (703)243-8268; fax: (703)841-9328.

News

FPI to Hold Food Microbiology Conference

The Food Processors Institute (FPI) will hold a conference on food microbiology on April 14-15, 1993 at the Hyatt Regency-Crystal City in Arlington, Virginia.

Entitled "Food Micro '93," the two-day meeting will provide an in-depth look at the latest issues in food microbiology. Among the topics the conference will address are predictive microbiology, regulatory issues, *Listeria*, new developments in microbial inactivation, and biotechnology.

The meeting is designed for food scientists, directors of research and development, managers of microbiology laboratories, and anyone with a professional interest in food microbiology. Speakers will come from NFPA's research laboratories, academia, regulatory agencies, and the food industry.

For more information on "Food Micro '93," contact Rita Fullem, FPI's executive director, at (202)639-5944.

U of M Scientist McKay Receives von Humboldt Award

Larry L. McKay, a professor in the University of Minnesota's Department of Food Science and Nutrition, has received the 1992 Alexander von Humboldt Foundation Award.

McKay received the award October 9 for his research on applying biotechnology principles to starter cultures of lactococci (pronounced LACK-toe-cock-see), or lactic acid-producing bacteria, for improved fermented dairy products. The award, which consists of a cash prize of $10,000, is given annually to the one or two persons whom a panel of judges considers to have made the most significant contributions to American agriculture during the previous five years.

Starter cultures of lactococci are used to produce fermented dairy products, such as cheese, yogurt and butter. These bacteria are responsible for the fermentations that give these dairy foods their characteristic physical properties, aroma and flavor. When starter cultures lose their ability to function as they should, manufacturing costs can increase and the quality of the product and its acceptance to consumers decline.

In 1970, McKay began his pioneering work by examining lactococci that had lost their ability to ferment lactose, utilize casein (a milk protein) or ferment citrate (a process that produces butter aroma). He found that lactococci have several types of plasmid DNA, separate from their chromosomes, that carry the genetic "commands" for the metabolic processes necessary for successful dairy fermentations. The lactococci lose their ability to perform acceptably if this plasmid DNA is lost when the bacteria multiply.

McKay's ultimate goal was to be able to develop lactococcal strains with specific abilities. His lab found that plasmids could be transferred from one bacterial cell to another by transduction, using a bacterial virus as the carrier, and by conjugation, a process in which plasmids move between cells that have come into contact with each other. Further work resulted in the cloning of the lactococcal DNA responsible for various desirable metabolic processes, such as the fermentation of lactose and the production of substances that inhibit spoilage and pathogenic bacteria.

But the final breakthrough, which opened the door for using recombinant DNA technology to develop the kind of lactococci needed by the dairy industry, was the development of the protoplast transformation system by one of McKay's students.

The findings of McKay and his workers has sparked worldwide interest in applying biotechnology to lactococci. "When I began this research at the University of Minnesota in 1970, ours was the only lab working in this area," says McKay. "Thanks to developments in this technology, more than 300 labs worldwide now work on improving the genetics and physiology of dairy starter cultures."

McKay, who does research for the University's Agricultural Experiment Station and the Minnesota-South Dakota Dairy Foods Research Center, received his B.A. and Ph.D. degrees in microbiology from the University of Montana and Oregon State University. In 1970, he joined the University of Minnesota, where he has advised 20 M.S. and 18 Ph.D. students. "This award is a tribute to the superb laboratory personnel I've worked with over the past 22 years," he says. "They did much of the research that made this scientific advancement possible."

Among the many honors that McKay has received for his research are the Nordica Research Award of the American Cultured Dairy Products Institute; the Fisher Scientific Co. Award from the American Society for Microbiology; and the Pfizer, Inc. Award, Dairy Research Foundation Award and Borden Award from the American Dairy Science Association. In 1989, the Institute of Food Technologists awarded McKay the Kraft General Foods Chair in Food Science, and last year it named him a Fellow.

One other University of Minnesota faculty member, agricultural economist Vernon W. Ruttan, has received the Alexander von Humboldt Foundation Award.

The Alexander von Humboldt Foundation is funded by the Alfred Toepfer Co., a German trading firm. The foundation and award are named for a famous, 19th century German geographer.

For more information contact Sam Brungardt at (612)625-6797.

Biotechnology: Principles and Processes

Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

August 2-6, 1993

The purpose of the course is to impart a fundamental understanding of microbial principles and processes for utilizing biological systems for manufacture of fuels, chemicals and biologicals. The emphasis throughout is on basic principles of physiology, biochemistry and genetics of microorganisms that are useful for biochemical processes. Applications of molecular biology procedures for protein engineering, biopolymer engineering, and DNA detection procedures are presented. Discussion of current research areas in this field, as well as future needs will be presented. Lectures on important biochemical engineering principles are also covered.

Lectures are by Dr. C. A. Batt, Dr. C. L. Cooney, Dr. O. P. Peoples, Dr. C. K. Rha, Dr. A. J. Sinskey, Dr. M. Follettie, Dr. G. C. Walker and Dr. C.-H. Wong. The program is intended for biologists, chemists, biochemists, engineers, food scientists and managers who are interested in recent developments in biotechnology.

If you are interested in obtaining further information, please contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139.

Crumbine Award Brochure Available

The Foodservice and Packaging Institute (FPI) has prepared a brochure outlining the criteria for the Samuel J. Crumbine Consumer Protection Award and summarizing the award-winning presentations of the last six years.

The Crumbine Award is presented annually to a local health department that has demonstrated excellence and innovation in its food program over a three to five year period.

The award-winning programs described in the brochure include those of Boulder County, Colorado (1992 winner), Tacoma-Pierce County, Washington (1991), San Joaquin County, California (1990), Albuquerque, New Mexico (1989), San Bernardino, California (1988) and Snohomish Health District, Washington (1987). The summaries are taken from the pages of *Environment News Digest*, an FPI quarterly publication which features the winning program each year.

"We felt that it would be helpful to potential candidates and stimulate a greater interest in the award if local health departments could compare their programs with these winners," said FPI President, Joseph W. Bow, CAE.

For a copy of the brochure, contact Charlie Felix, Crumbine Award, P. O. Box 1581, Leesburg, VA 22075. Telephone (703)777-7448; FAX (703)777-4453.

Mastitis Research Center Fights Costliest Dairy Disease

Scientists at Penn State are teaming up to combat mastitis, the costliest disease of dairy cattle.

"By reducing milk production, ruining udder tissue and even killing dairy cows, mastitis causes losses amounting to $2 billion in North America each year," says Dr. Lorraine Sordillo, assistant professor of veterinary science in Penn State's College of Agricultural Sciences and director of the university's Mastitis Research Center.

"Studies have shown that mastitis can cost up to $200 per cow every year," she says. "Despite continuing research, the disease remains a serious problem. Too many producers and scientists seem to take mastitis for granted, as if it inevitably comes with the territory. But the scientists in our center are dedicated to eliminating mastitis."

The Center for Mastitis Research informally unites more than 15 researchers who share an interest in the disease. It cuts across departmental and college boundaries, bringing together faculty in dairy and animal science, immunology, molecular and cell biology, veterinary science and other disciplines.

"Mastitis is a complex disease that involves many factors," Sordillo says. "The center enables researchers studying mastitis from different angles to share their knowledge and perspectives. This will strengthen our efforts to combat the disease.

"Pennsylvania's the fourth largest dairy state in the nation, so having a large number of scientists and educators interested in mastitis at Penn State is a real boon," she says. "We're in the right place at the right time, and we hope to make a big dent in mastitis losses both in Pennsylvania and in the nation."

Although the center is not yet a formal university facility, its members approach their mission aggressively. One of their efforts has been to enhance the Mastitis Research Farm on Penn State's University Park Campus. Located behind the Animal Diagnostic Laboratory, the farm has a milking herd of 22 cows. Facility improvements to be finished this month will increase the free-stall barn's capacity to 50 cows.

The group also has developed a strategic plan for slashing mastitis' economic impacts and for eventually thwarting the disease itself. The center's efforts include basic and applied research projects as well as extension programs that help producers apply research results in

the barn or milking parlor.

Current studies and projects include:

- the effects of vitamin E and selenium on dairy cattle immune cells.
- the role of milking machines in mastitis problems.
- methods of increasing udder defense mechanisms.
- management practices that can reduce mastitis costs and risks.
- differences between healthy and infected mammary cell growth and function.
- genetic and hormonal factors in mastitis risk and prevention.
- a computerized expert system to help producers troubleshoot mastitis problems.

"We take a proactive approach," Sordillo says. "We think prevention is better than cure, so we're seeking ways for producers to keep cows disease-free, whether through management techniques, selective breeding, hormones, immune system enhancers or other methods."

The center's members meet monthly to share information, research results and news from the dairy community. "Our team includes scientists and extension specialists, so we have a good exchange of information," she says. "The research scientists keep us posted on the latest findings while the extension specialists make us aware of, and responsive to, producer's needs."

Sordillo says this helps the center's research efforts continue to be relevant, while giving extension and education programs a direct line to the most current information. It's an approach Sordillo believes will ensure the center's success.

"The Center for Mastitis Research is just getting started," she says. "In the future, we hope to expand and collaborate with scientists at other universities and perhaps in other nations."

For more information, contact the Center for Mastitis Research, c/o Lorraine Sordillo, The Pennsylvania State University, 101 Henning Building, University Park, PA 16802.

Seafood Industry at 'Turning Point'

Does Seafood Play in Peoria?

The National Fisheries Institute (NFI), the national trade association for the seafood industry, met in Palm Desert, California from October 11-14 to search for "turning points" that will get the industry back on track toward a per capita consumption goal of 20 pounds by the Year 2000.

The Board of Directors met on October 14 to review the recommendations of the 20 committees and 8 regions which had met since May. Key issues were once again seafood inspection and generic advertising for seafood products. The Board reaffirmed its support for mandatory seafood inspection legislation and voted to express its strong reservations about the voluntary program recently announced by the National Marine Fisheries Service. A high level task force will be established by the incoming president to evaluate the feasibility of seeking legislation for a generic advertising or "check off" program for the seafood industry.

The Convention program began with "Will it Play in Peoria?" a market analysis of seafood consumption and sales in Peoria, Illinois, that isolated some of the key issues or "turning points" that influence seafood sales. Marketing expert Al Ries supplemented this presentation with his own interpretation of seafood's marketing advantages. Ries believes that health and nutrition are the best marketing "hook," a fact borne out by the Peoria report, with the price of many varieties of seafood giving it a certain exclusivity that also appeals to consumers.

Environmental issues, on the other hand, seem to have a more insidious impact on sales than previously thought. Many consumers will avoid products that they *believe* are environmentally "incorrect," even if their knowledge of the issues is weak. One retail clerk in Peoria recounted an incident where she discovered her customers had been avoiding fresh tuna because of the dolphin-safe issue — when she posted an explanation of how this tuna was caught (on hooks), her tuna sales picked up again.

NMFS Administrator Dr. Bill Fox addressed the group on a number of topics, concentrating on an overview of NMFS activities during his three-year tenure. Dr. Fox reported on the status of the fisheries stocks, some of which are depleted, and explained how NMFS is working toward reversing this trend through limited entry and other programs. FDA Office of Seafood Director Tom Billy followed up with a review of FDA activities and plans for the upcoming joint (voluntary) FDA/NOAA HACCP inspection program which should be available early in 1993. He also discussed the risk assessment for raw shellfish which FDA feels has been misused and promised a new risk assessment would be undertaken in 1993.

Environmental turning points were approached from two totally different perspectives by Dixy Lee Ray, former governor of Washington and chairman of the Atomic Energy Commission, and Mike Sutton of the World Wildlife Fund. Dr. Ray set about debunking popular misconceptions about environmental degradation, insisting that most of current environmental theory is based on romanticized views of some Acadian idyll which never existed. Furthermore, she made the case that no one can reasonably predict how many people the Earth could comfortably hold (only 18% of the surface being populated), and that the so-called "hole" in the ozone layer is a natural component of the cyclical pattern of the ozone — not a result of use of chlorofluorocarbons (CFCs).

The NFI is a non-profit trade association of 1,000 companies involved in all aspects of the U. S. fish and seafood industry — producers, processors, wholesalers, distributors, brokers, importers, exporters, and members of allied supportive industries. The Institute provides

government relations, technical, communications and educational services in support of industry objectives and goals.

For more information, contact the NFI Communications Department, 1525 Wilson Boulevard, Suite 500, Arlington, VA 22209, or call (703)524-8881.

Wiant Seeks Environmental Professionals with Interdisciplinary Approach

Chris J. Wiant, President of the National Environmental Health Association (NEHA), has issued a call to all environmental professionals to participate in a year of dramatic and crucial change — a change in the way environmental problems are approached and solved. NEHA is the nation's largest generalist society of professionals who work to improve the environment in order to protect and improve health; NEHA views an interdisciplinary approach as critical to our future.

Mr. Wiant invites forward-thinking professionals in all scientific disciplines in the environmental field to come together to create those interdisciplinary answers to the serious problems we face.

The coming year will be spent actively contacting individuals from all scientific disciplines who see benefit in looking at environmental issues from a multi-disciplinary point of view. These professionals will be invited to share their solutions with others at the NEHA 1993 Annual Educational Conference, June 26-30, 1993 in Orlando, Florida. The conference whose theme is "Advancing the Environmental Professional: The Quiet Revolution," will provide a forum that stresses the interdependence of these solutions.

For information on NEHA or the June 1993 conference, contact Linda Lehman-Murphy, National Environmental Health Association (NEHA), 720 South Colorado Blvd., Suite 970, Denver, Colorado 80222-1925, (303)756-9090.

Seminar Discusses Sanitation for Warehousemen

Managers of warehouse operations can gain current information to assist them in complying with applicable regulatory laws in the Principles of Sanitation for Warehousemen course in Manhattan, Kansas, February 22-23.

Conducted by the American Institute of Baking, the seminar will also present the technical information necessary in establishing and maintaining an effective sanitation program as it relates to warehouse operations.

"The manager of a warehouse must understand approved methods of pest control, pesticide use and application as well as the practices that will maintain a clean and sanitary facility," William Pursley, vice president-sanitation at AIB comments. "In fact it is more than an obligation, it is the law. By knowing these laws and practicing their applications, it can also mean new business and greater profits."

This seminar will give participants a better understanding of how insanitary conditions can sometimes be responsible for a forced closure. It will outline management's role in implementing and supervising a sanitation program and help identify sources of product contamination and ways of controlling them. New insights into sanitation concepts and techniques will be covered.

"The course will look at the major elements in a top notch sanitation program and how they can be adapted to fit your organization." Pursley added. "It will stress the need of a better understanding of a team effort and cooperative action by all employees."

Each participant will receive the American Institute of Baking's Warehouse Sanitation Manual as well as valuable handouts to reinforce the presentations and provide a future resource on the job.

Tuition fees are $325 per participant from companies who are members of the Institute and $350 for non-members. For further information write to the Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502 or call (913)537-4750 or (800)633-5137.

National Restaurant Association Appoints New Director of Technical Services

Robert Harrington, currently assistant director of Technical Services, Public Health and Safety for the National Restaurant Association, has been promoted to the position of director of that department.

Harrington assumed his new duties on December 2, upon the retirement of current director James Brown.

Brown, a 30-year veteran in the fields of equipment engineering and food safety, is retiring after eight years with the association to move to Indiana to be closer to his family.

"We at the National Restaurant Association are grateful to Jim Brown for steering us through the sometimes tricky regulatory shoals of FDA, USDA, EPA, OSHA and other government agencies," said William P. Fisher, executive vice president.

"He also maintained a strong presence for the foodservice industry in dozens of third-party standards groups, covering everything from building and fire codes to energy-efficient standards for restaurant equipment.

"Our sadness over Jim's departure is lessened only by the fact that Bob Harrington has agreed to take his post, thus ensuring the high degree of excellence we have come to expect of our Technical Sales department," Fisher concluded.

Harrington has been the department's assistant director since 1985. Prior to that, he was with Amtrak

for five years, where he oversaw public health and safety issues as part of the railroad's in-house quality control team. Harrington, who has also supervised a county health department in Colorado, holds a master's degree in Parasitology from Colorado State University.

The National Restaurant Association is the largest foodservice industry trade group in the country, representing 150,000 establishments.

Notice of Cancellation

Due to cutbacks in general grant support for the Washington Sea Grant Program, the Smoke Seafood Products Conference scheduled to be held in Seattle, March 9-11, 1993, has been cancelled. We regret any inconvenience this change may cause.

Because of the high degree of interest in the topic, it is possible that other parties may try to sponsor a similar activity in the future. If this should occur, we will pass along any notice of interest that we have received through our normal channels of communication.

Washington Sea Grant Program
University of Washington
3716 Brooklyn Avenue, NE
Seattle, WA 98105-6795

Sanitary Design

A Mind Set

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

CHECKLIST - PART 3 - WALLS, FLOORS, CEILINGS

When evaluating the walls, floors and ceilings in a facility the main question is "are they sanitary?" Refinishing the walls, floors and ceilings of an older plant is a major undertaking. Sanitary walls, floors and ceilings are major items in the design of a food processing facility. The following checklist discusses items that must be taken into consideration.

1. Are walls, floors and ceilings made of impervious, easily cleanable, nonpainted, nonpeeling, inert material?

If the answer to this question is "no", the product produced by this plant is vulnerable to contamination by physical as well as microbiological contaminates. If surfaces cannot be cleaned adequately, they become ideal growth media for all kinds of bacteria, mold and other fungi which can then contaminate the product and the rest of the plant.

There are a number of surfaces that meet the criteria of being moisture impervious, easily cleanable, nonpeeling and inert. For walls there are epoxy finishes that last for many years without peeling if applied to a well prepared surface. These finishes withstand wet cleaning, do not absorb spattered or splashed food products and are inert. Other possibilities include pressed fiberglass board applied to existing walls. Fiberglass board has been approved by USDA for application in meat and poultry plants and, when applied correctly, withstands wet cleaning procedures. It also works well for fry applications. If precast concrete walls are selected, specify a grade B architectural finish. Grade B finish is defined as a surface that contains no more than one 1/8 inch diameter pit per square foot of surface area. Many times these walls can merely be sealed and present a smooth, cleanable surface. Tiled walls are always an option and are found in many meat processing plants, slaughter areas, dairies, and ice cream plants. Ceramic tile walls are expensive but are easily cleanable, are impervious to moisture and are inert. They also present a cosmetically attractive and sanitary appearance to a food processing area.

Ceilings are always a problem when renovating a food processing facility. Many plants have installed a drop ceiling which can be sealed and looks good for a while. Then when someone must access something in the space above, the seal is broken and usually is never resealed. It then becomes a point of entry for dust, insects and in turn allows moisture from the process area to migrate into the space above the ceiling. When renovating a facility, the best type of ceiling is a walk-on type, provided there is enough room. This solid type ceiling can be installed using insulated panels made from pressed fiberglass as described for walls, aluminum sandwich panels and a number of other materials. When installing these panels, support them from above using hangers, and make them strong enough to walk on to reach utilities or air distribution units. Insulated panel ceilings are like having another floor and require a separate access and good ventilation. These areas must be included in the sanitation program to make sure they remain insect and rodent free.

New facilities using precast double tee roofs only need to have the underside sealed to prevent concrete dusting. Painting or other finishes are not needed on these smooth surfaces. New facilities using trusses to hold up other types of roofs should have the walk-on type drop ceiling. Ceilings have to be designed to fit the facility and process.

Floors are another surface designed to fit a specific area of a processing plant. Floor types range from plain, sealed concrete in warehouse areas to acid brick in high impact, high temperature, high chemical exposure areas. Monolithic floors are gaining in popularity because they are seamless, easier to apply and are less expensive then brick or tile. Monolithic applications, however, require

the substrate floor to be prepared correctly. That means dry, clean, and, in the case of new floors, correctly and adequately cured or the monolithic will not perform and create the danger of lifting and peeling. Monolithic floors are both epoxy and polyurethane based and are either rolled on or troweled on by hand. These types of floors should be well researched before deciding on one. The type of exposure these floors receive is a definite factor in their selection. Some stand up to high heat, such as exposure to steam, better than others and some withstand the attack of food acids better than others. Some monolithics can be walked on the next day and have equipment placed on it in a week. Others are not accessible for up to 30 days. This must be taken into consideration when selecting flooring materials.

2. Are walls free of ledges or, if present, are the ledges sloped at a 60 degree angle?

The 60 degree angle prevents items from being placed on top of the walls. Flat ledges can and do become collection points for clipboards, tools, extra nuts and bolts, etc. It is not uncommon to see an internal block wall with not only a flat top, but an uncapped flat top. The holes in the block make excellent access points for insects and even rodents. Once they obtain entrance into the block wall system, they are just about impossible to dislodge. Flat surfaces are to be avoided in a food processing plant.

3. Are your walls window free? If windows are present, are they permanently shut or, if they must be opened, adequately screened?

The ideal design of a food plant does not include windows. However, some fire codes require windows and the process might require daylight for product color control. Artificial lighting can simulate daylight and do it continuously eliminating the need for windows in new facilities. In renovation projects, however, windows are often present. If at all possible they should be removed and the space blocked up. Failing that, the next best situation is to have windows that do not open. If there are windows in place that do open, they should have permanent screens that cannot be opened. Open windows without screens or open screens allow flying insects to gain entrance to the plant. Screened open windows still allow dirt-laden air to enter the plant and contaminate the products in process. Food and Drug has stated that air-borne contamination is a major problem in the food processing industry. Open windows can upset the positive air pressure requirement in a processing or packaging area of a plant.

4. Are floor, wall junctions coved with a minimum one inch radius?

The purpose of installing a cove at the floor-wall junction in a food plant is to eliminate the crack that normally occurs there. The smooth sweep of a good cove eliminates an area that is extremely difficult to clean. It permits easier clean up procedures and is required by USDA regulations for meat, poultry and egg processing plants. Coving is good to include in any processing plant as it makes cleaning easier and presents a more sanitary appearance. Correct design and installation are important. The top of the cove should be flush with the wall and the bottom of the cove should be flush with the floor so no additional cracks or ledges are created.

5. Are truck dock entries constructed to prevent bird nesting and pest entry?

Truck docks provide opportunities for birds and other pests to enter a warehouse and proceed into a processing area. Truck dock canopies, especially the older ones, provide nesting and roosting places for birds. Pesky birds like sparrows nest in any area presenting even minimal space to build a nest. Their droppings contaminate the dock area and have been found on ingredients and packages being off loaded from trucks. If the truck pulls away from the dock and the door is left open and unattended for a period of time, the birds enter the plant presenting a potential contamination problem. Canopies should no longer be considered when designing the truck doors on a food warehouse. The use of door seals has become more commonplace. Dock leveler pits are a potential problem because they are very low to the ground and present easy access for rodents. However, the use of brush seals around the leveler platform discourages rodents from entering the plant by that route.

Part 3 of the checklist is continued next month.

HACCP - An Industry Food Safety Self-Control Program: Part XII

Food Processes and Controls, Cont.

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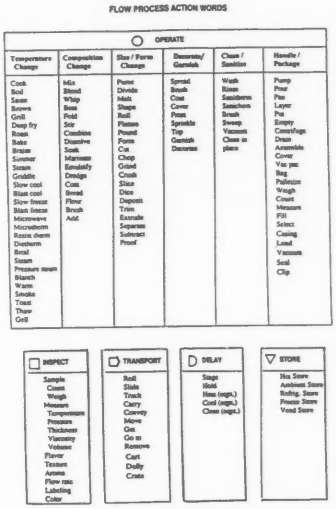
FLOW PROCESS ACTION WORDS

Action Words Lead to Computerized HACCP Processing

The list, **Flow Process Action Words**, contains simple descriptive words for flow process diagramming and then, writing HACCP recipe procedures. If these words are used exclusively, it is possible to computerize the entire flow process diagramming and hazard analysis procedure. (FIG. 5)

Figure 5.



BARLEY SOUP QA RECIPE FLOW

Temperature-Time Control

An example of a simple HACCP-based recipe flow process is shown in the flow chart, **Barley Soup QA Recipe Flow** (FIG. 6). Note that in each step, the step number and style of procedure are shown, along with "temperature in" (Ti), "temperature out" (To), and time (t) it takes to complete the step.

Critical Controls

Since a primary objective of retail chilled food operators is to eliminate the use of additives, the major control factors in pasteurized food process are times and temperatures. By writing a recipe in this form, one gains immediate control over the recipe, and one can determine the safety of a process, based on the microbiological standards previously discussed.

1. Receive, hold, and do pre-preparation in less than 5 days to control *Listeria monocytogenes*. Wash fruits and vegetables twice to remove microorganisms.
2. Cook from 40°F to 130°F in less than 6 hours to control *Clostridium perfringens*.
3. Pasteurize: 130°F, 121 minutes; 140°F, 12.1 minutes; 150°F, 1.21 minutes; 160°F, 0.121 minute to reduce *Salmonella* spp. 7D.
4. Cool from 130°F to 40°F in less than 4 hours (FDA) or 11 hours (USDA) to control *Clostridium perfringens*.
5. Use in 5 days if above 38°F. Keep until spoiled if below 30°F.

QUALITY-ASSURED HACCP RECIPE PROCEDURES

Cooks Need Recipes

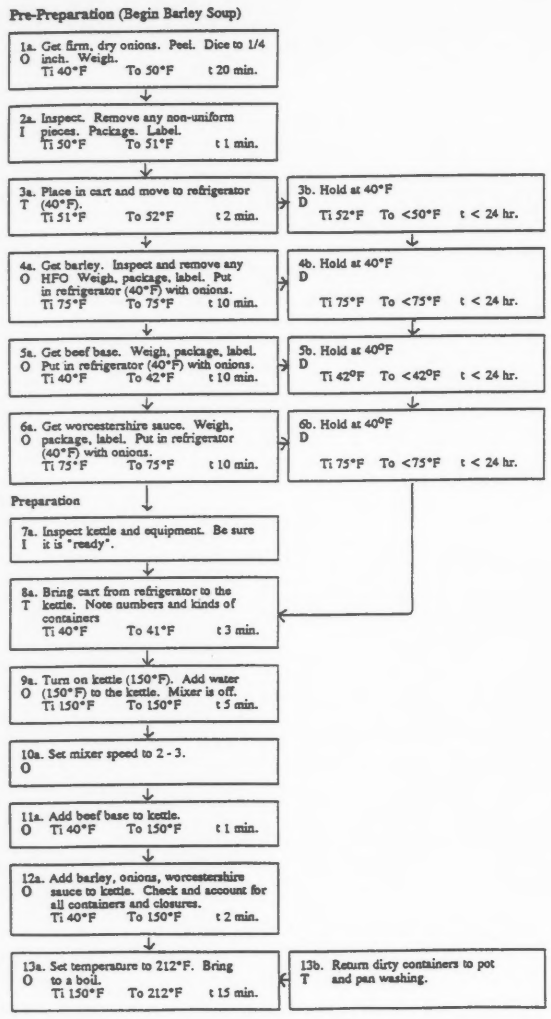
Cooks cannot practically use flow charts. Flow charts are made by quality assurance directors or chilled food process authorities. Cooks need to have the flow chart translated into a simple recipe form. The example of a simple recipe procedure is for the flow chart of barley soup. (FIG. 7)

Recipe Heading

At the top, the recipe name is identified, as well as the recipe process/production style (i.e., one of the seven recipe processes, in this case, sauces/brews). The recipe includes who wrote and OK'd the recipe, portion sizes, and preparation time. The person who is to prepare the recipe (O.P. Snyder) is also identified. The edible portion and weight percent are identified for each ingredient so that the recipe can be scaled up or down, preferably by computer. Unless the recipe is not to be pasteurized, ingredients are not a hazard control point. It is simply assumed that they are normally contaminated wih pathogens.

In commissaries and food manufacturing plants, special care must be taken with ingredients. Each ingredient should be purchased according to a thoroughly defined set of attributes. For each attribute there must be a sampling plan such as:

Figure 6. Barley Soup QA Recipe Flow



FOOD INGREDIENT ATTRIBUTE	SPECIFICATION	SAMPLING PLAN	ACTION
Hamburger	Less than 0°F at receiving	Measure an outer case from each lot	If at or below 0°F, accept If above 0°F, reject

Each regulated food additive in a recipe should be identified and in the space immediately under the ingredient list, the following included:

ADDITIVE	INTENDED USE	CFR REFERENCE	ALLOWABLE AMOUNT	ACTUAL AMOUNT

Recipe Body

The recipe procedure is divided into the sections shown in the form, **Quality Assured HACCP Recipe Procedures**:

- Pre-preparation procedures
- Preparation
- Chilling
- Store
- Reconstitution
- Served with (a quality element)
- Plating instructions
- Ingredients that could produce possible allergic reactions
- Leftovers

At the end of the form is space for comments about deviation in the process.

Hazard Control

The difference between a HACCP recipe and current uncontrolled recipes is that the critical control measures (time, temperature, pH, a_w) are written into each step. If only food time and temperatures are used for control, then the cook only needs to have an accurate ground junction 1/16-inch diameter thermocouple probe and 0.1°F thermometer calibration source. If acidity and/or water activity are used as controls, then the cook needs a pH meter and/or water activity instrument. Occupational hazard controls can also be included in the recipe form, such as putting on eye protection before using a cleaver or a wire glove before using a slicer.

Writing a Recipe Step

At the bottom of the form is the guide for writing a recipe step. As many steps from the flow diagram as appropriate are combined to create a recipe step. The HACCP recipe must have all of the controls, but it should not need to extend beyond the second page of the form.

The step begins with a step number. Then, the starting food temperature will be specified for the step; thickest dimension; container size; whether the food container is covered; temperature on/around the food; the time it takes to complete the step. Not all elements need to be specified for each step. For example, container size need only be specified when cooling or heating is taking place. All times and temperatures are derived by actual measurement during recipe development.

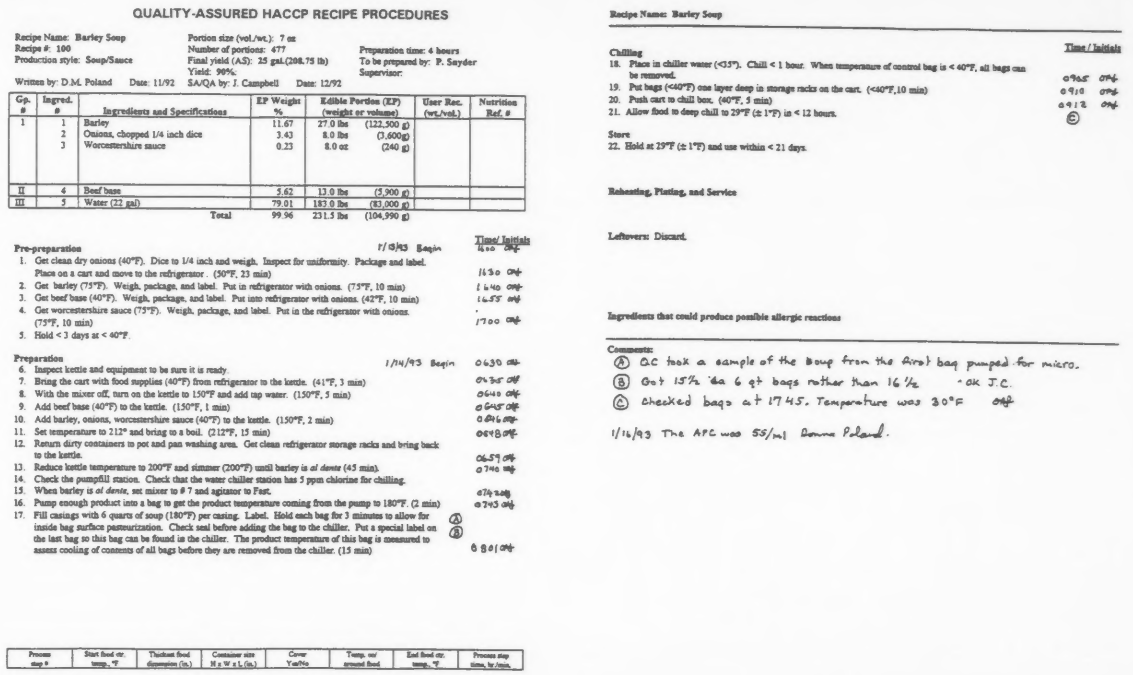
When a modified atmosphere or vacuum is being used, the exact specifications for the process must be designated in the recipe. The parameters include:

- Bag type
- Bag sealing temperature
- Bag size:
  - Vacuum setting time (how long to hold the vacuum before sealing)
  - mm mercury of vacuum at sealing
  - Evacuation speed
  - Gas flush (yes or no); if yes,
    - Mixture nitrogen (N^2) percent;
    - oxygen (O^2) percent; carbon dioxide (CO^2) percent
    - Evacuation to — — — — mm mercury
    - Back flush to — — — — mm mercury

Using the Recipe in a Restaurant

The critical control, which allows one to meet the HACCP principle of verification, is accomplished when the cook who is preparing the recipe initials each step of the recipe and indicates the time at which the step was completed. The supervisor, when he or she comes to the food preparation area, can then look at the recipe sheet to see if

Figure 7.



QUALITY-ASSURED HACCP RECIPE PROCEDURES

Recipe Name: Barley Soup
Recipe #: 100
Production style: Soup/Sauce
Portion size (vol./wt.): 7 oz
Number of portions: 477
Final yield (AS): 25 gal.(208.75 lb)
Yield: 90%
Preparation time: 4 hours
To be prepared by: P. Snyder
Supervisor:
Written by: D.M. Poland Date: 11/92 SA/QA by: J. Campbell Date: 12/92

Gp. #	Ingred. #	Ingredients and Specifications	EP Weight %	Edible Portion (EP) (weight or volume)	User Rec. (wt./vol.)	Nutrition Ref. #
I	1	Barley	11.67	27.0 lbs (122,500 g)		
	2	Onions, chopped 1/4 inch dice	3.43	8.0 lbs (3,600g)		
	3	Worcestershire sauce	0.23	8.0 oz (240 g)		
II	4	Beef base	5.62	13.0 lbs (5,900 g)		
III	5	Water (22 gal)	79.01	183.0 lbs (83,000 g)		
		Total	99.96	231.5 lbs (104,990 g)		

Pre-preparation 1/13/93 Begin — Time/ Initials

1. Get clean dry onions (40°F). Dice to 1/4 inch and weigh. Inspect for uniformity. Package and label. Place on a cart and move to the refrigerator. (50°F, 23 min) — 1430 DMP
2. Get barley (75°F). Weigh, package, and label. Put in refrigerator with onions. (75°F, 10 min) — 1440 DMP
3. Get beef base (40°F). Weigh, package, and label. Put into refrigerator with onions. (42°F, 10 min) — 1455 DMP
4. Get worcestershire sauce (75°F). Weigh, package, and label. Put in the refrigerator with onions. (75°F, 10 min) — 1700 DMP
5. Hold < 3 days at < 40°F.

Preparation 1/14/93 Begin — 0630 DMP

6. Inspect kettle and equipment to be sure it is ready. — 0635 DMP
7. Bring the cart with food supplies (40°F) from refrigerator to the kettle. (41°F, 3 min) — 0640 DMP
8. With the mixer off, turn on the kettle to 150°F and add tap water. (150°F, 5 min) — 0645 DMP
9. Add beef base (40°F) to the kettle. (150°F, 1 min) — 0646 DMP
10. Add barley, onions, worcestershire sauce (40°F) to the kettle. (150°F, 2 min) — 0648 DMP
11. Set temperature to 212° and bring to a boil. (212°F, 15 min) — 0659 DMP
12. Return dirty containers to pot and pan washing area. Get clean refrigerator storage racks and bring back to the kettle. — 0710 DMP
13. Reduce kettle temperature to 200°F and simmer (200°F) until barley is *al dente* (45 min). — 0714 DMP
14. Check the pumpfill station. Check that the water chiller station has 5 ppm chlorine for chilling. — 0715 DMP
15. When barley is *al dente*, set mixer to # 7 and agitator to Fast. — 0743 DMP
16. Pump enough product into a bag to get the product temperature coming from the pump to 180°F. (2 min)
17. Fill casings with 6 quarts of soup (180°F) per casing. Label. Hold each bag for 3 minutes to allow for inside bag surface pasteurization. Check seal before adding the bag to the chiller. Put a special label on the last bag so this bag can be found in the chiller. The product temperature of this bag is measured to assess cooling of contents of all bags before they are removed from the chiller. (15 min) — (A) (B) 0801 DMP

Process step #	Start food ctr. temp., °F	Thickest food dimension (in.)	Container size H x W x L, (in.)	Cover Yes/No	Temp. ctr/ ground food	End food ctr. temp., °F	Process step time, hr./min.

Recipe Name: Barley Soup

Chilling — Time / Initials

18. Place in chiller water (<35°). Chill < 1 hour. When temperature of control bag is < 40°F, all bags can be removed. — 0905 DMP
19. Put bags (<40°F) one layer deep in storage racks on the cart. (<40°F,10 min) — 0910 DMP
20. Push cart to chill box. (40°F, 5 min) — 0912 DMP
21. Allow food to deep chill to 29°F (± 1°F) in < 12 hours. — (C)

Store

22. Hold at 29°F (± 1°F) and use within < 21 days.

Reheating, Plating, and Service

Leftovers: Discard.

Ingredients that could produce possible allergic reactions

Comments:

(A) QC took a sample of the soup from the first bag pumped for micro.
(B) Got 15½ 6 qt bags rather than 16½ OK J.C.
(C) Checked bags at 1745. Temperature was 30°F DMP

1/14/93 The APC was 55/ml Donna Poland.

times and temperatures are reasonable. If the supervisor sees that each step is initialed, he or she knows that the recipe was controlled throughout its entire production. If there are problems that are beyond the scope of the employee to solve, the supervisor is called to make a decision and then, to initial the decision.

It is not proposed that it become standard practice to fill out a recipe control form for each recipe prepared, especially in restaurants. In restaurants, recipes are repeated almost daily, and the cook is really expected to memorize the steps. However, it can be used for training new cooks and for auditing performance.

It has also proven to be useful when a recipe has a special process such as preparing cold smoked salmon or steak tartar, which are high-hazard items. A recipe form could be logged each time a high-hazard product is made. In this way, there is a permanent record of the food variables for a production lot.

Using the Recipe in Health Care

In an environment that involves immune-compromised individuals such as hospitals, health care facilities, etc., the practice of initialing each recipe step is an excellent control procedure. Each time they are used, these recipes should be filed; and kept until all of the food produced from each recipe is consumed. Then, when it is known that no one became ill due to consumption of a certain food item, the recipe form can be discarded.

Federal Register

Food Safety and Inspection Service

Congressionally-Mandated Exemption Studies

Agency: The Food Safety and Inspection Service, USDA.

Action: Notice of study commencement; request for public participation.

Summary: The Food Safety and Inspection Service has commenced two exemption studies pursuant to a congressional mandate. The first study will examine present and future exemptions from Federal inspection requirements for specified products; the second will consider the appropriateness of exempting from inspection certain types of wholesale meat and poultry processing. These reports will be submitted to Congress on or before December 13, 1993. Public participation in the form of written comments is encouraged.

Dates: Written comments should be submitted by mail or FAX on or before: February 12, 1993.

Addresses: Written comments to Policy Office, Attn: Linda Carey, FSIS Hearing Clerk, room 3171, South Building, Food Safety and Inspection Service, U. S. Department of Agriculture, Washington, DC 20250.

For Further Information Contact: Dr. Jane R. Roth, Director, Policy Analysis Unit, Policy Evaluation and Planning Staff, FSIS, U. S. Department of Agriculture, Washington, DC 20250, (202)720-6735 or FAX (202)690-1030.

Supplementary Information:

Public Participation

All parties with an interest in the issues these studies raise are invited to submit written comments explaining their position and, where appropriate, make recommendations for consideration by this Agency. In particular, FSIS is interested in potential economic impacts and health-related scientific criteria that should be evaluated during the conduct of these exemption studies. Written comments should refer to docket number 92-028N. All comments submitted in response to this notice will be available for public inspection in the Policy Office from 9 a.m to 4 p.m., Monday through Friday.

Background

The Food, Agriculture, Conservation, and Trade Act Amendments of 1991 (section 1016, Pub. L. 101-237; approved December 13, 1991) amended the Federal Meat Inspection Act (FMIA) and the Poultry Products Inspection Act (PPIA) and commissioned two studies. The first is referred to as the "Product Exemption Study." The second is referred to as the "Wholesale Exemption Study." Study requirements as set forth in the amendments are as follows:

Product Exemption Study

"A study to develop criteria for, and evaluate, present and future inspection exemptions for meat food products and poultry products under the Federal Meat Inspection Act (21 U.S.C. 601 *et seq.*) and the Poultry Products Inspection Act (21 U.S.C. 451 *et seq.*), respectively, which shall examine the potential effect on consumers, on the affected industries, on public health and food safety, on the role of the Department of Agriculture, and the scientific basis for the exemptions."

Wholesale Exemption Study

"A study of the appropriateness of granting an exemption from the requirements of the Federal Meat Inspection Act or the Poultry Products Inspection Act, as appropriate, for wholesale meat outlets selling to hotels, restaurants, or other similar institutional users, provided that the processing of meat by the outlets is limited to cutting, slicing, grinding, or repackaging into smaller quantities."

Commencement of the Studies

Work on these studies has begun. They are being conducted concurrently. FSIS will consult with the National Academy of Sciences before finalizing study results. Reports of the studies will be provided to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate not later than December 13, 1993.

Done at Washington, DC, on December 8, 1992.

H. Russell Cross

Administrator, Food Safety and Inspection Service.

(FR Doc. 92-30321 Filed 12/11/92; 8:45 a.m.)
Federal Register/Vol. 57, No. 240/Monday, December 14, 1992/Notices

Food and Environmental Hazards to Health

Salmonella hadar Associated with Pet Ducklings — Connecticut, Maryland, and Pennsylvania, 1991

The association between *Salmonella* and pets, particularly birds and reptiles, is well established. In the spring of 1991, a cluster of *Salmonella* infections in Connecticut, Maryland, and Pennsylvania was linked to pet ducklings. This outbreak underscores the need for careful handling of pets, especially ducklings during the spring and Easter seasons.

On April 18, 1991, a local health department notified the Maryland Department of Health and Mental Hygiene of three cases of *Salmonella hadar* (group C2) infections linked to ducklings from one pet store. State health departments in Connecticut and Pennsylvania independently identified cases of *S. hadar* infection among persons who had recently obtained ducklings in their states. To determine the frequency of duckling-associated *S. hadar* infections, each state health department interviewed all persons with *S. hadar* infection reported during April 1 - May 15. Specimens from ducklings with whom infected persons had had contact before onset of infection were cultured, and the ducklings were traced to source hatcheries. This report summarizes the results of the investigation.

The three states identified 22 cases of *S. hadar* infection. Sixteen (73%) were duckling-associated: six from Pennsylvania and five each from Maryland and Connecticut; additional information was available for 15 of the 16 cases. Ages of infected persons ranged from 3 months to 42 years (mean: 7.5 years); 13 were aged <10 years. Eleven (73%) were female. Thirteen (87%) reported symptoms, including diarrhea (100%), fever (85%), abdominal cramps (77%), nausea (54%), bloody stool (46%), and vomiting (38%); four (27%) were hospitalized. Symptomatic patients had acquired one or more pet ducklings 3-19 days (median: 8 days) before onset of *S. hadar* infection. In all homes, ducklings were initially kept inside; in at least three, they were allowed to run free. In one home, a duckling lived in the bathtub where children bathed. In another, the mother of a 3-month-old breastfed infant with *S. hadar* infection reported not washing her hands after handling ducklings.

A case-control study of children aged ≤ 10 years was conducted in Maryland and Connecticut. Nine children with *S. hadar* infection were compared with 19 age-matched children with salmonellosis caused by other serotypes and reported during March 23 - May 10. Children with *S. hadar* infection were more likely to live in a household where a duckling was kept as a pet (9:9 versus 0:19; odds ratio indeterminate; $p<0.01$) but were not more likely to have had exposure to other pets or farm animals or to have had other risk factors for salmonellosis, such as consumption of inadequately cooked eggs or undercooked foods of animal origin.

S. hadar was recovered from 17 (81%) of 21 ducklings from lots supplied to the implicated pet store in Maryland and from rectal swabs or fecal specimens of eight (62%) of 13 ducklings associated with the Connecticut and Pennsylvania cases. Ducklings associated with Maryland cases had been obtained from the implicated pet store or had been won as prizes at an Easter egg hunt. Ducklings associated with cases in Connecticut and Pennsylvania were purchased at several different retailers. All ducklings were traced to two hatcheries in one Pennsylvania town. No connection was identified between the hatcheries, and no cultures were obtained from ducklings or from the environment at either hatchery. During duckling season (March-August), the two breeders distribute up to 2,000 ducklings per week by mail order, 80%-90% of which are sold in the northeastern and southeastern United States. Peak shipments occur during the Easter season.

Editorial Note: Previous reports have documented the potential for ducklings and chicks to transmit *Salmonella* to humans. The proportion of all salmonellosis attributable to ducklings and chicks is unknown but is likely to be small because most *Salmonella* infections are foodborne. Young children are at higher risk because they are often the recipients of these pets and may be unable to follow instructions about careful hygiene. Infants, if infected, are particularly susceptible to severe salmonellosis.

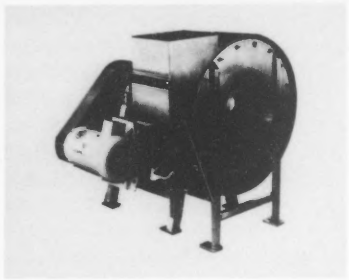
S. hadar was the fifth most frequently reported *Salmonella* serotype in humans each year from 1986 through 1990. During that period, 9,375 isolates (4.6% of all *Salmonella* isolates from human sources reported to CDC) were *S. hadar*. Poultry is the major reservoir of *S. hadar*. In 1990, the latest year for which data are available, 20% of *Salmonella* isolates from ducks were *S. hadar*. *S. enteritidis* and *S. typhimurium* have also frequently been isolated from ducks.

In Maryland, following the recovery of several serotypes of *Salmonella* from chicks and ducklings that were for sale during the Easter seasons of 1965-1967, legislation was enacted allowing the sale of fowl under 3 weeks of age only to commercial breeders and farmers. Similar legislation exists in Connecticut, Pennsylvania, and other states; however, enforcement is difficult, especially when ducklings can be purchased through out-of-state mail order and the seller may not ascertain why the fowl was purchased.

To prevent cases of *Salmonella* transmission from ducklings and chicks, owners should be aware of the risk for disease associated with contact of feces from these animals and of the need for careful handwashing after handling. Ducklings and chicks should not be kept as household pets for infants and young children. During investigations of *Salmonella* infections, especially during the spring and Easter seasons, health-care workers and public health personnel should consider contact with pet ducklings or chicks as a potential source and obtain cultures from these animals if they are implicated.

MMWR 3/20/92

Industry Products



New Sanitary Fans from Ammerman, Inc.

Ammerman Inc. has just introduced their new family of Sanitary Industrial Fans, the USRB and the SRB.

These fans have been designed and built to offer years of trouble-free operation under the most stringent sanitary applications.

The USRB is constructed entirely from stainless steel. It's been designed for ease of disassembly and cleaning. All the welds and internal surfaces have been ground and polished to a 4-B food grade finish. The USRB can be completely dis-assembled and washed down, both inside and outside. The USRB meets all USDA design and construction requirements for Food, Dairy and Pharmaceutical applications. Other applications include: Hospitals, Clean Rooms, plus Medical equipment handling and manufacture.

The companion SRB fans have a sanitary base, are manufactured of carbon steel, and are designed dry sanitary product applications including handling of cereals and other dry food products.

Ammerman, Inc. - Minneapolis, MN

Please circle No. 261
on your Reader Service Card

Cargille Products for Particle Identification

Particulates and particles from the air and water, chemicals, specimen fragments, plastics, translucent or transparent solids can be identified by using a microscope and dispersion staining, double variation refractometry, focal masking, and polariscopic immersion techniques. These techniques are used all over the world in optical analysis and for identification of solids, glasses, crystals, and flow patterns.

R. P. Cargille Laboratories, Inc. - Cedar Grove, NJ

Please circle No. 262
on your Reader Service Card

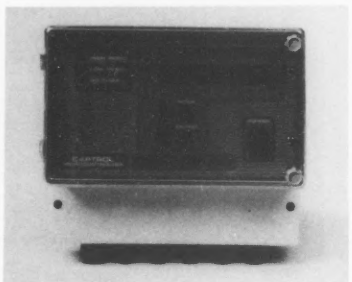
Selection/Specification Guide Describes Plastic Ball & Check Valves

A new eight-page brochure provides technical and application information on the complete line of Hayward corrosion resistant PVC, CPVC and PPL ball valves and check valves. The brochure describes true union, single entry, three-way and compact ball valves, as well as ball and "Y" check valves.

Detailed data and illustrations ensure a clear understanding of the valves and their operation. Annotated cut-away drawings show how the valves function and detail their component parts. Complete dimensional tables are provided for each valve type, along with a selection chart that makes it simple to select the correct valve for application. Logarithmic graphs are used to show the flow characteristics of each valve, eliminating the need for complex mathematical computations.

Hayward Industrial Products, Inc. - Elizabeth, NJ

Please circle No. 263
on your Reader Service Card



Capital Controls Introduces Captrol® The Microprocessor Controller for Chlorination/ Dechlorination Systems

Capital Controls Company, Inc. has introduced CAPTROL®, the microprocessor controller for chlorination/dechlorination systems.

CAPTROL® is a special-purpose, microprocessor controller designed for use with Capital Controls floor or wall cabinet mounted chlorination and dechlorination systems.

The controller automatically positions the gas feed control valve to maintain desired gas feed rate or chlorine residual based upon the electrical input signals from a flow meter or residual analyzer, or both.

All setup, tuning, and control adjustments are conveniently performed from the cleanly designed front panel.

Digital displays support rapid setup and tuning, and provide all information for precise and timely control of the process. Front panel alarm indicators and output contacts provide indication of process deviation and low process water flow. Setup, tuning, and control are accomplished with just four pushbutton switches conveniently located on the front panel. The microprocessor design simplifies controller tuning to just three adjustments: dosage, process lag time, and integral reset rate.

A 4-20 mAdc output signal, representing gas flow, can be used as input to computer control systems for ratio control of chloramination and dechlorination systems, or for remote indicating, recording, or totalizing of gas flow.

A self-contained battery provides full data protection, for a minimum of four days, in the event of a power failure.

The NEMA 12 enclosure is designed with separate access to controller electronics and wiring terminals for personnel safety.

Capital Controls Company, Inc. - Colmar, PA

Please circle No. 264
on your Reader Service Card

Gas and Liquid Sample Filters Protect Analyzers and Eliminate Downtime!

State of the art Gas and Liquid Sample Filters designed specifically to protect process analyzers and monitoring equipment are now available from Balston, Inc.

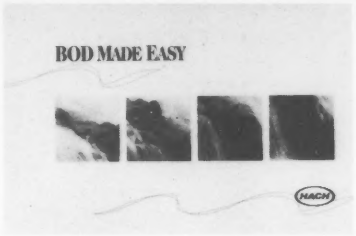
Balston Gas and Liquid Sample Filters remove solids and liquids from gases with 99.9999% efficiency at 0.1 µm, and solid particulate removal from liquids to .2 µm. These filters protect analyzers from sample impurities which are the most frequent cause of maintenance problems for instruments in an industrial environment. Models are available for gas flow rates up to 8,500 SCFM at 5,000 psig, and liquid flow rates up to 1,440 gallons per hour.

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

Typical applications include the sampling of stack gas; ambient air or high pressure gases; chemical, water, liquid effluent streams; and high pressure steam or condensate.

Balston, Inc. - Haverhill, MA

Please circle No. 265
on your Reader Service Card



Hach BOD Apparatus, Buffer Pillows are Highlights of New Brochure

Whether monitoring water or wastewater, Hach's complete biochemical oxygen demand system offers simplified products that make BOD analysis easy, accurate and reliable. In a new brochure from Hach, the time-saving, economical products are described, including:

BOD Nutrient Buffer Pillows. Add the contents of one pillow to distilled water, and dilution water is ready to be used immediately for the EPA-approved or Hach manometric method. Sterile pillows eliminate biological contamination.

Portable Dissolved Oxygen Meter. Use this meter and probe to perform USEPA-approved DO testing for BOD.

IncuTrol/2 Temperature Regulator. Converts any standard refrigerator to a dedicated BOD incubator.

Five more time- and money-saving products. Details about manometric apparatus, bottles, caps, seed culture and a toxicity test.

Hach Company - Loveland, CO

Please circle No. 266
on your Reader Service Card

Micro Motion's Elite™ Transmitter Improves Coriolis Flowmeter Performance

Micro Motion's newest electronics, the ELITE RFT9739 transmitter, improves Coriolis flowmeter accuracy, increases output capabilities and carries approvals for installation in hazardous areas. The ELITE transmitter is part of the ELITE flowmeter product line released earlier this year.

The ELITE transmitters accuracy is ±0.15% of rate for flow and ±0.0005 g/cc for density when paired with an ELITE flow sensor. ELITE also provides greater accuracy at low flow rates than any previous Coriolis meter. Application specific integrated circuit (ASIC) technology in the ELITE transmitter enhances flowmeter sensitivity, allowing the transmitter to process low flow sensor signals as small as two nanoseconds in duration.

The ELITE transmitter is encased in an explosion-proof, NEMA 4X, cast aluminum housing for field mounting. The ELITE transmitter is UL approved and rated for Class I, Division 1 hazardous areas. Two independently configured analog outputs provide users with simultaneous measurements. These outputs can represent mass or volumetric flow rates, density, or temperature. An additional frequency output scaled up to 10,000 Hz can be used to represent mass or volumetric flow rates. A rack-mount version for control room installation will be released in the United States later this year.

An ELITE transmitter can be used with any one of the 35 plus Model D or Elite sensors. The ELITE transmitter has fully digital communication capabilities using either the HART™ or Modbus™ protocols and Bell 202 or RS-485 physical layers.

Micro Motion, Inc. - Boulder, CO

Please circle No. 267
on your Reader Service Card

New Plastic Check Valves for Tubing ... Combine High Performance with Exceptional Economy

Plast-O-Matic Valves, Inc. announces that their recently introduced line of high-performance tubing check valves will now also be available in PVDF (Kynar®).

Designed specifically for tubing systems where exceptionally-high quantities of thermoplastic valves are required, these tubing checks provide the added benefits of high dependability and exceptionally low per unit cost.

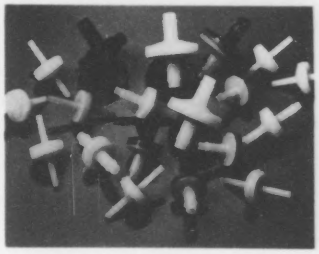
Already being manufactured in Nylon and Polypropylene, these highly reliable tubing checks perform effectively with many different applications, including: liquids, gases, pressure and vacuum. A free-floating diaphragm, which responds to even the slightest pressure change, is responsible for the superior sensitivity which is a major performance feature of these miniature tubing valves.

The Nylon valves have a silicone diaphragm and are designed for vacuum or applications where pressures up to 200 PSI are required. Also designed for vacuum or pressure, valves with Polypropylene bodies have a Viton® diaphragm which makes them ideal for corrosive or ultra-pure applications. The new PVDF tubing check valves have a Kalrez® diaphragm and represent the ultimate combination, where high-corrosion-resistance and high-purity applications are involved.

All three models are available in 1/8", 3/16", 1/4" and 5/16" tubing ID sizes.

Plast-O-Matic Valves, Inc. - Totowa, NJ

Please circle No. 268
on your Reader Service Card



New Hamilton HPLC Column Catalog

Hamilton Company introduces a NEW 44-page HPLC Column Catalog that lists and describes available application and technical information on various Hamilton Company polymeric packings:

- Three reversed phase column supports for general use and protein analysis.
- Two ion chromatography column supports for separation of inorganic anions and cations
- One ion excusion support for separation of organic acids and alcohols
- A superficially porous material for the anion exchange separation of proteins
- Two ligand exchange materials for separation of carbohydrates
- One anion exchange support for the high pH separation of carbohydrates
- Guard columns for columns listed in the catalog
- Column care and regeneration procedures

Hamilton Company - Reno, NV

Please circle No. 269
on your Reader Service Card

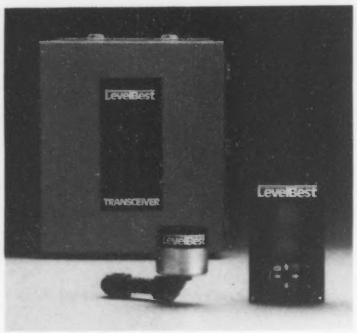
Faster, Simpler Protein Assay

The ANTEK **7000N Nitrogen Analyzer**, using patented Pyro-chemiluminescent™ technology, is 200 times more sensitive than the standard Lowry protein assay and five times better than the micro-Lowry method. Detection by chemiluminescence suffers no interference from buffers or reagents. In addition, the **7000N** is capable of assaying a much wider range of concentrations. Nitrogen analysis with the **7000N** gives a standard curve over a wide range of concentrations.

Completely micro-processor controlled, the **7000N** features onboard, data handling, printed results and reports, battery protected methods and data storage, internal and external timed events, internal calibration and data reduction, and more. For routine operation all parameters can be stored as a method and recalled as needed. The **7000N** involves less time and labor than colorimetric assays and can be automated with optional liquid or solid autosamplers.

ANTEK Instruments, Inc. - Houston, TX

Please circle No. 270
on your Reader Service Card



Non-Intrusive Level Measurement System Provides Clean Way to Monitor Liquid Level

Sandeno Technical, Inc. announces the availability of the new LevelBest™ Non-Intrusive Liquid Level Measurement System. The system is comprised of a display/controller unit, a transceiver, and proprietary ultrasonic sensors designed to mount externally (non-intrusively) to the bottom of storage tanks, allowing liquid level to be monitored from outside of the tanks. The system "reads" the liquid level by sending signals up through the tank bottom to rebound off of the liquid/vapor barrier — computing volume from the signal return.

Because the LevelBest sensors are mounted externally, they are safe, easy, and inexpensive to install or retrofit. In addition, because the sensors never come into contact with the contents of the tanks, they won't interfere with government "cleanliness" regulations.

LevelBest's ability to network up to 128 tanks with a single display/controller, keeps per-tank costs low. Tank-level readings are displayed on the graphic LCD (liquid crystal display) in the display/controller, which can be located up to a mile from the transceiver. The unit can display the volume of up to eight tanks simultaneously and offers a choice of three easily selectable display modes: digital, bar graph, or digital and bar graph combined.

Sandeno Technical - Lynnwood, WA

Please circle No. 271
on your Reader Service Card

CAD Plant Design for Sanitary Systems could Revolutionize Industry

CADPIPE® P&ID and CADPIPE ISO, to be used by designers of sanitary systems in the dairy, brewing, bottling, beverage and pharmaceutical industries, is the first plant design product for sanitary systems to be available on a personal computer (PC).

Don Chapman, President of International Software Systems, sees this as an opportunity to change the way plant design is done in the sanitary design industry.

"Many designers are still on the drafting board, and the computer-aided-design revolution has so far just passed them by," said Mr. Chapman. "We're going to change that by showing them the power, ease, and productivity increases that can come from designing with CADPIPE."

CADPIPE ISO will have all the ease of a drawing board, with all the intelligence of a sophisticated CAD plant design program.

"Once designers have been converted to the CADPIPE way of plant design, we believe productivity in the industry will sky-rocket," Mr. Chapman added.

"We have developed a unique system of defaults for users of CADPIPE ISO," said Barry Morris, Manager of Engineering and Development for ISS. "The sanitary designer does not have to be concerned about the end types of the various fittings. A customizable file, which will be loaded automatically on start-up, lets the designer route the pipe or tubing, while the program has already set the end-types for the particular type of system the user is designing. Then the bill of materials is extracted, and all the information is there on the print-out for ordering. At no point in the design process does the designer have to attend to the many different end-type decisions."

CADPIPE P&ID and ISO databases include the entire line of Tri-Clover® fittings, valves, and pumps. Part numbers and weights are included in the database and they are printed on the bill of materials.

International Software Systems, Inc. - Calgary, Alberta, Canada

Please circle No. 272
on your Reader Service Card

Open and Hooded Combination Kjeldahl Units Combine Digestion and Distillation Processes in One Space-Saving Apparatus

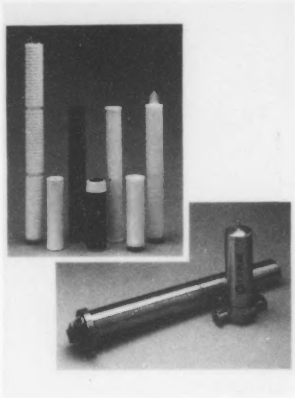
The Open Combination Kjeldahl digests and distills up to 12 samples at a time. It is constructed of tubular steel with the distillation rack located above the digestion apparatus.

The Hooded Combination Kjeldahl encloses the digestion and distillation processes providing operation protection and heat removal by exhausting heat from the laboratory. Two blower connection collars are included: one for a remotely located exhaust blower connection and the other for an optional auxiliary-air blower connection. Models are available with 6, 12 and 18 sample capacities.

Both Kjeldahl units are fully assembled with either a blower fume exhaust manifold or water ejector system. Other features include a water temperature gauge, electric heaters, chlorinated polyvinyl chloride fume manifold with teflon nipples and borosilicate glass, connecting bulbs and delivery tubes.

Labconco Corporation - Kansas City, MO

Please circle No. 273
on your Reader Service Card



Ionpure Now Offers a Line of Filter Cartridges and Housings Especially Selected for Water Purification Applications

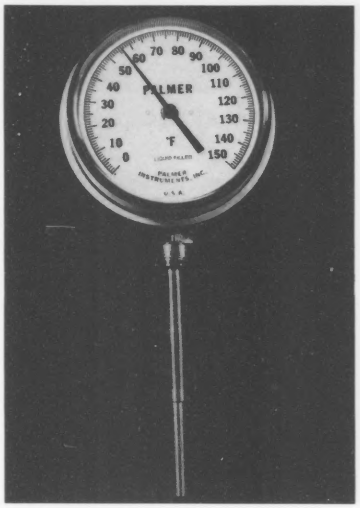
Ionpure Technologies is targeting applications within the water industry as potential outlets for its new line of filter and housing cartridges. The line consists of a broad range of prefilters for removal of particulates from feedwater, post filters for downstream clarification of purified water, hydrophilic membrane final filters for bacteria removal in water, hydrophobic membrane filters for tank venting applications, point-of-use capsule filters, and a complete line polypropylene and stainless steel housings.

Ionpure's most recent filter, the point-of-use capsule filter is made of polypropylene construction with one square foot of hyrophilic membrane rated at 0.2 micron absolute retention. Also introduced recently is a tank vent filter, fitted with a foam prefilter sock to protect the membrane from dust and airborne dirt, it can vent up to 275 liters of air per minute and requires no housing due to its cage type construction.

Ionpure is offering an array of low flow and high flow housings. The low flow housings consist of natural and reinforced polypropylene housings and single tube stainless steel for prefiltration applications. High flow housings come in an assortment of multi-tube stainless steel configurations. There are 304 and 316L stainless steel units available for industrial use and electropolished 316 stainless steel for sanitary applications. The industrial and sanitary housings are offered in a variety of lengths and cartridge code configurations to accept a wide range of cartridge products.

Ionpure Technologies Corp. - Lowell, MA

Please circle No. 274
on your Reader Service Card



New - Liquid Filled Dial Thermometers!

These new thermometers enable customers to replace Industrial mercury-in-glass and mercury actuated Dial thermometers with a thermometer containing a non-toxic, odorless, organic, and non-flammable liquid.

Our new liquid filled thermometers eliminate environmental concerns over mercury and respond faster than bimetal thermometers. They fit into existing industrial type thermowells with tapered bores, saving customers money.

These thermometers are equipped with a double wound direct drive bourdon coil which lasts longer than traditional sector and pinion thermometers. They also have an external calibration screw readily accessible, and simple to use. The case easily adjusts to the best reading angle utilizing two pivot points instead of one, and a case that can be rotated 350°.

All our dial thermometers have a Three Year Warranty and Free Lifetime Recalibration!

Palmer Instruments, Inc. - Asheville, NC

Please circle No. 275 on your Reader Service Card

New Ceiling, Wall and Fan Brush from Sparta

Dusting hard to reach places has been made easier with Sparta's introduction of the new Ceiling, Wall and Fan Brush.

This unique brush will easily pick up dust from very hard-to-reach places, such as ceilings, etc. It's made of a durable flagged synthetic bristles and will retain a like new appearance when washed.

Sparta Brush Company is a leading manufacturer of high quality specialized brushes for the food service and food processing industry.

Sparta Brush Company - Sparta, WI

Please circle No. 276 on your Reader Service Card

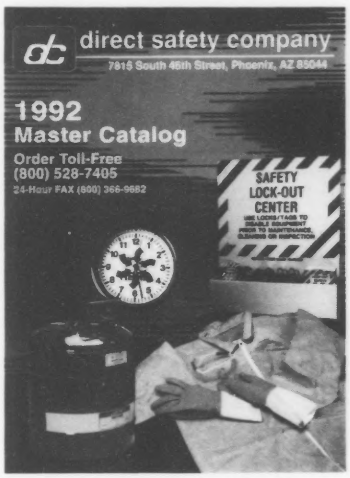
General Purpose Water Bath (0 to 80°C)

Science/Electronics announces the introduction of a new series of general purpose thermostatic water baths to its line of controlled temperature equipment. This series of baths/circulators, W-KM and LTM Models, fill the gap when applications are too demanding for utility baths, and high precision is not required. Available in 6 models with a temperature range of 0 to 80°C with sensitivity/uniformity of ±0.5°C.

Baths range in size from 6 to 38 liters and feature corrosive resistant stainless steel construction with stainproof fiberglass color molded exterior cases. All models include direct temperature setting in °C, over-temperature and low liquid level cutouts, internal circulation, pumps (at 10 liters per minute) for external temperature control, THREE-YEAR warranty and modular construction with a full range of useful accessories. All units include a unique circulation system for improved uniformity and sensitivity. The LTM units include integral refrigeration for continuous operation at ambient or below.

Science/Electronics - Dayton, OH

Please circle No. 277 on your Reader Service Card



New Catalog of Safety Products Offered Free

A new catalog of products designed to meet or exceed OSHA, ANSI and USDA requirements for industry is offered free by Direct Safety Company.

Illustrated in full color, the catalog contains a complete line of practical and educational products for sanitation, health and safety. Included are protective clothing, hand, eye, ear, and face protection, respirators, environmental monitors, anti-slip products, leak detectors, products for sanitary maintenance, first aid and emergency response, signs, labels, barricades, and communication systems, safe lighting, educational charts, manuals and videos, fire protection products, and more.

Direct Safety Company - Phoenix, AZ

Please circle No. 278 on your Reader Service Card

Filtration/Purification Filter Chambers

SERFILCO's line of filter chambers of engineered plastics - CPVC, Polypropylene, PVC and PVDF - offers the chemical and corrosion resistance necessary for use with strong acids and alkalies.

Chambers are ideally suited for use in filtering chemicals used in process work, where clarification will extend life and improve quality, prior to drum filling or aerosol packaging. Also for use with food and beverage products, pharmaceuticals, petro-chemicals, electroplating solutions, water and waste treatment and most other industrial liquids.

Their Series 'S' Filter Chamber pictured, offers flow rates varying from 3 - 80 GPM, others up to 335 GPM, for use with a variety of filter media - depth, pleated, carbon and membrane cartridges, discs, or cleanable sleeves, with temperatures to 200°F and pressure ratings up to 135 psi.

SERFILCO, Ltd. - Northbrook, IL

Please circle No. 279 on your Reader Service Card

Smooth Bore Sanitary Tubing Prevents Lodging of Sediments and Bacteria

Clear, flexible Excelon® tubing features a high performance, smooth bore construction which provides outstanding flow characteristics that prevents lodging of sediments and bacteria.

Excelon tubing offers superior purity, glass-like clarity, flexibility, strength, and enhanced resistance to oxidation, abrasion, chemicals and bacteria.

The inert, non-toxic, Excelon tubing is ideal for use in food and beverage processing, laboratory, hospital and chemical processing operations. Excelon RNT 1065 tubing conforms to all applicable FDA, USDA and 3-A milk handling standards, and is recommended for use with a wide range of foods including soft drinks, syrups, milk and processed dairy products.

Excelon tubing is available in sizes ranging from 1/16" ID to 4" ID in a wide variety of wall thicknesses to match specific working pressure requirements.

Thermoplastic Processes, Inc. - Stirling, NJ

Please circle No. 280 on your Reader Service Card

Affiliate News

Upcoming IAMFES Affiliate Meetings

1993

FEBRUARY

•**2, Georgia Association of Food and Environmental Sanitarians Annual Meeting** will be held at the Holiday Inn Airport North in Atlanta, GA. For more information, contact Mark Harrison at (706)542-2286.

•**23-25, Kentucky Association of Milk, Food and Environmental Sanitarians, Inc.'s Annual Meeting** will be held at the Quality Hotel Riverview, 666 W. 5th Street, Covington, KY 41011. For more information, please contact Anita Travis at (502)564-3127.

MARCH

•**2-3, Virginia Association of Sanitarians and Dairy Fieldmen** will meet at the Donaldson Brown Center for Con-Ed, Virginia Tech, Blacksburg, VA. For further information, please contact Donna Izac, Dairy Services Branch, VDACS, P. O. Box 1163, Richmond, VA 23209, (804)786-8912.

•**9-11, Basic Pasteurization Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

•**17-18, Michigan Environmental Health Association Annual Educational Conference** will be held at the Holiday Inn Crowne Plaza, Grand Rapids, MI. For more information, please contact John Kowalczyk at (313)761-1294.

•**18-19, Florida Association of Milk, Food and Environmental Sanitarians Annual Meeting** in conjunction with Suppliers Night at the Marriott on International Drive. For more information, please contact Bill Thornhill, 3023 Lake Alfred Road, Winter Haven, FL 33881, (813)299-6555.

•**24-26, 1st Annual Meeting of the Carolina Association of Milk, Food and Environmental Sanitarians** will be held in Charlotte, NC. For more information, please contact Elizabeth Johnson at (803)937-6201.

APRIL

•**8, Nebraska Association of Milk and Food Sanitarians Annual Meeting** will be held at the Douglas County Extension Office, Omaha, NE. For more information, please contact Allen Ackerman at (402)471-0387.

•**7-9, Missouri Milk, Food and Environmental Health Association's Annual Education Conference** will be held at the Ramada Inn, Columbia, MO. For more information, please contact Janet Murray at (816)263-6643.

JUNE

•**8-9, Texas Association of Milk, Food and Environmental Sanitarians Annual Meeting** will be held at the Wyndham Hotel, 4140 Governor's Row at Benwhite Exit off IH35, Austin, TX (512)448-2222. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

JULY

•**13-15, Basic Pasteurization Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

AUGUST

•**1-4, 80th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc.** to be held at the Stouffer Waverly Hotel, Atlanta, GA. For more information please contact Julie Heim at (800)369-6337 (US) or (800)284-6336 (Canada).

•**17-19, Special Problems Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Seven Oaks Hotel, 1400 Austin Hwy, San Antonio, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

OCTOBER

•**26-28, Basic Pasteurization Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

Tennessee Holds Fall Meeting

The fall meeting of the Tennessee Association of Milk, Water and Food Protection was held at the Ellington Agriculture Center, Nashville, Tennessee with 58 members and guests present.

Dr. Ann Draughon of the University of Tennessee, President of the Tennessee Affiliate presided over the meeting.

Wayne Crabtree of Mayfield Dairy, Athens, TN served as Session Chairman.

The group was welcomed to Ellington Center by Jimmy Hopper, Director of Quality and Standards Division, Tennessee Department of Agriculture.

A panel discussion on dairy regulations was presented by Tennessee Department of Agriculture staff. Hugh Wilson, Milk Rating Officer, served as moderator. Dennis Lampley, Dairy Administrator, updated the group on enforcement and regulation changes. Emily McKnight, Laboratory Certification Officer, spoke on changes in the Certified Milk Laboratory program. John Sanford, Milk Rating Officer, updated the group on the Interstate Milk Shippers program.

After a milk break, Dr. Bill Morris of the University of Tennessee, spoke on Food Safety.

Dr. Draughon reported on a study of pathogens in raw milk in Tennessee and updated the members on IAMFES activities.

Jerry Baggett of TDA, served as door prize chairman, with everyone in attendance receiving a prize.

After lunch, the group enjoyed a tour of the Fleming (Malone & Hyde) Dairy plant in Nashville.

Glenda Smead of TDA served as photographer. Mary Lou Hopper and Teresa Graves of TDA conducted registration.

Ohio Affiliate Meets

On October 1, 1992, the Ohio Association of Milk, Food and Environmental Sanitarians met at the Honda of America Manufacturing, Inc., (HAM) in Marysville, Ohio for our fall meeting and tour. Dee Buske, Affiliate Liaison, from the IAMFES Office in Des Moines, Iowa was in attendance.

The day began with a continental breakfast and then a movie to introduce Honda to the visitors. During the tour, each visitor wore headphones to hear the commentary even in the noisiest areas.

In order to appreciate the corporation as it stands today, one must know the sheer magnitude, the number of employees, the amount and types of waste generated during production and how rapidly this giant developed in Marysville, Ohio where there was farm land.

Ground was broken for the $250 million, one million square-foot facility in December, 1980. The Marysville Auto Plant is the most integrated auto manufacturing plant in North America. The mammoth building houses stamping, welding, painting, plastic injection molding, assembly, quality assurance, export and other operations. Production of the Accord 4-door sedan began at the facility in November, 1982.

In early 1984, HAM announced plans to proceed with a $240 million expansion of the Marysville automobile plant. With the expansion completed in April 1986, HAM began producing the 3-door Accord on the number two line. In July 1986, the sub-compact 4-door Civic was added to production and in December 1987, the Accord 2-door Coupe was added, making HAM the only manufacturer of this model. By the end of 1987, HAM was producing Accords and Civics at the rate of 320,000 per year, and preparing to export 2-door Accords to Japan in early 1988. In 1990, production began on the Accord wagon, the first Honoda automobile to be designed, engineered and manufactured in the United States and is exported to Europe, Japan and other countries. Both right and left hand drive cars are produced on the same assembly line.

In 1986, a $42 million plastics plant opened adjacent to the auto plant for the production of bumpers and other parts, many of which are exported worldwide. In 1987, HAM announced plans to begin full-scale production of Accord and Civic engines, drivetrains, suspension and brake parts at the Anna (Ohio) Engine Plant which supplies the Marysville plant with parts.

Adjacent to the Marysville Auto Plant is the Motorcycle Plant which is a 260,000 square feet facility under roof and employs 400 associates. The capital investment in this facility is approximately $90 million. Sixty thousand motorcycles and utility vehicles are manufactured annually: GL 1500 Gold Wing, Shadow 1100, TRX200 and TRY200 Fourtrax. Many engines and parts are also produced in the Anna Plant Making HAM the first company to produce both motorcycle and automobile engines in the United States. A tour of this facility was impossible due to time constraints.

The short history of HAM has been the story of extraordinary accomplishments. The Marysville Automobile Plant is now 3.1 million square feet under roof, represents a capital investment of $1.3 billion and employs over 5,300 associates. All this now covers land which was being farmed only twelve short years ago. The environmental effects of such growth has been astounding and yet the grounds and plants are impeccably clean. Honda works closely with OSHA, EPA and Health Department to assure a clean, safe, healthy workplace for their associates and the community.

During the tour, visitors noticed that all associates wear the same white uniform and they all park in the same parking lot without reserved spaces. They all eat in the same cafeteria and they have no private offices, all desks being in the same large areas without walls. These are some of the ways Honda shows respect for the individual associate and to acknowledges the individual's intelligence, hardwork and commitment.

Following the two hour, two mile walking tour, a delicious buffet luncheon was served in the cafeteria. In the afternoon, associates from the Environmental Division gave a slide presentation and spoke about health and safety issues. There was a question and answer period followed by a brief business meeting.

Gloria Swick, M.S.A., R.S.
OAMFES Past President

Texas Association of Milk, Food and Environmental Sanitarians to hold Training Seminars

The Texas Association of Milk, Food and Environmental Sanitarians have finalized plans for four training seminars for 1993. Three training seminars are entitled "Basic Pasteurization Course" and one "Special Problems Course."

Each course will have a maximum enrollment of fifty registrants. Enrollment will be administered by Ms. Janie F. Park. It is requested that all applicants contact Ms. Park by telephone at (512)458-7281, Monday through Friday, between the hours of 7:00 a.m. CST through 4:00 p.m. CST. Filling of seminar dates will be prioritized on a first come, first serve basis. The enrollment fee is $150 per applicant and may be remitted to Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363. Checks should be payable to TAMFES. Sustaining members may supply one applicant for these seminars at no charge. Regulatory officials are exempt from the $150 enrollment fee.

The 1993 training dates for the four seminars and the locations are:

Dallas	March 9-11 July 13-15 October 26-28	Basic Pasteur. Course	Le Baron Hotel 1055 Regal Row (214)634-8550
San Antonio	August 17-19	Special Problems Course	Seven Oaks Hotel 1400 Austin Hwy (512)824-5371

Lodging will be the responsibility of the individual registrants. Telephone numbers and addresses of host hotels are listed for your convenience. Please state when registering that you are with TAMFES in order to get the appropriate group rates. Airport service is available from hotels.

Please be reminded that the sooner you apply, the more likely you are to be enrolled at your place and on your date of greatest choice. We look forward to seeing you at one of the training seminars.

New IAMFES Members

Arkansas

Ken Tyree
Land O'Frost
Searcy

California

Steven Cooper
California Milk Producers
Artesia

Gene Goetsch
Joseph Gallo Farms
Hilmar

Andrew P. Holm
Best Foods/CPC International
Santa Fe Springs

Mac McGann
GFI Stainless
Modesto

Lee Mitchell
California Milk Producers
Artesia

Jule Taylor
Safeway, Inc.
San Leandro

Colorado

Jay C. Lemmermen
WDCI
Thornton

Connecticut

Richard P. Werner
Milford Health Dept.
Milford

Georgia

Kimberley Donaldson
University of Georgia
Comer

Guodong Wang
University of Georgia
Athens

Idaho

Roger L. Hancock
Albertson's Inc.
Boise

Illinois

Catherine Bachner
Liquid Carbonic
Chicago

John P. Hertsgaard
Tetra Rex Packaging Systems, Inc.
Buffalo Grove

Lawrence E. Wyatt
Silliker Laboratories of Illinois, Inc.
Chicago Heights

Iowa

H. Keith Erickson
Linn County Health Dept.
Cedar Rapids

Louisiana

David N. Domma
Louisiana State University
Baton Rouge

Maryland

Richard D. Eubanks
USPHS/FDA
Monrovia

Massachusetts

Marjorie Radlo
Vicam
Somerville

Michigan

James R. Harness
Neogen Corp.
Lansing

Clifford L. Raber
Leprino Foods
Allendale

Minnesota

Lance Heaton
Pure Culture Producers
Hutchinson

Tina Kenefick
Minnesota Valley Testing Labs
New Ulm

Nebraska

Dean Danilson
IBP, Inc.
Dakota City

New York

Jon Delaharpe
Applied Microbiology
New York

Manzur Mian
Sunnydale Farms
Brooklyn

Pennsylvania

Kathy Fritzler
Blommer Chocolate Co.
East Greenville

Tennessee

Roger Williams
Williams Sausage Co.
Union City

Texas

Paul Cannon
The Perrier Group
Ft. Worth

Jerome Chaney
Stainless Service Company
Irving

Rhonda L. Wilmington
Minh Food Corporation
Pasadena

Utah

Randy Bastian
Cream O Weber
Salt Lake City

Marilyn Martinez
Southland Foods
Salt Lake City

Vermont

L. S. Donnelly
Wyeth Nutritional Inc.
Milton

Washington

Neil Gilbert
Othello

Mike Sweet
Vita Rich Ice Cream
Renton

Wisconsin

David P. Gebhart
Klenzade, Service of Ecolab
LaCrosse

Dave Mills
Jerome Foods, Inc.
Barron

Jeff Pfaff
BK Ladenburg
Cedarburg

Mike Shoop
Stainless Products Inc.
Somers

Canada

Karen Galye
Burnaby, British Columbia

Mexico

Maria Nieves Becerra Reza
Facultad De Zootecnia Uach
Chihuahua

1993 IAMFES AWARDS NOMINATIONS

The International Association of Milk, Food and Environmental Sanitarians is proud of its members and their contributions.

As a member, you are entitled to nominate deserving colleagues for the IAMFES Awards.

Nomination forms need to be completed and back to the Ames office by April 2, 1993.

1. Previous award winners are not eligible for the same award. Check pages 40 and 41 in this issue for a complete listing of past award winners.

2. Present Executive Board members are not eligible for nomination.

3. Candidates must be current IAMFES members in order to be nominated.

Presentation of these awards will be during the IAMFES Annual Meeting August 1-4, 1993 at the Stouffer Waverly Hotel, Atlanta, Georgia, during the Annual Awards Banquet Wednesday evening.

NOMINATION FORMS WILL BE MAILED OUT TO THE MEMBERSHIP THE END OF JANUARY. SEND COMPLETED MATERIALS TO:

Steven K. Halstead, CAE
IAMFES, Awards
200W Merle Hay Centre
6200 Aurora Avenue
Des Moines, IA 50322

Questions? Call 800-369-6337 (includes Iowa) 800-284-6336 (Canada), 8-4:30 weekdays, or FAX 515-276-8655.

The following lists the awards that you may nominate a person for.

Nominate a deserving colleague for these prestigious IAMFES Awards:

- **SANITARIANS AWARD** - in recognition of outstanding service to the profession of the Sanitarian.
  $1000 award and plaque

- **EDUCATOR AWARD** - presented to an educator in recognition of outstanding service in academic contributions to the profession of the Sanitarian.
  $1000 award and plaque

- **CITATION AWARD** - for many years of devotion to the ideals and objectives of the association.
  plaque

- **HAROLD BARNUM INDUSTRY AWARD** - in recognition of outstanding service to the public, IAMFES and the profession of the Sanitarian.
  $500 award and plaque

- **HONORARY LIFE MEMBERSHIP** - for devotion to the high ideals and principles of IAMFES.
  plaque and lifetime membership with IAMFES

Past IAMFES Award Winners

EDUCATOR-INDUSTRY AWARD

1973-Walter A. Krienke
1974-Richard P. March
1975-K. G. Weckel
1976-Burdet H Heinemann
1977-Elmer H. Marth
1978-James B. Smathers
1979-Joseph Edmondson
1980-James R. Welch
1981-Francis F. Busta

In 1982 this award was split into the Educator Award and the Harold Barnum Award (for industry).

EDUCATOR AWARD

1982-Floyd Bodyfelt
1983-John Bruhn
1984-R. Burt Maxcy
1985-Lloyd B. Bullerman
1986-Robert T. Marshall
1987-David K. Bandler
1988-Edmund A. Zottola
1989-Vernal Packard
1990-Michael Stiles
1991-William E. Sandine
1992-William S. LaGrange

HAROLD BARNUM AWARD

1982-Howard Ferreira
1983-C. Dee Clingman
1984-Omer Majerus
1985-William L. Arledge
1986-Hugh C. Munns
1987-J. H. Silliker
1988-Kenneth Kirby
1989-Lowell Allen
1990-Roy Ginn
1991-Thomas C. Everson
1992-Ronald Case

CITATION AWARD

1951-J. H. Shrader and
William B. Palmer
(posthumously)
1952-C. A. Abele
1953-Clarence Weber
1954-C. K. Johns
1955-R. G. Ross
1956-K. G. Weckel
1957-Fred C. Baselt
1958-Milton R. Fisher
1959-John D. Faulkner
1960-Luther A. Black
1961-Harold S. Adams
1962-Franklin W. Barber
1963-Merle P. Baker
1964-W. K. Moseley
1965-H. L. Thomasson
1966-J. C. Olson, Jr.
1967-William V. Hickey
1968-A. Kelley Saunders
1969-Karl K. Jones
1970-Ivan E. Parkin
1971-L. Wayne Brown
1972-Ben Luce
1973-Samuel O. Noles
1974-John C. Schilling
1975-A. R. Brazis
1976-James Meany
1977-None Given
1978-Raymond A. Belknap
1979-Harold E. Thompson, Jr.
1980-Don Raffel
1981-Henry V. Atherton
1982-None Given
1983-William B. Hasting
1984-Elmer H. Marth
1985-Ralston B. Read, Jr.
1986-Cecil E. White
1987-None Given
1988-Carl Vanderzant
1989-Clem Honer
1990-None Given
1991-Frank Bryan
1992-Ewen C. D. Todd

SANITARIANS AWARD

1952-Paul Corash
1953-E. F. Meyers
1954-Kelley G. Vester
1955-B. G. Tennent
1956-John H. Fritz
1957-Harold J. Barnum
1958-None Given
1959-William Kempa
1960-James C. Barringer
1961-Martin C. Donovan
1962-Larry Gordon
1963-R. L. Cooper
1964-None Given
1965-Harold R. Irvin
1966-Paris B. Boles
1967-Roger L. Stephens
1968-Roy T. Olson
1969-W. R. McLean
1970-None Given
1971-Shelby Johnson
1972-Ambrose P. Bell
1973-None Given
1974-Clarence K. Luchterhand
1975-Samuel C. Rich
1976-M. W. Jefferson
1977-Harold Bengsch
1978-Orlowe Osten
1979-Bailus Walker, Jr.
1980-John A. Baghott
1981-Paul Pace
1982-Edwin L. Ruppert
1983-None Given
1984-Harold Wainess
1985-Harry Haverland
1986-Jay Boosinger
1987-Erwin P. Gadd
1988-Kirmon Smith
1989-Robert Gales
1990-Leon Townsend
1991-James I. Kennedy
1992-Dick B. Whitehead

HONORARY LIFE MEMBERSHIP AWARD

1957-J. H. Shrader
1958-H. Clifford Goslee
1959-William H. Price
1960-None Given
1961-Sarah Vance Dugan
1962-None Given
1963-C. K. Johns and Harold Macy
1964-C. B. and A. L. Shogren
1965-Fred Basselt and Ivan Parkin
1966-M. R. Fisher
1967-C. A. Abele and L. A. Black
1968-M. P. Baker and W. C. Frazier
1969-John Faulkner
1970-Harold J. Barnum
1971-Wiliam V. Hickey
1972-C. W. Dromgold and

and Past Presidents

E. Wallenfeldt
1973-Fred E. Uetz
1974-H. L. Thomasson and
K. G. Weckel
1975-A. E. Parker
1976-A. Bender Luce
1977-Harold Heiskell
1978-Karl K. Jones
1979-Joseph C. Olson, Jr.
1980-Alvin E. Tesdal
1981-Robert M. Parker
1982-None Given
1983-Orlowe Osten
1984-Paul Elliker
1985-Patrick J. Dolan,
Franklin W. Barber and
Clarence K. Luchterhand
1986-John G. Collier
1987-Elmer Marth and
James Jezeski
1988-Kenneth Whaley and
Paul J. Pace
1989-Earl Wright
Vernon Cupps
1990-Joseph E. Edmondson
1991-Leon Townsend
Dick B. Whitehead
1992-A. Richard Brazis
Harry Haverland

SHOGREN AWARD

1972-Iowa Affiliate
1973-Kentucky Affiliate
1974-Washington Affiliate
1975-Illinois Affiliate
1976-Wisconsin Affiliate
1977-Minnesota Affiliate
1978-None Given
1979-New York Affiliate
1980-Pennsylvania Affiliate
1981-Missouri Affiliate
1982-South Dakota Affiliate
1983-Washington Affiliate
1984-None Given
1985-Pennsylvania Affiliate
1986-None Given
1987-New York Affiliate
1988-Wisconsin Affiliate
1989-Georgia Affiliate
1990-Texas Affiliate
1991-Georgia Affiliate
1992-Georgia Affiliate

MEMBERSHIP ACHIEVEMENT AWARD

1986-Iowa Affiliate
1987-Florida Affiliate
1988-Florida Affiliate
1989-California Affiliate
1990-California Affiliate
1991-Illinois Affiliate
1992-Illinois Affiliate

PAST PRESIDENTS

1912-C. J. Steffen
1913-C. J. Steffen
1914-C. J. Steffen
1915-A. N. Henderson
1916-Claude F. Bessio
1917-Wm. H. Price
1918-Alfred W. Lombard
1919-James O. Kelly
1920-Ernest Kelly
1921-C. L. Roadhouse
1922-H. E. Bowman
1923-Geo. E. Bolling
1924-J. B. Hollingsworth
1925-T. J. Strauch
1926-G. C. Supplee
1927-W. A. Shoults
1928-Ira V. Hiscook
1929-H. R. Estes
1930-R. E. Irwin
1931-A. R. B. Richmond
1932-W. B. Palmer
1933-H. N. Parker
1934-P. F. Krueger
1935-C. K. Johns
1936-G. W. Grim
1937-J. C. Hardenbergh
1938-A. R. Tolland
1939-V. M. Ehlers
1940-P. D. Brooks
1941-L. C. Frank
1942-F. W. Fabian
1943-C. A. Abele
1944-C. A. Abele
1945-R. R. Palmer
1946-R. R. Palmer
1947-R. G. Ross
1948-W. D. Tiedeman
1949-A. W. Fuchs
1950-M. R. Fisher
1951-K. G. Weckel
1952-H. L. Thomasson
1953-H. J. Barnum
1954-John D. Faulkner
1955-I. E. Parkin
1956-Harold S. Adams
1957-Paul Corash
1958-Harold Robinson
1959-Franklin Barber
1960-W. V. Hickey
1961-John Sheuring
1962-Charles E. Walton
1963-Ray Belknap
1964-John H. Fritz
1965-W. C. Lawton
1966-Fred E. Uetz
1967-P. R. Elliker
1968-A. N. Myhr
1969-Samuel O. Noles
1970-Milton E. Held
1971-Dick B. Whitehead
1972-Orlowe M. Osten
1973-Walter F. Wilson
1974-Earl O. Wright
1975-P. J. Skulborstad
1976-H. E. Thompson, Jr.
1977-H. V. Atherton
1978-David F. Fry
1979-Howard Hutchings
1980-Bill Kempa
1981-William Arledge
1982-Harry Haverland
1983-Robert Marshall
1984-A. Richard Brazis
1985-Archie Holliday
1986-Sidney E. Barnard
1987-Roy Ginn
1988-Leon Townsend
1989-Robert Gravani
1990-Ron Case
1991-Bob Sanders
1992-Damien A. Gabis

IAMFES Audio Visuals Library

A Free IAMFES Members Benefit

DAIRY

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

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

❑ **The Bulk Milk Hauler: Protocol & Procedures** - (8 minute videotape). Teaches bulk milk haulers how they contribute to quality milk production. Special emphasis is given to the hauler's role in proper milk sampling, sample care procedures, and understanding test results. (Iowa State University Extension)

❑ **Causes of Milkfat Test Variations and Depressions** - (140 slides-tape-script-30 minutes). This set illustrates the many factors involved in causing milkfat test variations or depressions in your herd, including feeding, management, stage of lactation, age of samples, handling of samples, and testing procedures. The script was reviewed by field staff, nutritionists, laboratory personnel and county extension staff. It is directed to farmers, youth and allied industry. (Penn State-1982)

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

❑ **Ether Extraction Method for Determination of Raw Milk** - (26 minute video). Describes the ether extraction procedure to measure milkfat in dairy products. Included is an explanation of the chemical reagents used in each step of the process. (CA-1990)

❑ **The Farm Bulk Milk Hauler** - (135 slides-tape-script-30 minutes). This set covers the complete procedure for sampling and collecting milk from farms. Each step is shown as it starts with the hauler entering the farm lane and ends when he leaves the milk house. Emphasis is on universal sampling and automated testing. Funds to develop this set were provided by The Federal Order #36 Milk Market Administrator. (Penn State-1982)

❑ **Frozen Dairy Products** - (27 minute videotape). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients; emphasis is on what to look for in a plant inspection. Everything from receiving, through processing and cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA-1987)

❑ **The Gerber Butterfat Test** - (7 minute video). Describes the Gerber milkfat test procedure for dairy products and compares it to the Babcock test procedure. (CA-1990)

❑ **High-Temperature, Short-Time Pasteurizer** - (59 minute videotape). Provided by the Dairy Division of Borden, Inc. It was developed to train pasteurizer operators and is well done. There are seven sections with the first covering the twelve components of a pasteurizer and the purpose and operation of each. The tape provides the opportunity for discussion after each section or continuous running of the videotape. Flow diagrams, processing and cleaning are covered. (Borden, Inc., 59-min.-1986)

❑ **The How and Why of Dairy Farm Inspections** - (110 slides-tape-script-15 minutes). This was developed at the request of seven northeast dairy cooperatives and with their financial support. Emphasis is on clean cows, facilities and equipment and following proper procedures. Regulatory agencies cooperated in reviewing the script and taking pictures. This was developed for farmers, youth and allied industry. (Penn State-1984)

❑ **Milk Plant Sanitation: Chemical Solution** - (13 minute video). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titration are reviewed ... alkaline wash, presence of chlorine and iodophor, and caustic wash and an acid wash in a HTST system. Emphasis is also placed on record keeping and employee safety.

❑ **Milk Processing Plant Inspection Procedures** - (15 minute videotape). Developed by the California Department of Food and Agriculture. It covers pre and post inspection meeting with management, but emphasis is on inspection of all manual and cleaned in place equipment in the receiving, processing and filling rooms. CIP systems are checked along with recording charts and employee locker and restrooms. Recommended for showing to plant workers and supervisors. (CA-1986)

❑ **Pasteurizer: Design and Regulation** - (15 1/2 minute videotape). This tape provides a summary of the public health reasons for pasteurization and a nonlegal definition of pasteurization. The components of an HTST pasteurizer, elements of design, flow-through diagram and legal controls are discussed.

❑ **Pasteurizer Operation** - (10 1/2 minute videotape). This tape provides a summary of the operation of an HTST pasteurizer from start-up with hot water sanitization to product pasteurization and shut-down. There is an emphasis on the legal documentation required.

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

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

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

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

FOOD

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

❑ **Supermarket Sanitation Program - "Cleaning and Sanitizing"** - (12.5 minute videotape). Contains a full range of cleaning and sanitizing information with minimal emphasis on product. Designed as a basic training program for supermarket managers and employees.

❑ **Supermarket Sanitation Program - "Food Safety"** - (10.5 minute videotape). Contains a full range of basic sanitation information with minimal emphasis on product. Filmed in a supermarket, the video is designed as a basic program for manager training and a program to be used by managers to train employees.

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

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

ENVIRONMENTAL

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

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

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

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

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

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

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

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

❑ **Foodservice Disposables: Should I Feel Guilty?** - (11 1/2 minute videotape). The video, produced by the Foodservice & Packaging Institute, Inc., national trade association of manufacturers and suppliers of single service articles for foodservice and packaging, examines such issues as litter, solid waste, recycling, composting and protection of the earth's ozone layer, makes for an excellent discussion opener on the theme of conservation of natural resources (trees, fresh water and energy) and the environmental trade-offs (convenience, sanitation and family health) that source reduction necessarily entails. (Foodservice & Packaging Institute, Inc.)

❑ **Garbage: The Movie** - (24 1/2 minute videotape). A fascinating look at the solid waste problem and its impact on the environment. Viewers are introduced to landfills, incinerators, recycling plants and composting operations as solid waste management solutions. Problems associated with modern landfills are identified and low-impact alternatives such as recycling, reuse, and source reduction are examined. (Churchill Films)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

OTHER

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

❑ **Eating Defensively: Food Safety Advice for Persons with Aids** - (14 1/2 minute videotape). While HIV infection and AIDS are not acquired by eating foods or drinking liquids, persons infected with the AIDS virus need to be concerned about what they eat. Foods can transmit bacteria and viruses capable of causing life-threatening illness to persons infected with AIDS. This video provides information for persons with AIDS on what foods to avoid and how to better handle and prepare foods. (FDA/CDC)

❑ **Legal Aspects of the Tampering Case** - (about a 25-minute, 1/2" videocassette). This was presented by Mr. James T. O'Reilly, University of Cincinnati School of Law at the fall 1986 Central States Association of Food and Drug Officials Conference. He emphasizes three factors from his police and legal experience - know your case, nail your case on the perpetrator, and spread the word. He outlines specifics under each factor. This should be of the greatest interest to regulatory sanitarians, in federal, state and local agencies. (1987)

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

❑ **Psychiatric Aspects of Product Tampering** - (about a 25 minute, 1/2" videocassette). This was presented by Emanuel Tanay, M.D. from Detroit, at the fall 1986 conference of CSAFDA. He reviewed a few cases and then indicated that abnormal behavior is like a contagious disease. Media stories lead to up to 1,000 similar alleged cases, nearly all of which are false. Tamper proof packaging and recalls are essential. Tampering and poisoning are characterized by variable motivation, fraud and greed. Law enforcement agencies have the final responsibilities. Tamper proof containers are not the ultimate answer. (1987)

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

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

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Dairy, Food and Environmental Sanitation Instructions for Authors

Nature of the Magazine

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

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

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

Submitting Articles

All manuscripts and letters should be submitted to the Editor, Margie Marble, 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, 50322.

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

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

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Types of Articles

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

General Interest

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

Book Reviews

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

Preparation of Articles

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

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

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

Illustrations, Photographs, Figures

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

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

Examples of Proper Bibliographic Citations

Paper in a journal

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

Paper in a book

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

Book

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

Patent

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

Dairy, Food and Environmental Sanitation, Vol. 13, No. 1, Pages 48-53 (January 1993)

Amendments to the 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-17E

Number 08-19E

[Inlet and Outlet Leak-Protector Plug Valves]

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

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Inlet and outlet leak-protector plug valves heretofore or hereafter developed which so differ in design, material, construction, or otherwise, as not to conform with the following standards, but which in the manufacturer's or fabricator's opinion are equivalent or better may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at any time.

These 3-A Sanitary Standards are in two parts. This Part One contains the text. Part Two contains the drawings.

A

SCOPE

A.1

These standards cover the sanitary aspects of inlet and outlet leak-protector plug valves for batch pasteurizers, hereinafter called valves, (reference 3-A drawings, numbers 3 A-100 E-1, 3 A-100 E-2, 3 A-100 E-3, 3 A-100 E-4, 3 A-100 E-5, 3 A-100 E-6, 3 A-100 E-7 and 3 A-100 E-8).

B.3.2

Valve With an Irreversible Plug: Shall mean one in which the plug cannot be reversed in the body.

B.3.3

Fully Open Position: Shall mean that position of the plug which permits the maximum flow into or out of the pasteurizer.

B.4

Engineering Plating: Shall mean plated to specific dimensions or processed to specified dimensions after plating.*[1]

C.1.1

Plugs and valve bodies made of materials provided for in C.1 may be covered with an engineering plating of chromium.

C.1.2

Rubber and rubber-like materials may be used for gaskets, 0-Rings, seals and parts used in similar applications.

C.1.4

Plastic materials may be used for gaskets, seals and parts used in similar applications.

C.1.5

Plastic materials, when used, shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-17 as amended.

D.1

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

D.2

The minimum thickness of engineering plating shall not be less than 0.0002 in. (0.005 mm) for all product contact surfaces when used on stainless steel.

D.3

Product contact surfaces of leak-protector plug valves by design cannot be cleaned by mechanical cleaning techniques, therefore all product contact surfaces shall be easily accessible for cleaning and inspection either when in an installed position or when removed. Removable parts shall be readily demountable.

D.4

Product contact surfaces shall be self-draining.

D.11.2

They shall be designed to be attached to a pasteurizer so that the combined length of the valve inlet passage in the valve body and of any passage of corresponding

---

*[1] *QQ-C-320B-Federal Specification for Chromium Plating (Electrodeposited) June 17, 1985 with Amendment 4, April 10, 1987. QQ-N-290A-Federal Specification for Nickel Plating (Electrodeposited) November 12, 1971. Both documents available from the General Services Administration, 18th & F Sts., NW, WFCIA, Washington, DC 20405 (202-472-2205).*

diameter in the pasteurizer does not exceed the diameter of the passage in the valve. (See 3-A drawings number 3 A-100 E-4 and 3 A-100 E-8).

D.13

All sanitary fittings and connections shall conform with the applicable provisions of 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Parts I and II 08-17 as amended.

E

SPECIAL CONSIDERATIONS

E.1

Special sanitary fittings on inlet and outlet leak-protector plug valves may be used where interchangeability is not required. These special fittings must conform to the provisions of this standard with respect to material, finish, construction thread dimensions (if used) and use of gaskets but do not have to conform to the face-to-face or center line-to-face dimensions in the drawings. All product contact surfaces of such fittings shall be accessible for cleaning and inspection.

APPENDIX

F

STAINLESS STEEL MATERIALS

Stainless steel conforming to the applicable composition ranges established by AISI for wrought products, or by ACI for cast products, should be considered in compliance with the requirements of Section C.1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08 percent. The first reference cited in C.1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 series. Cast grades of stainless steel corresponding to types 302, 303, 304 and 316 are designated CF-20, CF-16F, CF-8, and CF-8M, respectively. These cast grades are covered by ASTM[*5] specifications A351/A351M, A743/A743M and A744/A744M.

G

Surface finish equivalent to 150 grit or better as obtained with silicon carbide properly applied on stainless steel sheets, is considered in compliance with the requirements of D.1 herein. A maximum Ra of 32 micro in. (0.8 microm), when measured according to the recommendations in ANSI/ASME B46.1 - Surfaces Texture, is considered to be equivalent to a No. 4 finish.[*6]

NOTE: The following applies to the drawings: Distances shown between the ends of the arcs are lengths of chords, not arcs. Distances involving fractions of d are not chords but parts of chords of lengths d and must be measured parallel to it.

---

*[*5] Available from ASTM, 1916 Race St., Philadelphia, PA 19103-1187 (215-299-5400).*

*[*6] Available from American Society of Mechanical Engineers; 345 East 47th Street, New York, NY 10017 (212-705-7722).*

These standards will be effective on May 22, 1993.

Amendments To Part Two of the 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-17E

Number 08-19E

[Inlet and Outlet Leak-Protector Plug Valves]

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

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Inlet and outlet leak-protector plug valves heretofore or hereafter developed which so differ in design, material, construction, or otherwise, as not to conform with the following standards, but which in the manufacturer's or fabricator's opinion are equivalent or better may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at any time.

These 3-A Sanitary Standards are in two parts. Part One contains the text. This Part Two contains the drawings.

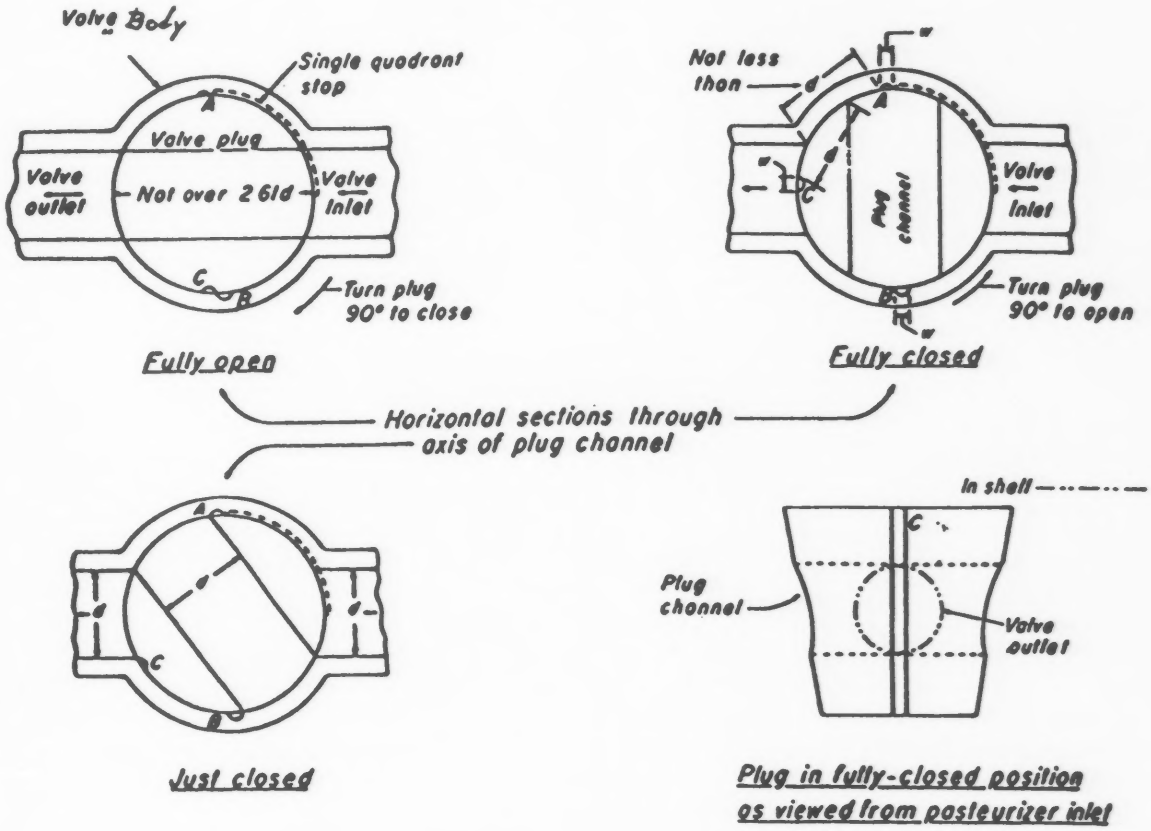
APPENDIX

H

DRAWINGS

This APPENDIX is continued in Part Two of these 3-A Sanitary Standards which contains drawings of Inlet and outlet leak-protector plug valves. Drawings of the following are included in this Appendix:

Name	3-A Page No.	3-A Drawing No.
Horizontal inlet leak-protector plug valve for batch pasteurizers	51	3A-100 E-l
Horizontal inlet leak-protector plug valve for batch pasteurizers	52	3A-100 E-2
Horizontal outlet leak-protector plug valve for batch pasteurizers	53	3A-100 E-3

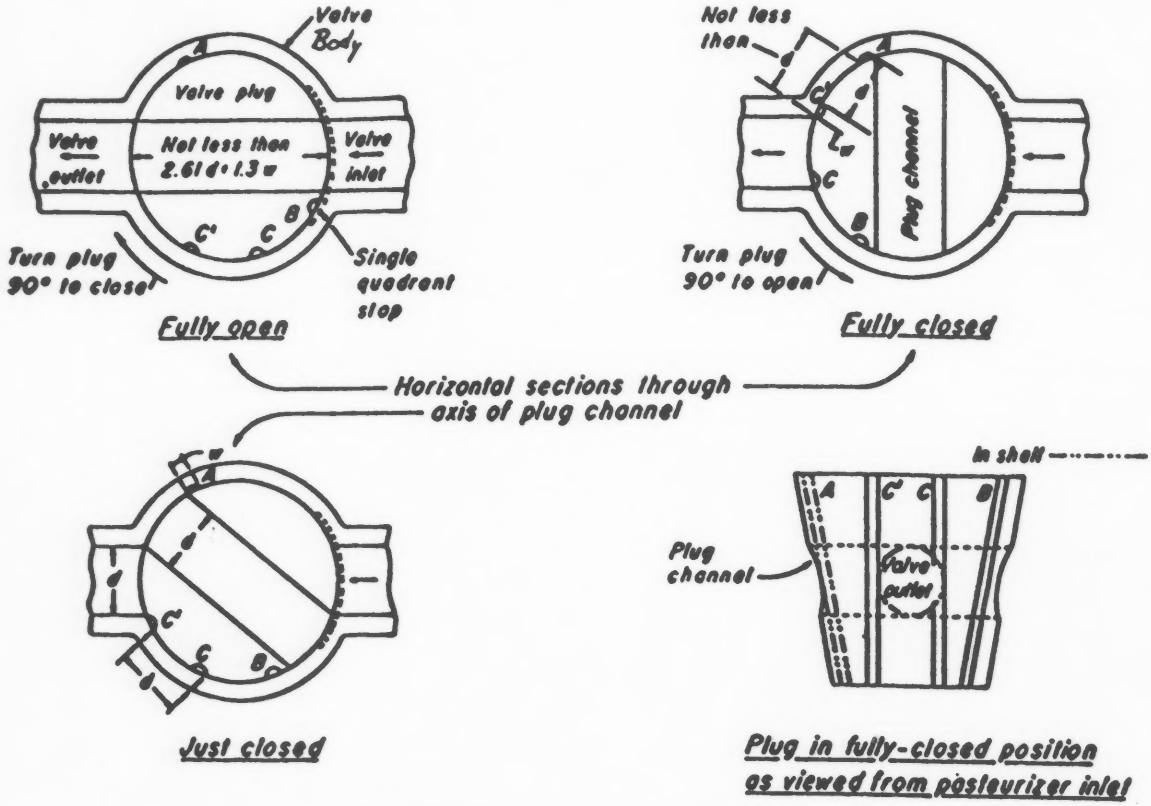


Notes A and B are leak-protector grooves. C is an air relief groove. All grooves are full length, but upper or lower half of C may be omitted. W = the width of leak-protector groove with a minimum width of 3/16 in. d = diameter of the plug channel.

HORIZONTAL INLET LEAK-PROTECTOR PLUG VALVE FOR BATCH PASTEURIZERS

3A STANDARD SANITARY FITTINGS

3A-100 E-1

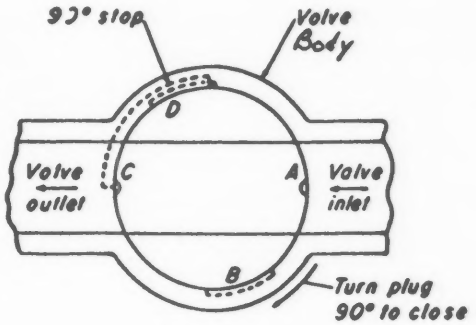


Notes: A and B are leak-protector grooves. C and C' are air relief grooves. All grooves are full length, but upper or lower halves of C and C' may be omitted. w = the width of the leak-protector groove, minimum width is 3/16 in. d= diameter of the plug channel.

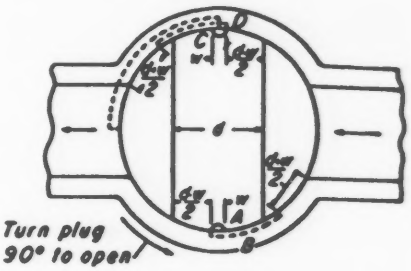
HORIZONTAL INLET LEAK-PROTECTOR PLUG VALVE FOR BATCH PASTEURIZERS

3A STANDARD
SANITARY FITTINGS

3A-100 E-2

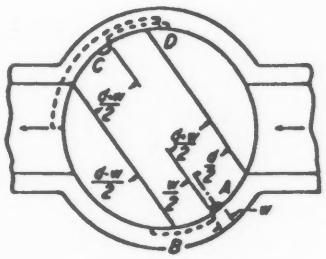


Fully open

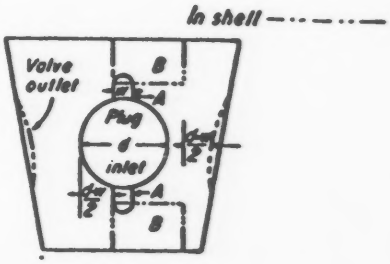


Fully closed

Horizontal sections through axis of plug channel



Just closed



Plug in fully-closed position showing relative positions of grooves.

Notes: A, B, C, and D are leak-protector grooves. A extends part way in the plug and mates with B (in upper and lower shell) in all closed positions. Grooves C and D are diagonally opposite A and B. w = width of leak-protector groove, minimum width 3/16 in. d = diameter of the plug channel.

HORIZONTAL OUTLET LEAK-PROTECTOR PLUG VALVE FOR BATCH PASTEURIZERS

3A STANDARD SANITARY FITTINGS

3A-100 E-3

Dairy, Food and Environmental Sanitation, Vol. 13, No. 1, Pages 54-58 (January 1993)

Amendments to Part One of the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections Used on Milk and Milk Products Equipment, Number 09-08

Number 09-09

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

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Sensors and sensor fittings and connections specifications heretofore or hereafter developed which so differ in design, material, construction, or otherwise, as not to conform with the following standards, but which in the manufacturer's or fabricator's opinion are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at any time.

These 3-A Sanitary Standards are in two parts. This Part One contains the text. Part Two contains the drawings.

A

SCOPE

A.1

These standards cover the sanitary aspects of sensors and sensor fittings and connections for milk and milk products equipment and on lines which hold or convey milk and milk products.

B.3

Sensor Fittings and Connections; (Referred to as fittings throughout these standards): Shall mean fittings and/or connections for instruments or their sensing elements that will be installed in milk and milk products equipment and in sanitary pipelines, for the measurement of temperature, pressure, pH, oxidation-reduction potential (ORP), viscosity or conductivity.

B.4

SENSORS

B.4.1

pH Sensor: Shall mean a device which is sensitive to hydrogen ion activity requiring a hydrogen ion-sensitive electrode and a reference electrode providing electrolytic contact with the product or cultured media.

B.4.2

Oxidation-Reduction Potential (ORP) Electrode: Shall mean a noble metal electrode sensitive to electrochemical potential utilizing a reference electrode as defined in B.4.1.

B.4.3

Conductivity Sensor: Shall mean a device sensitive to resistance changes in a solution as a function of ionic concentration.

B.4.4

Pressure Sensor: Shall mean a device sensitive to changes in force per unit area as exerted by product or cultured media.

B.4.5

Temperature Sensor: Shall mean a device sensitive to the degree of hotness or coldness of a product or cultured media.

B.4.6

Viscosity Sensor: Shall mean a device sensitive to the flow resistance of product or cultured media.

B.5

Noble Metal(s): Shall mean metals, such as gold, silver, platinum and iridium which have a relatively positive electrode potential, and which do not enter readily into chemical combination with nonmetals. These materials have a high resistance to corrosive attack by acids and corrosive agents, and resist atmospheric oxidation.

C.1.1

Noble metals or their oxides may be used for ORP electrodes and parts having the same functional purposes, and shall be nontoxic.

C.1.2

Glass may be used in pH and ORP electrodes and, when used, shall be heat and chemical resistant. (See Appendix, Section G.)

C.1.2.1

Fluids internal to the pH and ORP measuring and reference electrodes shall be nontoxic and shall conform to applicable Food, Drug and Cosmetic Act requirements.

C.1.3

Where materials having certain inherent functional purposes are required for specific applications, such as ion-permeable materials on pH electrodes or reference junctions in pH or ORP sensors, ceramic materials may be used. Ceramic materials shall be inert, nonporous, nontoxic, nonabsorbent, insoluble, resistant to scratching, scoring and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment or sterilization.

C.1.7

Plastic materials when used for the above specified applications shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces in Dairy Equipment, Number 20-17 as amended.

C.1.8

Ion-permeable plastic materials may also be used on pH electrodes or reference junctions in pH or ORP sensors.

C.1.8.1

Plastic materials when used for the above specified applications shall meet all requirements of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces in Dairy Equipment, Number 20-17 as amended except for Section H.2 (weight gain). These plastics shall be nonpermeable to microorganisms.

C.1.9

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

D.5

Gaskets

D.5.3

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

D.5.4

Gasket grooves or gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.0 mm) in depth or be less than 1/4 in. (6.0 mm) wide except those for standard O-Rings smaller than 1/4 in. (6.0 mm) and those provided for in Section D.8.

D.6

Radii

D.6.1.1

Smaller radii may be used when they are required for essential functional reasons, such as those in sensing devices for high pressure gauges, viscosity probes and conductivity probes. In no case shall such radii be less than 1/32 in. (1 mm).

D.6.1.2

The radii in gasket grooves, gasket retaining grooves or grooves in gaskets, except those for standard 1/4 in. (6.0 mm) and smaller O-Rings, shall not be less than 1/16 in. (2 mm) and those provided for in Section D.8.

APPENDIX

G

GLASS MATERIALS

When glass is used as a product contact surface in pH or ORP electrodes, the glass should be installed in such a manner as to protect it from breakage or be provided with a cleanable, sanitary protective shield or device.

I

OPERATING RANGE

Sensors should be labeled in a visible location with information about the conditions of use regarding maximum or minimum allowable temperature and/or pressure conditions.

These standards shall become effective May 22, 1993, at which time the 3-A Sanitary Standards for Instrument Fittings and Connections Used on Milk and Milk Products Equipment, Number 09-08 are rescinded and become null and void.

Amendments to Part Two of the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections Used on Milk and Milk Products Equipment, Number 09-08

Number 09-08

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

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Sensors and sensor fittings and connections specifications heretofore or hereafter developed which so differ in design, material, construction, or otherwise, as not to conform with the following standards, but which in the manufacturer's or fabricator's opinion are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at any time.

These 3-A Sanitary Standards are in two parts. Part One contains the text, this Part Two contains the drawings.

APPENDIX

I

Drawings of 3-A Sensors and Sensor Fittings and Connections

Drawings of the following are included in this Appendix:

Part	Name	3-A Page No.	3-A Drawing No.
3A17	pH/conductivity/ORP sensor - tank mount	57	3A-101-19
3A18	pH/conductivity/ORP sensor - pipe mount	58	3A-101-20

These standards shall become effective May 22, 1993, at which time the 3-A Sanitary Standards for Instrument Fittings and Connections Used on Milk and Milk Products Equipment, Number 09-08 are rescinded and become null and void.

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

IAMFES

International Association of Milk, Food and Environmental Sanitarians Inc

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

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

Name _____ Title _____

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

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

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

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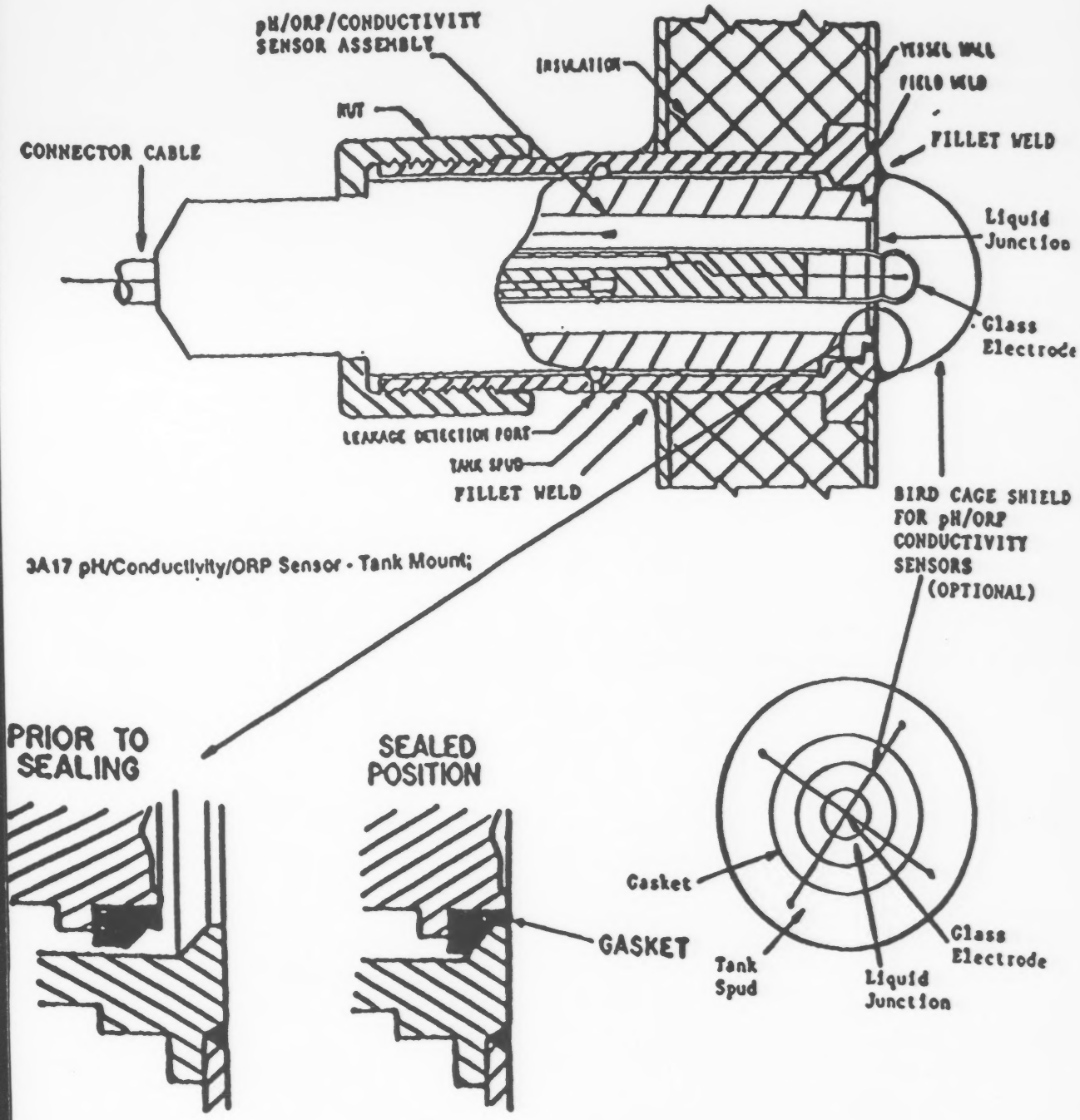
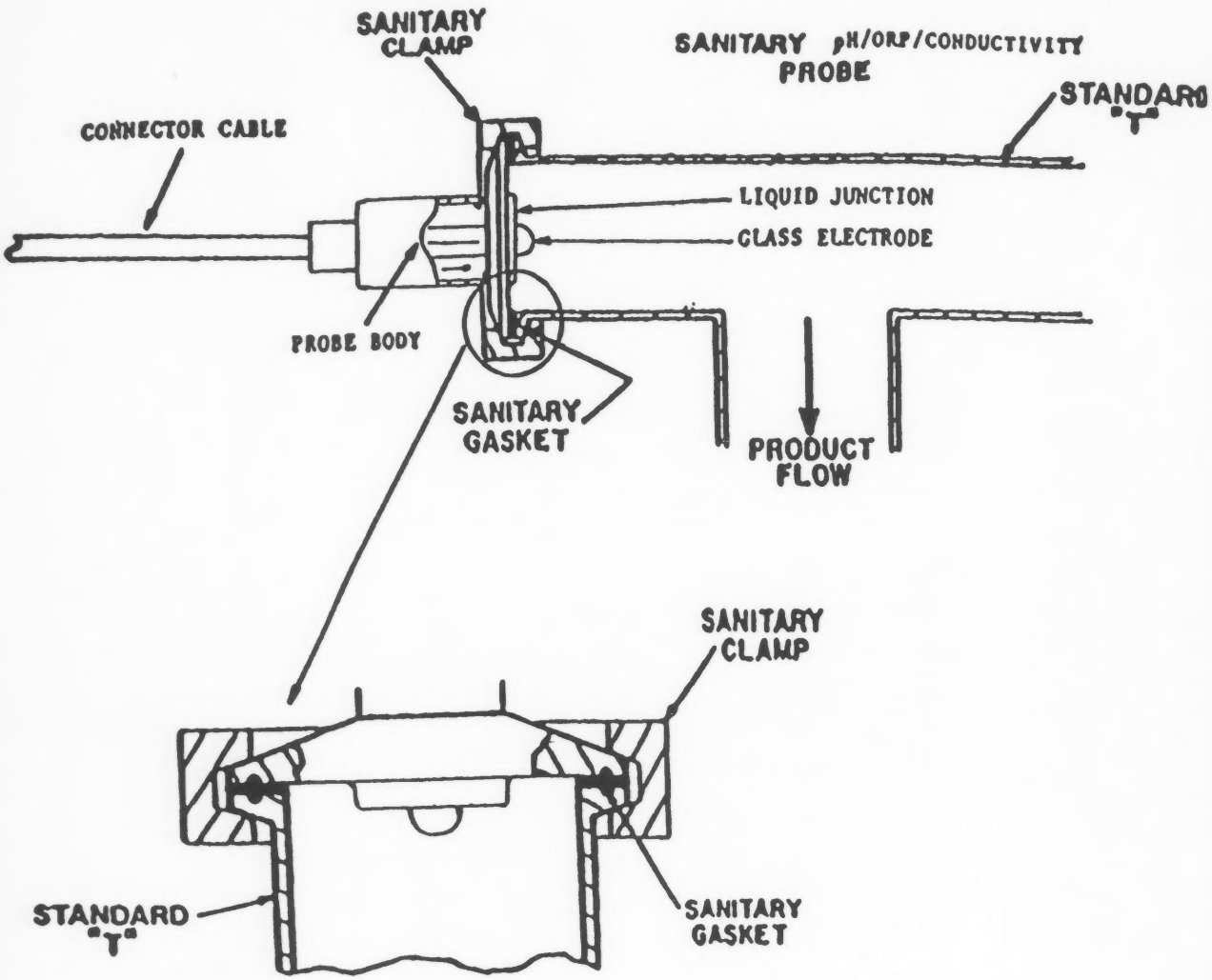


3A STANDARD SANITARY FITTINGS

3A-101-19



3A18 pH/Conductivity/ORP Sensor - Pipe Mount

3A STANDARD
SANITARY FITTINGS

3A-101-20

Business Exchange "Classifieds"

Services / Products

Equipment For Sale

Coming Events

1993

February

•2, **Georgia Association of Food and Environmental Sanitarians Annual Meeting** will be held at the Holiday Inn Airport North in Atlanta, GA. For more information, contact Mark Harrison at (706)542-2286.

•2-5, **The Third International Dairy Housing Conference**, sponsored by the American Society of Agricultural Engineers, will be held in Orlando, FL. For more information contact The American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659, (616)429-0300; FAX (616)429-3852.

•3-4, **Food Processors Sanitation Workshop,** presented by the University of California Cooperative Extension, to be held at the Holiday Inn - Mission de Oro, Santa Nella, CA. For more information contact Heidi Fisher, Food Science and Technology, University of California, Davis, CA 95616, (916)752-1478.

•15-18, **Freezing Technology Short Course** to be held at the University of California-Davis, Davis, CA. For more information or to enroll, call (800)752-0881. From outside California, call (916)757-8777.

•22-23, **Sanitation for Warehousemen**, sponsored by the American Institute of Baking, will be held in Manhattan, KS. For more information contact AIB, 1213 Bakers Way, Manhattan, KS 66502, telephone (913)537-4750, (800)633-5137, FAX (913)537-1493.

•22-23, **Dairy and Food Industry Conference; Focus on Food Ingredients** to be held at Ohio State University, Columbus, OH. For more information contact Dr. Ken Lee, Department of Food Science and Technology, 2121 Fyffe Road, Ohio State University, Columbus, OH 43210-1097 or call (614)292-6281; FAX (614)292-0218.

•23-25, **Kentucky Association of Milk, Food and Environmental Sanitarians, Inc.'s Annual Meeting** will be held at the Quality Hotel Riverview, 666 W. 5th Street, Covington, KY 41011. For more information, please contact Anita Travis at (502)564-3127.

•26, **BISSC Annual Membership Meeting** will be held at the Chicago Marriott Hotel, Chicago, IL. For more information, contact the BISSC headquarters at 401 North Michigan Avenue, Chicago, IL 60611; (312))644-6610.

March

•2-3, **Virginia Association of Sanitarians and Dairy Fieldmen** will meet at the Donaldson Brown Center for ConEd, Virginia Tech, Blacksburg, VA. For further information, please contact Donna Izac, Dairy Services Branch, VDACS, P. O. Box 1163, Richmond, VA 23209, (804)786-8912.

•5-9, **Statistical Quality Control** to be held at the University of California-Davis, Davis, CA. For more information or to enroll, call (800)752-0881. From outside California, call (916)757-8777.

•9-11, **Basic Pasteurization Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

•15-17, **Food Product Development/Ingredient Technology** to be held at the University of California-Davis, Davis, CA. For more information or to enroll, call (800)752-0881. From outside California, call (916)757-8777.

•15-17, **Microbiology and Engineerting of Sterilization Processes** to be held at the St. Paul Campus of the University of Minnesota. For further information, contact Dr. William Schafer, course coordinator, Department of Food Science and Nutrition, 1334 Eckles Avenue, St. Paul, MN 55108, (612)624-4793.

•15-18, **Better Process Control School** to be held at the University of California-Davis, Davis, CA. For more information or to enroll, call (800)752-0881. From outside California, call (916)757-8777.

•17, **Indiana Dairy Industry Conference** to be held at Purdue University. For more information contact James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907, (317)494-8279.

•17-19, **Michigan Environmental Health Association Annual Educational Conference** will be held at the Holiday Inn Crowne Plaza, Grand Rapids, MI. For more information, please contact John Kowalczyk at (313)761-1294.

•18-19, **Florida Association of Milk, Food and Environmental Sanitarians Annual Meeting** in conjunction with Suppliers Night at the Marriott on International Drive. For more information, please contact Bill Thornhill, 3023 Lake Alfred Road, Winter Haven, FL 33881, (813)299-6555.

•22-24, **Introduction to Statistical Methods for Sensory Evaluation of Foods** to be held at the University of California-Davis, Davis, CA. For more information or to enroll, call (800)752-0881. From outside California, call (916)757-8777.

.•22-26, **Midwest Workshop on Milk, Food and Environmental Sanitation** to be held at Ohio State University, Columbus, OH. For more information contact Dr. Matrid Ndife, Department of Food Science and Technology, 2121 Fyffe Road, Ohio State University, Columbus, OH 43210-1097 or call (614)292-3069; FAX (614)292-0218.

•22-26, **Molds and Mycotoxins in Foods,** offered by the American Association of Cereal Chemists, will be held in Lincoln, NE. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121-2097, USA. Telephone (612)454-7250; FAX (612)454-0766.

•23-25, **Food Extrusion,** offered by the American Association of Cereal Chemists, will be held in Kansas City, MO. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121-2097, USA. Telephone (612)454-7250; FAX (612)454-0766.

•**24-26, 1st Annual Meeting of the Carolina Association of Milk, Food and Environmental Sanitarians** will be held in Charlotte, NC. For more information, please contact Elizabeth Johnson at (803)937-6201.

•**26-28, Sensory Evaluation: Overview and Update** to be held at the University of California-Davis, Davis, CA. For more information or to enroll, call (800)752-0881. From outside California, call (916)757-8777.

April

•**7-9, Missouri Milk, Food and Environmental Health Association's Annual Education Conference** will be held at the Ramada Inn, Columbia, MO. For more information contact Janet Murray at (816)263-6643.

•**8, Nebraska Association of Milk and Food Sanitarians Annual Meeting** will be held at the Douglas County Extension Office, Omaha, NE. For more information, please contact Allen Ackerman at (402)471-0387.

•**14-15, Food Micro '93**, sponsored by the Food Processors Institute (FPI), will be held at the Hyatt Regency-Crystal City, Arlington, VA. For more information contact Rita Fullem, FIP's executive director, at (202)639-5944.

•**19-22, Purdue Better Process Control School** to be held at Purdue University. For more information contact James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907, (317)494-8279.

•**20-22, NIR Spectroscopy,** offered by the American Association of Cereal Chemists, will be held in Chicago, IL. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121-2097, USA. Telephone (612)454-7250; FAX (612)454-0766.

May

•**2-7, National Conference on Interstate Milk Shipments 1993 Meeting** will be held at the Sheraton Central Park Hotel, Arlington, TX. For more information contact Leon Townsend, Executive Secretary/Treasurer, National Conference on Interstate Milk Shipments, 110 Tecumseh Trail, Frankfort, KY 40601, telephone and/or FAX (502)695-0253.

•**6-12, INTERPACK 93, 13th International Trade Fair for Packaging Machinery, Packaging Materials and Confectionery Machinery**, will be held at the fairgrounds in Dusseldorf, Germany. For further information on exhibiting at or attending INTERPACK 93, contact Dusseldorf Trade Shows, Inc., 150 North Michigan Avenue, Suite 2920, Chicago, IL 60601,(312)781-5180; FAX (312)781-5188.

•**10-13, Purdue Aseptic Processing and Packaging Workshop** to be held at Purdue University. For more information contact James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907, (317)494-8279.

June

•**8-9, Texas Association of Milk, Food and Environmental Sanitarians Annual Meeting** will be held at the Wyndham Hotel, 4140 Governor's Row at Benwhite Exit off IH35, Austin, TX (512)448-2222. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

•**15-17, Low Calorie Food Product Development (with IFT & CFDRA),** offered by the American Association of Cereal Chemists, will be held in Chipping, Campden, England. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121-2097, USA. Telephone (612)454-7250; FAX (612)454-0766.

•**20-23,** Joint International Summer Meeting of **The American Society of Agricultural Engineers and The Canadian Society of Agricultural Engineering** to be held in Spokane, WA. For more information contact The American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659, (616)429-0300; FAX (616)429-3852.

July

•**13-15, Basic Pasteurization Course,** sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

•**16-23, Rapid Methods and Automation in Microbiology: International Workshop XIII** to be held at the Kansas State University, Manhattan, KS. For more information contact Dr. Daniel Y. C. Fung, Workshop Director, telephone (913)532-5654, FAX (913)532-5681. A mini--symposium will occur on July 16-17.

August

•**1-4, 80th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc.** to be held at the Stouffer Waverly Hotel, Atlanta, GA. For more information please contact Julie Heim at (800)369-6337 (US) or (800)284-6336 (Canada).

•**17-19, Special Problems Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Seven Oaks Hotel, 1400 Austin Hwy, San Antonio, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

October

•**19-21, Food Preservation 2000 - Integrating Processing, Packaging, and Consumer Research** is sponsored by and held at U. S. Army Natick Research, Development and Engineering Center, Natick, MA, USA. For additional information, please contact Lisa McCormick or Sonya Herrin, Science and Technology Corporation, (804)865-7604.

•**26-28, Basic Pasteurization Course,** sponsored by the Texas

Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

To insure that your meeting time is published, send announcements at least 90 days in advance to: IAMFES, 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, IA 50322.

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at the

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Listeria monocytogenes: Current Issues and Concerns

- **Listeria monocytogenes*: State of the Science
- **Listeria monocytogenes*: Current Issues and Concerns from the Perspective of the U.S. Food Industry
- **Listeria monocytogenes*: Current Issues and Concerns from the Perspective of U.S. Regulatory Agencies
- **Listeria monocytogenes*: Current Issues and Concerns from the Perspective of the International Scientific Community
- *Epidemiology of Listeriosis in the United States

Session Two—8/2/93

International Perspectives on *Escherichia coli* 0157:H7

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- **Escherichia coli* 0157:H7: Perspectives from the International Scientific Community
- **Escherichia coli* 0157:H7: The U.S. Government Perspective

Session Three—8/2/93

Campylobacter Update

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- **Campylobacter jejuni*: Perspectives from the International Scientific Community
- **Campylobacter jejuni*: The U.S. Government Perspective

Session Four—8/3/93

Microbial Concerns of the International Community

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- *Microbial Concerns of the North and South American Countries and Implications for International Trade
- *Microbial Concerns of the Pacific Rim Countries and Implications for International Trade
- *Safety and Quality Management Through HACCP and ISO 9000

Session Five—8/4/93

ILSI-Sponsored Research Update

- **Escherichia coli* 0157:H7 Diarrhea in the United States: A Multicenter Surveillance Project
- *Establishment of a Bovine Surveillance Program for *E. coli* 0157:H7 in Washington State
- *Source of *Escherichia coli* 0157:H7: Establishment of a Retail Food Surveillance Project
- *Insertion Sequence Fingerprinting: A New Subtyping System for *E. coli* 0157:H7 Strains
- *Use of in vitro Primer-directed Enzymatic Amplification of DNA for Rapid Detection of *Listeria monocytogenes*: Studies with Food Samples
- *Development of DNA Probes Specific for Virulent *Listeria* by Amplification of Virulence-related Genes of *Listeria monocytogenes*
- *Microbial Ecology of *Listeria monocytogenes* Biofilms Associated with the Food Processing Plant Environment

For Meeting Registration Forms, Scheduling or Further Information, Contact the:

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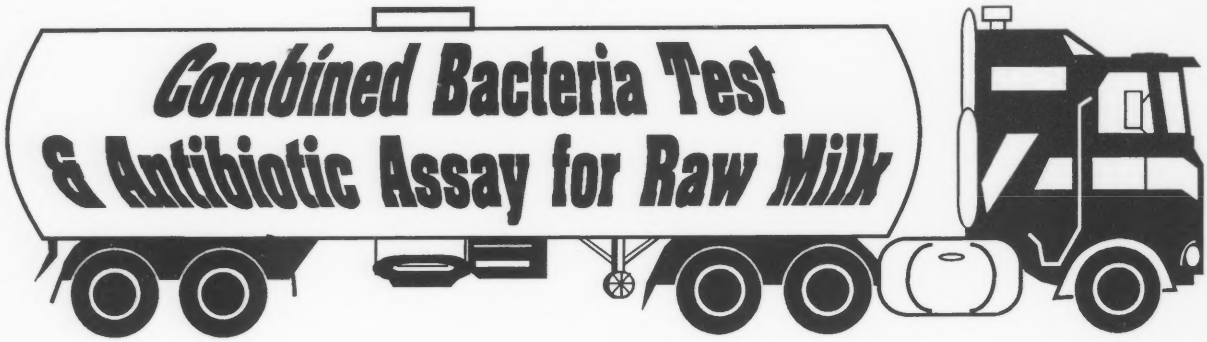

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