

ISSN: 1043-3546

April • 1993

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APRIL 1993

80th IAMFES Annual Meeting  
Preliminary Program  
(inside this issue)

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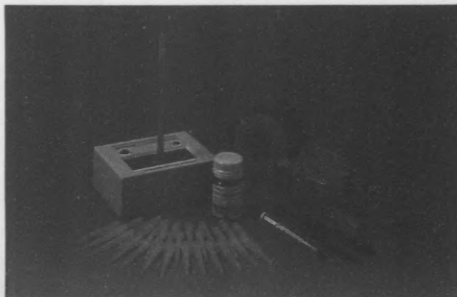
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Dairy, Food and Environmental Sanitation (ISSN-1043-3546) is published monthly beginning with the January number by the International Association of Milk, Food and Environmental Sanitarians, Inc. executive offices at 200W Merle Hey Centre, 6200 Aurora Avenue, Des Moines, IA 50322-2836 USA. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc. 911 N. Second Street, Ames, IA 50010 USA. Second Class Postage paid at Des Moines, IA 50316 and additional entry offices.

**Postmaster:** Send address changes to Dairy, Food and Environmental Sanitation, 200W Merle Hey Centre, 6200 Aurora Avenue, Des Moines, IA 50322-2836 USA.

**Manuscripts:** Correspondence regarding manuscripts and other reading materials should be addressed to Margaret Marble, 200W Merle Hey Centre, 6200 Aurora Ave., Des Moines, IA 50322, 515-276-3344. "Instructions to Contributors" can be obtained from the editor.

**Orders for Reprints:** All orders should be sent to DAIRY, FOOD AND ENVIRONMENTAL SANITATION, IAMFES, Inc., 200W Merle Hey Centre, 6200 Aurora Ave., Des

Moines, IA 50322. Note: Single copies of reprints are not available from this address; address reprint requests to principal author.

**Business Matters:** Correspondence regarding business matters should be addressed to Steven K. Halstead, IAMFES, 200W Merle Hey Centre, 6200 Aurora Ave., Des Moines IA 50322.

**Subscription Rates:** \$100.00 per year. Single copies \$10.00 each. No cancellations accepted. U.S. FUNDS ONLY.

**Sustaining Membership:** A sustaining membership in IAMFES is available to companies at a rate of \$450 per year, which includes \$100 credit toward an ad in the "annual meeting issue" of the Journal, the July issue. For more information, contact IAMFES, 200W Merle Hey Centre, 6200 Aurora Ave., Des Moines, IA 50322, 515-276-3344.

**Membership Dues:** Membership in the Association is available to individuals only. Direct dues are \$50 per year and include a subscription to Dairy, Food and Environmental Sanitation. Direct dues and the Journal of Food Protection are \$80.00. Affiliate and International Membership include both journals for \$80, plus affiliate dues. Student membership is \$25.00 per

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# Thoughts From the President . . .



By  
Michael P. Doyle  
IAMFES President

## The Search for New Members; Where Do We Go From Here?

How can an Association that publishes one of the most highly regarded microbial food safety journals in the world be so stagnant in attracting new members? How should IAMFES focus its efforts to enlist new members? With the major investment IAMFES has made during the past five years to recruit new members through its Affiliates, why haven't our numbers grown? These are just a few of the questions that prompted your Executive Board to seek professional help.

We solicited the services of Lawrence-Leiter and Company to conduct a survey that would hopefully shed some light on our troubling dilemma. The approach was to question by telephone 300 randomly selected individuals from three groups which included 100 IAMFES members who are also Affiliate members, 100 IAMFES members who are not Affiliate members, and 100 Affiliate members who are not IAMFES members. Examples of questions asked included (1) why did you join (or not join) IAMFES? (2) rate the overall value you receive from IAMFES for your dues dollar, (3) what are the main reasons you retain your membership in IAMFES? (4) in what areas should IAMFES become involved in the future? and (5) why did you join (or not join) an Affiliate?

We received some very interesting answers which help identify what our members like about IAMFES and what Affiliate, non-IAMFES members think. I shall note only a few of the more enlightening observations. IAMFES members, whether they belonged to an Affiliate or not, overwhelmingly indicated that our journals, both the *Journal of Food Protection* and *Dairy, Food and Environmental Sanitation*, are the most important service IAMFES provides. They rated the value of the journals and their IAMFES membership very highly (as high as Lawrence-Leiter has ever seen on this type of survey). Many said IAMFES is a real bargain for the value they receive — especially compared to other memberships. Most members indicated they are not very active in IAMFES and do not consider IAMFES to be their primary professional society.

The profile of Affiliate only members was in many ways quite different than current members of IAMFES. Many see less value in national professional organizations in general. The most common reason given for not joining IAMFES was that it is too costly. Interestingly, several respondents didn't know their Affiliate was even associated with IAMFES, rather they thought it was associated with the National Environmental Health Association.

The results of the survey and report of Lawrence-Leiter will be given to members of the Long-Range Planning Task Force for their use in making recommendations concerning membership recruitment and future directions of IAMFES. We hope to receive many creative ideas. Our future depends on them.



# On My Mind . . .



By  
Steven K. Halstead, CAE  
IAMFES  
Executive Manager

....is Government Cutbacks

I had an interesting discussion the other day with Dan Mattern, President of our North Dakota Affiliate. Dan had called asking for help with a problem that was developing. It seemed as how the state government there was looking for places to cut back and had zeroed in on food inspection.

I had to tell Dan that our tax status (501(c)(3)) forbids IAMFES from being politically active. IAMFES may, if invited, provide testimony to congressional and legislative bodies, but we may not provide that information unsolicited. Similarly, we may not form a political action committee; we may not donate money to a political campaign; and we may not provide in kind services, ie. mailings and postage for political campaigns. We may not participate in grass roots activities on political issues which means that we are precluded from running advertisements in the newspaper asking the readers to support a particular issue.

I then went on to suggest a number of courses of action to Dan and we talked at length about the efforts they have made and what the future might hold for them. I am afraid that for the most part, I was not able to provide much help to this Affiliate. That doesn't mean that we don't care.

After talking to Dan, I got to thinking about this problem and some other things that I see happening in our country. More and more we are finding our government strapped for the funds they need to be able to do the things we have come to expect of them.

During much of the Reagan and Bush administrations, the federal level saved money by having the states take over some of the jobs that were historically the domain of the feds. Before long, the state level turned to the locals to pick up some of the duties that they had been doing.

In each case, the higher level of bureaucracy passes the work and expense on to the lower level. In each case, the upper level is able to say "we saved you (taxpayers) money."

But, in fact, the bottom line is that no money was saved--it was just passed on to someone else. This is not to say that the job is not being done, or not being done as well, it is just being done by different people.

Of late, we have seen another approach to this problem--the "fee for service" approach. This approach says that those who use a state service will pay for that service--even if they must use the service because it is mandated by law.

For example, it wasn't very many years ago that state labs would test water for free. Then, there was a postage charge. Now, you pay for the test itself. It is not unusual to be charged for ambulance calls or for fire calls.

I read recently where a city council had billed a group of protestors (who were trespassing on private property) thousands of dollars for the police and fire personnel that it took to remove the protestors.

This idea takes on a frightening dimension when applied to food safety. Many cities and counties are considering the idea of charging for restaurant inspections. Will we see a time where restaurants will have the ability to say "No, I don't want my restaurant inspected if I have to pay for it?" Think of the money they could save, but at what cost?

Clearly, that doesn't make much sense to anybody. Nor, does it make much sense to allow private individuals to get into the inspection business on anything other than a consulting basis. We surely would not expect to see a contracted employee finding anything wrong with a restaurant he/she is inspecting. What kind of enforcement could they possibly have? An employee is not going to shut down the employer's company.

I expect that we are going to see more and more "fee for service" throughout this country. I'm not sure that's good. I'm not sure its bad. I do think, however, that we need to be vigilant. The recent *E. coli* outbreak hopefully has shown us that where food safety is concerned, we cannot drop our defenses.

# Safe Handling of Potentially Hazardous Foods (PHF) - A Check List

George H. Reed, Jr., MPH,  
Sr. Environmental Health Specialist, University of Massachusetts at Amherst, Amherst, MA 01003

Actual and potential hazards are associated with food preparation operations. A hazard is the unacceptable contamination of foods by biological, chemical or physical agents (3). Epidemiological data indicate that the microbiological (biological) agents present the highest risks to the largest number of persons.

Food protection and sanitation practices and procedures can be utilized that will present preventive or control measures in a food establishment operation that will eliminate, prevent, or reduce (minimize) microbiological hazards. The proper use of temperature controls, especially heat, is a major factor in controlling microbiological problems in food service establishments. But time-temperature abuse (neglect of temperature monitoring) has resulted in the time-temperature factor accounting for six of the first seven contributing factors to foodborne illness outbreaks. (2)

Most raw foods contain at least low levels, and occasionally hazardous levels, of contamination. Even pasteurized foods, which are subjected to a heat process sufficient to reduce or eliminate vegetative microorganisms to a safe level, usually must be refrigerated after the thermal process. (5) What is the current definition of PHF?

PHF defined: (4) any food or ingredient, natural or synthetic, in a form capable of supporting (1) the rapid and progressive growth of infectious or toxigenic microorganisms or (2) the slower growth of *C. botulinum*. Included are any foods of animal origin, either raw or heat treated, and any food of plant origin which has been heat treated, and raw seed sprouts. Excluded are the following:

- Air dried hard boiled eggs with intact shells;
- Foods with a pH level of 4.6 or below;
- Foods with a water activity ( $a_w$ ) value of 0.85 or less;
- Foods, in unopened hermetically sealed containers, which have been commercially processed to achieve and maintain commercial sterility under conditions of non-refrigerated storage and distribution; and
- Foods for which laboratory evidence (acceptable to regulatory authority) demonstrates that rapid and progressive growth of infectious and toxigenic microorganisms or the slower growth of *C. botulinum* cannot occur.

Temperatures of PHF must be routinely monitored at critical control points during operation to assure safety of the food. The establishment should designate a person(s) to measure and record these temperatures. Food temperatures should be recorded during cooking and reheating or at

the peak of the post-heating rise in temperature; foods being held hot or cold on a serving line, including PHF on a salad bar, should be measured; monitoring of food stored in refrigeration units should include dimensions of storage containers, the depths of foods in these containers, and the foods' temperature. (1)

The following list provides guidance for the safe handling of PHF and for food products in general. Clean work habits, sanitary handling of PHF, and avoidance of time-temperature abuse are of prime importance for a good food protection and sanitation program and in preventing foodborne illness outbreaks. A sufficient number of metal-stem thermometers shall be available for monitoring temperatures.

## CHECK LIST

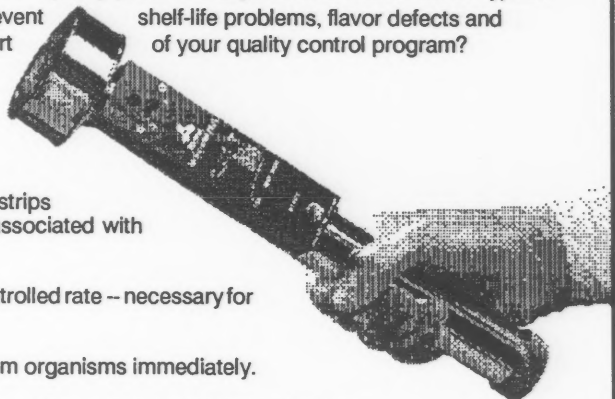
1. ( ) Verify that PHF is from safe and approved sources.
2. ( ) Check incoming PHF for proper temperature, signs of spoilage, sound condition, expiration dates, proper labeling.
3. ( ) Do not accept products of questionable integrity (example: swelled or damaged cans).
4. ( ) Maintain a regular stock rotation program (example: first-in, first-out) to ensure use before expiration date.
5. ( ) Refrigerate PHF at or below 45°F (7.2°C) (better, 40°F (4.4°C) or below) until ready to use; store in chillable quantities (shallow pans with food no more than 4 in. in depth); loosely cover PHF until it cools below 45°F (7.2°C) to allow sufficient air flow to the surface of the food; avoid double stacking of storage containers.
6. ( ) Store frozen PHF at or below 0°F (-17.8°C).
7. ( ) Thaw frozen PHF properly to prevent a rise in surface temperature above 45°F (7.2°C); DO NOT thaw at room temperature.
8. ( ) Exclude from work food handlers with illnesses transmissible by food, carriers of such illnesses, and those with boils, cuts, and infected wounds. Persons with diarrhea, sore throat, and sneezing/coughing should stay at home or go home.
9. ( ) Verify that workers practice good personal hygiene habits; handling of food minimized; hands washed as frequently (and effectively) as necessary; careless hand habits controlled.
10. ( ) Minimize potential for cross contamination of PHF

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- by reviewing work practices to eliminate problems via workers' hands, food-contact surfaces (counters), cutting boards, utensils, cleaning cloths (DO NOT use sponges), or equipment.
11. ( ) Insure proper cleaning and sanitizing of surfaces and equipment.
  12. ( ) Prepare PHF as close to serving time as possible.
  13. ( ) Cook PHF to internal temperature required to kill pathogenic agents; give special attention in cooking eggs and egg-containing items until firm (not runny) or use commercially pasteurized egg product.
  14. ( ) PHF not being held at room temperature more than 2 hours, cumulatively (during preparation time).
  15. ( ) Cool hot PHF to 45°F (7.2°C) or below within 4 hours of cooking.
  16. ( ) When using PHF as ingredients, be sure to keep PHF refrigerated (chilled) until ready to use; especially pertinent when preparing meat, poultry, egg, or seafood salads.
  17. ( ) Rapidly reheat refrigerated pre-prepared or left-over PHF to at least 165°F (74°C) throughout before transferring to hot holding equipment.
  18. ( ) Hold hot PHF at 140° F (60°C) or above (roast beef, 130°F [54.4°C]) until served.
  19. ( ) Protect PHF from contamination by poisonous or toxic substances as the result of carelessness, improper storage, mistaking these chemicals for food ingredients, or accidents.
  20. ( ) Protect PHF from contamination by pests (roaches, flies, rodents).
  21. ( ) Thermometers in place or available to verify holding temperatures (hot, cold) of food products.
  22. ( ) Do not re-serve unwrapped foods, especially PHF.
  23. ( ) SALAD BAR: PHF displayed, protected properly and temperature monitored; PHF discarded after operation ceases, not returned to storage for later re-use.

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## When the Inspector Arrives . . .

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*One of the more terrifying things for many food processors or warehouse/distributors is to hear that a Food and Drug investigator has arrived at the plant site and is preparing to conduct an inspection. Food plant inspection is an integral part of the Food and Drug Administration's enforcement program, a part which may well be given greater support under the new director, Dr. David Kestler. Inspections are one of the tools at the agency's disposal to ensure the safety of the food supply. If processors or warehouse/distributors operate according to the current Good Manufacturing Practices described in 21 CFR, Part 110, there should be very little to worry about. Unfortunately, not all operators are so conscientious.*

*This article will provide readers with some background about "what to do when the F.D.A. investigator comes," which may help reduce the trauma of such events. The authors do recommend, however, that you establish formal company procedures for dealing with F.D.A. investigators following consultations with your legal staff.*

*In order to fully comprehend the F.D.A.'s food inspection program and your rights as a food processor or warehouse, it is imperative that all operations involved in the production or handling of foods understand the pertinent federal regulations. Processors should also be cognizant of local and state regulations, topics which will not be addressed in this discussion.*

The first act that processors should understand is the federal Food, Drug and Cosmetic Act. This legislation was enacted by Congress in 1938 to deal with abusive practices in several industries, including the food industry. Under the terms of the act (Section 301), the following activities are prohibited. (The citations which follow have been amended slightly by the authors to focus on food. When reading the as-written legislation, the references are to "foods, drugs, cosmetics or devices.")

1. The introduction or delivery for introduction into interstate commerce of any food that is adulterated or misbranded.
2. Adulteration or misbranding of food in interstate commerce.
3. The receipt of any food that is adulterated, and the delivery or proffered delivery for pay or otherwise.
4. The failure to permit access or copying of records as required, or the failure to maintain such records.
5. Refusal to permit access to an inspector.
6. The manufacture of any food that is adulterated or misbranded.
7. The giving of a guarantee or undertaking which is false.
8. The adulteration, mutilation or removal of a label, resulting in the article being adulterated or misbranded.

The act also established regulations for seizure of goods and sets out penalties. We won't elaborate on these penalties here, but suffice it to say that they include fines and prison. Other "penalties" a company can incur from violating these regulations include loss of business, public humiliation and, what may be most important, a loss of confidence in your operation from both buyers and sellers.

One more point: the federal Food, Drug and Cosmetic Act and the agency responsible for administering it, the F.D.A., only have authority over products involved in interstate commerce. For example, a bakery that makes bread for local consumption will not be involved with the agency, but the moment it expands and begins shipping across state lines, it comes under F.D.A. jurisdiction.

The key to the Act as it relates to inspection may be found in Part 402 (a) (3 & 4), which provides two definitions of adulterated foods.

A food shall be deemed to be adulterated—

- (3) If it consists in whole or in part of any filthy, putrid or decomposed substance, or if it is otherwise unfit for food; or
- (4) If it has been prepared, packed or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health.

The first of the two definitions of adulteration is easily understood by most individuals. People seem to be able to grasp that it makes sense to use only clean and wholesome ingredients and materials in food preparation, or that the presence of foreign substances like chemicals, glass or wood can render a product both adulterated and unsafe.

The second definition is the one which many people find difficult to understand. A product may be deemed adulterated if it is prepared in an environment which is considered insanitary and whereby the product in question may have become contaminated. Such situations are harder to prove, but if a production or storage area shows evidence of rodent contamination, or roofs on which birds perch can then leak onto process machinery, or if severe insect infestations are noted, it is very likely that the food produced in that environment may have become contaminated, even if actual contamination was not observed. As stated above, it is very difficult to prove insanitation under 402 (a)(4).

Perhaps the most famous case relating to this second part of the act involved General Foods. The F.D.A. attempted to prosecute the company for alleged adulteration. They observed machinery mold on lines and alleged the operation was insanitary, but General Foods won the case, convincing the court that the operation was not insanitary. There are quality conscious persons in the industry today who look at this decision with some dissatisfaction, because



the ruling has made the F.D.A. more wary in their efforts to enforce this part of the act.

The Food, Drug and Cosmetic Act provides provisions for enforcement. F.D.A. investigators are given the power to enter any facility, warehouse or establishment where foods are manufactured, packed or held for shipment in interstate commerce to ensure that the provisions of the act are enforced. They are also empowered to inspect any vehicle used in interstate commerce. Investigators may enter a plant after presenting appropriate credentials and written notice to the owner, operator or agent in charge. To people at the plant level, this means that the investigator(s) shall present his or her badge and a FD Form 482.

What will the investigator look for during the course of his inspection? The answer lies in the F.D.A.'s current Good Manufacturing Regulations (GMPs) found in 21 CFR, Part 110. These regulations were promulgated in the late 1960s (and revised in 1986) to provide guidelines for what was expected in plant sanitation to minimize adulteration. As they provide the investigators with guidelines for what to look for, so they also provide operators with a framework for how to run a clean and sanitary plant.

The GMPs contain two words which are defined in Section 110.3 and are critical to understanding the regulations. These words are *shall*, which means something is mandatory, and *should*, which means recommended or advisory. Investigators frequently treat the *shoulds* as *shalls* in actual inspections, particularly if a situation in which a strong likelihood of adulteration is observed.

If you, as food processors, treat all the *shoulds* in the GMPs as *shalls* (which when you consider what is being recommended makes very good sense), there would be very little chance for product adulteration. This is, however, the real world, and plants or warehouses are operated by people who all too frequently see sanitation and a commitment to quality as needless expenses. Thus, there will always be problems and our government agencies will always be busy.

**INTRODUCING THE GMPs.** In 21 CFR, Part 110, Section 110.03 contains the definitions. *Should* and *shall* have already been mentioned. Another definition which is very central to an inspection and to efficient plant operation is *critical control point*. A critical control point is basically a point in a food process where loss of control creates a good chance for adulteration. This is the basis for the Hazard Analysis and Critical Control Point (HACCP) system.

Section 110.10 is titled "Personnel" and is an area often overlooked in many operations. Many inspectors consider the plant staff as the best weather vane for evaluating management commitment to sanitation and food safety. Sloppy or slovenly staff generally mean that the inspector will find more violations.

Consider this scenario. An inspector begins his inspection, and the first thing he sees is a line worker wearing a dirty, sleeveless shirt, an earring and long, unwashed hair, not restrained by some kind of hat or hairnet. The odds are that the report that is filed will contain more than that observation of an individual.

This section states that plant staff shall take all reasonable precautions to ensure the following:

1. Disease control (SHALL).
2. Cleanliness: hygiene, clothing, where people may and may not eat, jewelry, hair restraint, personal gear, etc. are all covered. This area is simple common sense, but often ignored (SHALL).
3. Education and training (SHOULD).

Point 3 is one which many sanitarians believe should be changed. The regulations state that responsible persons should have a background in good food handling and that food handlers should receive training in proper food handling and sanitary principles. The feeling is that this should be made a mandatory requirement, changing the *should* to *shall*. With adequate initial education and frequent reminders, many concerns and problems could disappear.

Section 110.10 also states that responsibility for assuring compliance shall be assigned to competent supervisory personnel, so that in any food handling operation, it is mandatory that someone be designated as the person responsible for assuring personnel compliance. In the real world, many operations do not have such a position.

Section 110.20 addresses maintenance of the grounds, and construction and maintenance of the plant buildings themselves. With regards to the grounds, the regulations state that "they shall be kept in a condition which will protect against contamination of the foods." The words "include but are not limited to" are used to describe methods of control. This short statement, used in this section and others, provides investigators with greater freedom and delivers a message to operators that programs to protect the food should be all-encompassing and really go one step beyond the guidelines. Among the methods of control described in the regulation are:

1. Properly storing equipment, controlling vegetation and removing litter and waste to discourage pests.
2. Maintaining the grounds so that they do not constitute a source of contamination.
3. Assuring the grounds drain properly.
4. Operating waste disposal systems so they don't constitute a source of contamination.

Included in the section on grounds is an issue many persons do not consider during their routine maintenance programs and inspections: their neighbors' grounds. If the neighbors fail to maintain their grounds, an additional burden of inspection and control falls to the operator.

On the subject of plant construction and design, the regulations address a number of issues such as sufficient space for equipment placement and storage, design precautions to prevent adulteration, protection of bulk storage vessels, construction of walls, floors and ceilings so that they may be cleaned and repaired, plant lighting, proper ventilation and adequate facility design (screening, for example) to exclude pests.

Pest control is a major issue and extremely important because pests (insects, birds and rodents) can both carry microorganisms of public health significance and adulterate food materials. Adequate pest control involves close scrutiny of the whole building. A discussion of pest control is a big topic by itself and beyond the scope of this article.

Section 110.35 governs sanitary operations. This mandates that the operation be maintained in a sanitary condition

and in good repair. Among the issues addressed are use and storage of cleaning and sanitizing compounds and pesticides. Perhaps the most important statement in the section reads "all food contact surfaces, including utensils and food contact surfaces of equipment, shall be cleaned as frequently as necessary to prevent contamination of food".

Going hand-in-hand with this section is Section 110.37, sanitary facilities and controls. Requirements and expectations for plant and personal sanitary facilities, toilets and wash facilities are outlined. One point which all investigators will look for is the potential for cross contamination between waste and clean water lines. A warning to all operations ... when making any changes to your plumbing be sure the plumbers are given proper plans and directions and that the changes are made on updated plant blueprints.

Since the regulations require equipment and utensils to be cleaned and sanitized, it makes sense that this kind of equipment be designed and constructed of materials that allow proper cleaning and are not prone to contamination. Section 110.40(a) requires precisely this.

Also, this particular section addresses installation and types of materials which may be used in the construction of equipment which comes into contact with food. All such equipment must be constructed from materials which are non-toxic and corrosion resistant.

Further, this section addresses the requirement for temperature recording devices for freezers and cold storage compartments and maintenance of instruments for monitoring pH (acid/base),  $A_w$  (water activity), temperatures, etc. It is essential that these instruments and devices be properly maintained and that maintenance records be retained. There are many in the industry who feel that all temperature monitoring or recording devices should be maintained as described in the low-acid canned food regulations, that is, they should be checked and calibrated regularly, preferably by an outside agency. Investigators will check instruments to determine if they are operating correctly. This is especially true with pH meters. Good Laboratory Practices (GLPs) should become a part of the testing and checking procedures of the plant's quality control and process control operations.

Section 110.80 relates to processes and controls. The basic mandates are that all operations "shall be conducted in accordance with adequate sanitation principles" and that appropriate measures be taken to "ensure that the food is suitable for human consumption and that packaging materials are safe and suitable." Within this section, the focus is on manufacturing and raw materials. With the raw materials, the regulations emphasize proper storage and handling to prevent contamination. There is the same emphasis in the comments pertaining to manufacture, but they are more specific. These specifics include temperature control for different types of foods (frozen, refrigerated and hot), disposal of adulterated goods, moisture control for dry materials and pH control.

Finally, Section 110.93 governs warehousing and distribution. The statement is simple: "The food shall be protected against physical, chemical and microbial contamination, as well as deterioration of the package." It sounds simple and rather direct, but there are many in the industry

who seem to feel that their job is over once the product is packaged. Abuse in storage and distribution is far too common.

As one reads through the GMPs, there is a sense of ambiguity. Words like *adequate*, *sufficient* and *suitable* are commonly used. This lack of specificity can be both a blessing and a curse. The lack of specific requirements allow for broad interpretation and flexible compliance, but they can hinder actual enforcement. Most sanitarians suggest companies allow for broad interpretation of the GMPs and recommend they develop their programs accordingly. A broad, integrated program is more likely to be trouble-free.

The preliminaries are now done. Someone (or two) in the company knows and understands the regulations, and these persons have been appointed as sanitarians with the power to develop and enforce programs. Another mandate for the sanitarian(s) is educating the staff. Suddenly, an F.D.A. investigator appears at the front door announcing that she or he is here to inspect the facility. "Suddenly" is used because that is how F.D.A. inspections occur. The agency will not warn an operation they are coming. They want to surprise people, so they can see what normal operations are like or, in other words, what is "business as usual." The investigator may even know more about the plant or warehouse than some people in that facility. The agency maintains a plant file, and it is standard practice for the investigator(s) to review past records before visiting a plant.

Federal law and regulations give the investigator the right to inspect a food plant involved in interstate commerce (Section 704 (a)). F.D.A. investigators do not require a warrant to gain access to a facility, although she or he may have obtained one if the feeling is that there will be a problem gaining admission.

Generally, the investigator will present his credentials (a badge) and a written notice (Form FD-482) that the intent of the visit is to inspect the facility. If the investigator is refused admission without a warrant, one can be easily obtained. Refusal to admit an investigation is grounds for prosecution. If the investigator returns with a warrant and the company bars his way, that operation will definitely be prosecuted.

During the training process, investigators are instructed not to use force or harassment to gain access to a facility. They are also taught not to intimidate company officials. If an investigator uses these tactics, any evidence gathered during the inspection may be suppressed through court orders, so there is really no need to fear being bullied.

There are cases where a company would be within their rights to bar an investigator. Such a situation occurred several years ago when a plant barred a bearded investigator from conducting an inspection. This plant had a strict "no-beard" policy for sanitation purposes. If such a situation arose today, it is likely that the agency would simply send an inspection who did not wear a beard ... unless the feeling was that the operation was obviously trying to hide something.

The investigator is now in the door. The Form FD-482 should be taken by an appropriate individual and marked for filing as a record of the inspection. When the investigator begins his inspection, the plant sanitarian or another indi-

vidual (preferably someone who understands the inspection process) should accompany the investigator. This is one good reason for having several individuals who have received sanitation training in the facility.

The person accompanying the investigator should carry a notebook and perhaps a camera (more on cameras later). The notebook should be used to record questions the investigator has and to make detailed notes on the investigation itself. The individual accompanying the investigator should do just that: accompany him. Be courteous, direct the investigator to areas he asks to see or show him where materials are stored or held. But the person accompanying the investigator is not required to explain or give up information about plant operations. The importance of being courteous cannot be overemphasized. If you give an investigator "lip," the inspection may become longer and more comprehensive. Remember investigators are people, too.

When an inspection is initiated, questions such as "How long will this take?" or "Is this a fair time to inspect us?" inevitably will be asked. The law states that inspections must be undertaken "at reasonable times and within reasonable limits." Reasonable times are normally construed as during the day or ordinary business hours, but if a facility is operating at night and on weekends, those times are also reasonable. The inspection itself may take hours or even days, depending upon the size and condition of the facility.

When the F.D.A. trains their inspectors, this training is based on the GMP regulations, so what the investigator will be looking for are violations of these regulations. She or he is authorized to inspect "all pertinent equipment, finished and unfinished materials, containers and labelling therein." In other words, the investigator has access to the whole facility.

There are individuals who cry "I don't ship interstate, what's he doing here?" What people must realize is that the F.D.A.'s authority also covers materials received that have been shipped interstate. This includes packaging materials, ingredients and any other materials involved in food processing.

**RECORD REVIEW.** Most F.D.A. investigators will want to examine plant records as part of their investigation. This is an issue that terrifies many operators. It is within the investigator's right to examine shipping records for articles received in interstate commerce, but he has no right to examine manufacturing documents or shipment records. If the investigator wants to look at receiving records, the request should be made in writing. It is recommended that operators insist on such a request to assure that the documents will not be used in a criminal prosecution.

It is also within the rights of the investigator to inspect and copy records pertaining to the production of low-acid and acidified foods. As noted above, the investigator is required to present a written request to view these records. Refusal to comply with a written request may result in prosecution. F.D.A. is authorized to impose an emergency permit on a company under these circumstances.

It is not within the investigator's rights, however, to ask for manufacturing or quality control records. If these records

are shared voluntarily, they can be used in an enforcement action. Whether quality control or manufacturing records are shared is the choice of the operator. Most companies do comply with reasonable requests.

With the advent of HACCP (Hazard Analysis and Critical Control Point) programs, it is likely that the F.D.A. will examine the HACCP program and accompanying records in the future. HACCP is a food safety system, so record review would be in line with the agency's duties. This is one reason for designing a HACCP plan which focuses exclusively on food safety. If quality issues are included in the plan, these records could be available to the investigator.

It was mentioned earlier that the individual accompanying the investigator might consider carrying a camera. He or she should only carry a camera if the company policy allows the investigator to use a camera during his inspection. The right to take photographs is a major issue between the F.D.A. and the industry. The Act does not explicitly authorize investigators to take photographs during the course of inspections. The F.D.A., however, instructs their investigators to carry cameras during inspections and use them as necessary without permission from the management of the operation.

Photographs present an issue which has yet to be definitively resolved in court. The F.D.A. interpretation of the ruling in the case *Dow vs. United States* is the basis of the right to use camera. This Supreme Court ruling in 1986 gave the Environmental Protection Agency authority under the Clean Air Act to take aerial photographs of open spaces. As this ruling of open spaces dealt with areas open to public view rather than in-plant premises, a more concrete resolution is still needed. Although the photography issue is still unresolved, operators should be aware of the following.

1. If company policy allows the investigator to take photos, the photographs may be used as evidence in an enforcement proceeding.
2. If an operation objects to an investigator using a camera, the investigator is instructed not to take photos without a search warrant.
3. If a warrant is obtained specifically authorizing photographs within a facility, refusal to cooperate could result in prosecution for contempt of court. A firm does have the option of opposing a warrant which is more general in its photographic license on the grounds that the photos are unwarranted or trade secrets or confidential materials may be jeopardized.
4. If an operation allows photographs to be taken or a warrant authorizing the use of a camera is presented, the operators should take steps to protect themselves against loss of confidentiality of misinterpretation of the photographs. Management can request the F.D.A. not take pictures of materials or equipment which might be deemed trade secrets or confidential. If the investigator insists on taking these photographs, the operation should request that those particular photographs and negatives be marked confidential. This request should be followed up with a letter to the regional F.D.A. office.

It is because this final point that the comment was made that the person accompanying the investigator carry a camera. He or she should take the same photographs from



the same angles and locations the investigator does. This provides the operation with a record of what was taken and can eliminate potential problems stemming from misinterpretation of the photographs.

Whether or not a facility allows investigators to carry a camera is their decision. It is a decision that should be made before a F.D.A. investigator comes to the plant, however. It is strongly recommended that operators meet with their legal staff to determine what position they will take and prepare a document summarizing that position. This document can be presented to investigators when they arrive at a plant.

**SAMPLE COLLECTION.** Investigators have the right to collect samples during the course of their inspections. As part of their training program, investigators receive instructions on proper sample collection. Samples which are collected should accurately represent the lot in question and proper precautions must be taken to ensure that the sample is not contaminated. The investigator is required to provide the facility management with a receipt describing the sample and to pay a fair price. To protect themselves, operators should collect duplicate samples for themselves and have these analyzed using recommended procedures. Lastly, the investigator is required to provide the operation with a copy of the results for each sample collected and indicate whether the food or foods were unfit for consumption.

At the completion of his inspection, the investigator is required by law to leave a written report of practices only if the inspections indicates that the food in the establishment:

1. Consisted of any filthy, putrid or decomposed substances, or
2. Had been prepared, packed or held in insanitary conditions.

This report, known as Form FD-483, will be left at the plant only if violative conditions or practices are observed. The investigator is not allowed to "assist" an establishment in solving their problems. All he or she can do is report what they observed; the facility is required to address the issues. On the FD-483 form, investigators have been trained to note observations as follows: "I observed ..." During the course of the investigation, the company should, if possible, move to correct deficiencies as they are noted. The deficiency may be listed on Form FD-483, but prompt response is viewed favorably by the F.D.A.

If the investigator has left a Form FD-483, the facility should respond to each point on the report as soon as possible. A letter should be written to the F.D.A. outlining how each item will be corrected and timelines for addressing each concern. This letter is not required by the Act but demonstrates an interest in compliance. Be forewarned, however, if a company makes such promises and future inspections indicate that they were not kept, that company could be prosecuted.

**AFTER THE INSPECTION.** When the investigator returns to his office, he is required to prepare an Establishment Inspection Report for submission to his superiors. The investigator may include his own recommendations, but it is the Compliance Officer who determines the course of action. Factors which influence the decisions to be made are:

1. The past history of the facility.
2. Response by the facility.
3. Severity of the observed violations.

The actions which are taken depend upon these factors and the most recent report. The situation is evaluated and rated appropriately. NAI or "No Action Indicated" means the agency does not feel that any observations constituted a violation and there are no problems with the facility. A facility in which some violations are observed will be rated VAI, II or III (Voluntary Action Indicated). The level will depend on the severity of the problem. The agency will await a response from the company notifying them that items of the FD-483 have been addressed. OAI or "Official Action Indicated" is the most severe and indicates continued violations or observed very obvious and major adulteration situations. If this course of action is taken, the facility will get a warning letter from the F.D.A., or they may become the subject of formal court enforcement action. In other words, the facility is in serious trouble.

Operators should realize that a report of adverse findings increases the probability that there will be another inspection shortly. The severity of the violations will affect the timetable for the next inspection.

In summary, F.D.A. inspections are an integral part of the agency's enforcement policy and are conducted to protect the public. This is one point which operators must realize and accept. Inspections are not vendettas against individuals or companies. To minimize problems and reduce the frequency of visits, companies should seek to operate their facilities in compliance with, and perhaps in excess of, the guidelines set forth in the Good Manufacturing Practices (GMP) regulations. Operators should consider treating the *shoulds* as *shalls*, and they will find that good sanitation pays off. In fact, they will probably find that maintenance of such practices will end up saving money.

When the day comes that the F.D.A. investigator does knock on the door, follow the protocols outlined earlier. Be cooperative, accompany him or her on the inspection, make and record your own observations, and listen to his or her comments as you accompany him or her throughout the plant. When he is gone, prepare your own report, whether a FD-483 has been left or not. If your plant or warehouse is clean and well-maintained, and you work to foster this feeling or to demand this same commitment from suppliers and shippers, the chances are very slim that there will be any problems arising for your operation from the F.D.A. inspection process.



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# Automatic Recirculation Cleaning In The 90's

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*This presentation was part of the Automation in Dairy Process Control Symposium, July 28, 1993,  
at the 79th IAMFES Annual Meeting, Toronto, Ontario, Canada*

## INTRODUCTION

The dictionary defines cleaning in the following way: "To clean means to remove dirt and to leave the objects clear of foreign matters".

The first challenge in the food industry is to decide "How clean is clean". This question - as analyzed by Corrieu (1981) - becomes even more critical in a global society, because cleaning standards are different in each part of the world; continuously evolving as societies become more developed; and very difficult to measure, except by very primitive ways (i.e.: visual inspection) and by the delayed effects when surfaces interact with the food being processed.

Effective cleaning occurs when proper results are obtained consistently using the optimum combination of labour, energy, chemical input, capital investment and time to minimize the total cost of cleaning.

The most common form of automatic cleaning and sanitation has been offered since the dairies started automating the C.I.P. (Cleaning-in-Place) Systems. C.I.P. has been equated with internal cleaning and sanitation by recirculation. But the term C.I.P. is also being applied to other methods of automatic cleaning of surfaces without dismantling; i.e.: foam and pressure cleaning of conveyors.

## CLEANING PARAMETERS IN RECIRCULATION CLEANING

The main parameters that affect the removal of soils from surface reviewed in detail by Correau (1981), are:

### Mechanical Action

The International Dairy Federation has sanctioned the empirical rule that, to properly clean piping, a minimum velocity of 1.5 m/s (5 ft/s) of cleaning solutions is required. Furthermore, Timperley established that Reynolds number values do not correlate well with cleaning effectiveness, as measured by reduction of micro-organisms in different diameter pipes; while the experiments with velocity changes were consistent in their results, regardless of pipe sizes.

### Balance of Flow

This is particularly important in cleaning reservoirs. The balance has to start with a sprayball properly designed for the application, fed at the proper pressure (and therefore the right flow), and solution removed at proper rate. Adverse effects of unbalanced systems are one or a combination of

atomization, streaking of tank walls and soak cleaning of tank floors.

### Temperature

Temperature selection and control is critical due to its contradictory effect in cleaning results. Once you are above melting point of butterfat, there is constant improvement with temperature increase, due to the increased rate of chemical reaction that makes the detergents more effective. But there is a turning point, where protein and/or sugars start changing their chemical composition. At that point, the temperature begins playing a negative role in cleaning effectiveness.

### Chemical Selection and Concentrations

The most appropriate blends should be selected, but the criteria for selection is becoming much more complicated in recent years due to secondary and environmental considerations; i.e.: in-use pH and effluent discharge, chemical compatibility with rubbers and elastomers, in-use concentrations, control methods, reusability, etc. The sanitizers' limitations include, additionally: residual sanitation value, non-rinse approvals and concentration control methods vs. bactericidal activity control.

### Time

This is the most consistently and accurately measured parameter in the cleaning process. This is due to its large influence on the economics of the plant, resulting in a continuous effort to reduce cleaning time.

### Surface Access to Cleaning

North America has enjoyed the presence of the 3-A standards for many years. Each piece of equipment or component approved, satisfy the need of easy access to the surface for both processing and cleaning. That support is both a warranty for the engineering designer of processing plants and for the purchaser of replacement parts.

However, there are no such standards in total plant design and piping layout. And that is almost an impossible task, because there is no standard plant for any one or combination of processes. The variables and permutations are infinite in numbers, so all that can be asked for, is that the designers adhere to some commonly agreed upon good design practices.

Often one encounters plant designs where the total cleaning consideration is viewed as a last necessary evil. But this could possibly change in the future if the design contracts were issued under different sets of rules, such as:

- Daily production in set number of shifts, including sanitation, instead of hourly production capabilities.
- Warranties that include both total actual output and minimum required product shelf-life.

#### **AUTOMATION: PAST, PRESENT AND FUTURE**

The sensing and control of various cleaning parameters continues to evolve. In this section the past, present and future of each parameter is reviewed.

**Time:** Initially time was controlled by electro-mechanical timers; then by cam-timers, Drum controllers associated to a battery of timers. Today it is done with Programmable Logic Controllers (PLCs). We shall re-visit this subject later in this article.

**Temperature:** Almost every plant has steam available for processing and/or pasteurization. Steam is the most common heating medium. Heating has been accomplished by direct steam injection, in-line or inside the solution tank, with on-off temperature controllers. The initial controllers had gas filled bulbs with contact relays, but today the most prevalent are the electronic controllers with J thermocouples.

In later years, some plants have switched to heat exchangers, whether shell-and-tube or plate heat exchangers. To smooth the temperature changes, Proportional, Integral, Differential (P.I.D.) Controllers activate a modulating steam valve with little fluctuation and overheating. This requires that the dynamic conditions remain fairly stable; such conditions are never met in C.I.P. applications.

The latest in temperature controllers are the Fuzzy Logic Controllers. These are computer based and have the ability to learn from previous experience and compensate for unexpected changes.

**Flow:** Flow adjustment was traditionally achieved by restrictors placed in the C.I.P. feed lines to the sprayballs. The results are very good, provided that the same supply pump is used. Change of the supply pump can totally unbalance the system.

The most frequent problem is failure to calibrate the supply flow. Excessive supply pressure can lead to streaking, large puddles and atomization; all of which will result in poor tank surface washes.

Modulating valves after the supply pump have been added to eliminate restrictors. Controlled by potentiometers to open on a percentage basis, they can be selected by the program controller according to the specific needs. Later, flow meters have been added to get feed-back and maintain preset flow rate.

The latest trend is to use pumps associated with programmable RPM Controllers, with or without flow-meters. Obviously this solution tends to be much more expensive, and many companies may not be prepared to pay the extra capital cost involved. However, the use of these devices provides a payback in the form of lower power consumption.

**Chemical feed and Control:** Chemical feed and control was initially achieved by time feed or stroke feed in piston pumps.

Later on, conductivity controllers were introduced and perfected, becoming the most widely used method of chemical control to activate chemical feed pumps. They are now temperature compensated, programmable and very accurate. They are also used for interphase detection. Conductivity controllers work on the principle of the conductivity cell, measuring the electrical conductance between two electrodes. Conductivity correlation to chemical concentration is good for acidic or caustic solutions at most temperatures and so is the correlation between temperature increase and conductivity of a given solution. Using both parameters, chemical concentration control of given solutions is easy and accurate.

The latest alternative method is to use inductive conductivity controllers with toroid probes. These probes are most useful in areas of very soiled solutions, which can easily foul the standard conductivity electrodes. These probes are not affected, because the solution goes through a large central orifice of a round annular probe, consisting of two winding cables, similar to a transformer. The solution acts as a nucleus, transferring the signal from the primary to the secondary winding, which is picked up and read by the instrument.

In general terms, all three systems coexist in the industry and, as long as the current high conductive chemicals are used, there will be little incentive to look for other methods. But due to environmental concerns, there is a potential that new, more environmentally friendly products, will not respond well to conductivity and may require different control parameters and instrumentation.

**Controllers:** Dedicated computer technology was developed for C.I.P. for those plants growing gradually. But those plants built from the ground up in the early 1980's, went for Central Control Rooms, with a Programmable Logic Controller (PLC) to manage both production and cleaning. Each machine would have the necessary inputs and outputs, and all the information would be transferred back and forth to the control room. But the logic would reside in the control room.

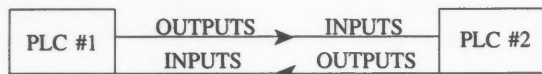
There had to be redundant PLC to take over, in case the acting controller would go down. Electrical installation cost was very high, because every signal had to go through the control room.

As PLC's (dedicated industrial computers) have become cheaper and powerful, very reliable, compact and flexible, many designers have gone from centralized to distributed controls. What does this mean? It means that originally there was a Master Controller located in the control room, with inputs and outputs in remote locations to detect and effect changes occurring in the machines, product or adjacent environment. As technology improved, it became cheaper and simpler to put individual PLC's in each location, to make the individual equipment work independently.

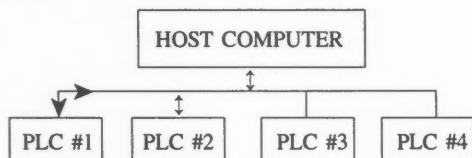
However, there is a need for coordination, which has been achieved by hand-shake signals, communication networks, etc.

What is a Hand-shake? It is a combination of signals exchanged between different controllers, in order to insure that each machine is doing what is expected of it at any point

in time. When the other machine receives the confirmation signal of an action, it reacts according to a prescribed routine.



Communication networks are a combination of computer hardware and software, that allows direct commands to different PLC's and to receive and process data collected from them.



All this leads to the information technology age, where the tools available to each individual for decision making are becoming very sophisticated. Smart controllers are being designed for self-diagnosis, indicate when preventative maintenance is due, correlate information from multiple sources to identify problems, etc. Even more critical, in the future these smart systems will be able to learn from their own experiences, without any human intervention.

**Monitoring and Reporting:** Monitoring and collecting the information to confirm that the cleaning sequence has been performed; and storing that information has moved faster in the last five years than in all previous times, again as a result of the use of PLCs.

Up to a few years ago, the only method of tracking down whether something had been washed, was the Temperature/Pressure Recorder. This instrument even became regulated for monitoring the washing cycles. However, it obviously lacked sufficient information to properly evaluate cleaning performance.

Lately, computer based C.I.P. Monitoring Systems, such as Shur-Graph, were introduced to the market. Interestingly enough, by monitoring on a time basis the critical variables of return temperature, return solution's conductivity and flow rate, we found several important messages embedded:

- Each circuit has a distinctive finger-print when washes went according to a preset program; therefore, if any discrepancy were detected, it gave a clear indication of where the trouble-shooting survey should start.
- The finger-printing allows to determine the quality of wash and sanitation with a much higher degree of certainty than ever before.
- There are significant savings to be achieved by changing cleaning sequences and/or their timing.

On the minus side, it required an increased use of paper from generated reports and more discipline is needed in checking this information to achieve its benefits.

Now it is possible to view this information on a screen and store it electronically (floppy and hard discs), to be printed only when warranted.

Computer technology offers a promise of additional simplification and further integration into common data

bases with production and sophisticated quality assurance programs. This will allow identification and tracking of all the processes, environment and controls of the product up to the individual container; providing a complete history of production to determine cause and effect in specific results.

**Environmental Concerns:** The effect on the environment is a source of increasing concern for both production and cleaning processes. This concern will take in consideration issues such as energy conservation (due to CO<sub>2</sub> and SO<sub>2</sub> discharge and/or radioactive waste), liquid waste (pH, B.O.D., product salvage, solid separation), water conservation, and others that we might not even be aware of today.

The cost of doing business is increasing significantly due to these concerns. Companies are taking a new look at their water consumption patterns and implement effluent control programs in response to effluent charges by municipalities.

Holistic approaches are considered, where ideally 100% of raw materials are converted into finished product of one sort or another. Water is being re-directed to secondary uses, such as post-rinses used in pre-rinses, condensed water from evaporators (cow water) used for truck washing and pre-rinses, reverse osmosis treatment for total reuse of water, reuse of cleaning solutions, etc. But eventually, solutions must be dumped and, on their way to the sewer, they need to be neutralized. And that can be done through the C.I.P. system or in a central effluent treatment plant. There seems to be a trend towards integrating effluent treatment and cleaning.

## CONCLUSIONS

Up to the present date, the parameters monitored are all indirect ways of determining "HOW CLEAN IS CLEAN". One assumes that if production process and its attending variables have remained constant then one can provide some assurance that product quality is maintained.

However, there is no direct measure of the cleaning process where we can have an in-line control as we clean and assess when we have cleaned properly or sufficiently. There is also still a waiting period of up to 9 days before one can predict whether the milk will last for the coded 14 or 18 days. All this leads us to the conclusion that washing processes may be unnecessarily too long, at too high concentration and at too high a temperature, building such redundancy, when if avoided will save resources and ultimately make the product more competitive. On the other hand, in spite of effort to clean, the product reaching the market has inferior quality, with the attending loss of cost and image.

The opportunity therefore exists for researchers to find such parameter and the best way to incorporate it into the control system.

Automation is constantly providing new sets of sophisticated tools, to continuously increase the effectiveness of cleaning, the quality of results and the flexibility to operate the production facilities.

The rate of technological change is such, that what today is the state-of-the-art can well be obsolete within a couple of years. The great concern will be to differentiate between real improvements and gimmicky trendiness.



In order to achieve the best results, processors will have to properly evaluate the whole array of technological offerings and assess what will be applicable to their own operations; how to adapt the technology to their marketing efforts and how to adapt their own behaviour to what the market will expect from them.

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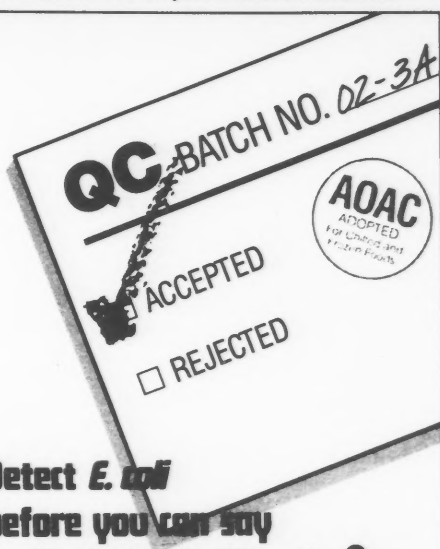
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## Setting the Record Straight About Food Irradiation

Christine M. Bruhn, Consumer Marketing Specialist,  
Cooperative Extension Service, University of California, Davis, California

Increased efforts to reduce foodborne illness and recent successful marketing of irradiated produce has renewed interest in food irradiation. We can help consumers make informed decisions by providing accurate information on this technology. Should you have the occasion to participate in a debate about irradiation, be prepared for a "moving target." Activists change the issue they question, depending upon the sophistication of the audience.

Produced from nuclear waste, laden with unknown toxins, deficient in nutrients, and likely to cause cancer in children, Food and Water Inc., the primary opponent to food irradiation, continues to spread misinformation. Generally they will allude to a nuclear weapon connection, will question the safety and quality of irradiated products, and will claim that irradiation is not necessary because other treatments are more effective. Regretfully, at least one other consumer organization, Center for Science and the Public Interest, is now using food irradiation as a focus in their plea for membership and funds.

Major health organizations present a different view of irradiation. The World Health Organization confirms irradiation's safety and recommends consumers seek irradiated meat and poultry products where available. The American Medical Association, FDA, and health and safety authorities in over 30 countries acknowledge the safety of irradiated foods.

Treating foods with gamma rays offers benefits to the consumer, retailer and food manufacturer. Irradiation can be compared to other food treatments. When foods are pasteurized, they are exposed to heat, when foods are irradiated, they are exposed to electrical energy. The effect of this treatment varies by the amount of energy used. A high dose sterilizes spices and substitutes for the fumigant, ethylene oxide. Pathogens in raw poultry can be virtually eliminated by a lower "pasteurization" dose of radiation. Grain and produce can be disinfested by still lower doses, and natural senescence of fruit and vegetables can be retarded. In all cases, this is a cold treatment. The food maintains the raw, fresh-like character. The electrical energy passes right through the food, leaving no residue.

Consumer attitude studies and market experiences demonstrate that, after hearing the scientific perspective on irradiation safety, most consumers will purchase irradiated foods. Never-the-less, activists groups like Food and Water

Inc. continue to seed media attention, claim the process and products are unsafe, and vow to picket any retailer that offers irradiated foods to the consumer. This food terrorism continues to slow the introduction of food irradiation, and thereby denies consumers the right to choose safer food.

The procedures to irradiate poultry are in review by USDA. The deadline to submit comments was July 6. Vindicator of Florida is prepared to proceed with poultry irradiation as soon as final regulations permit. FDA is reviewing two proposals to permit irradiation of fish and seafood.

Following is a brief summation of major activist's themes with a brief rebuttal and suggestion for key readings. The World Health Organization has prepared an excellent series of consumer information sheets, available from IAEA/FAO, Wagramerstrasse #5, P. O. Box 100, A-1400 Vienna, Austria.

- **Nuclear weapons connection:** Activists continue to refer to the irradiation process as utilizing "nuclear waste" even though there are no commercial irradiation facilities in the U.S. using Cesium 137, a reported by-product of nuclear weapons manufacture. All U.S. commercial facilities use Cobalt 60, a product specifically made for irradiating medical supplies and other material; cobalt is also used in most research facilities, however some utilize linear accelerators or machine generated gamma rays, one uses cesium.
- **Children and Cancer:** Activists frequently cite the reported incidence of polyploidy in children fed freshly irradiated wheat and claim these children exhibited precancerous symptoms. As in their custom, Food and Water interprets the experimental result to further their beliefs. This study used 5 children suffering from malnutrition, hardly an appropriate sample to predict results for the population in general. Normal healthy humans have an average incidence of 1/2% to 2% polyploid cells of white blood cells with more than the usual number of chromosomes. The malnourished children had a polyploid cell incidence of 1.8%, well within the normal range. Polyploidy is not associated with cancer or any other ill effect.

In this study, the children fed freshly irradiated wheat had better weight gain, better serum albumin contents, and better haemoglobin levels, indication that they were responding well to their diet and recovering from malnutrition. Others have studied the effect of the consumption of irradiated foods on a large group of consenting adults, and found

that consumption of irradiated foods does not cause polyploidy or any genetic aberration.

- **Microbiological food safety:** Gamma treatment has been shown to reduce the pathogens in poultry by 99.9% at an estimated cost of 1-3 cents per pound. Activists however claim that this reduction is insignificant, that manufacturers will use irradiation to clean-up unclean processing operations, consumers may not refrigerate the raw poultry, and at body temperature, the growth rate of salmonella is so fast that it doesn't matter how much the original count is reduced!

Of course, irradiation does not compensate for improper handling of food, nor does it replace good manufacturing practices. These fear arousing comments are similar to those alleged against pasteurization at the turn of the century, "Pasteurization is an excuse for the sale of dirty milk," "Pasteurization is unnecessary, because raw milk does not give rise to tuberculosis," "Pasteurization favors the growth of bacteria in the milk," "Pasteurization destroys beneficent enzymes, antibodies, and hormones, and takes the 'life' out of the milk," and "Pasteurization will encourage people to mishandle milk and will be more risky in the end." Pasteurization has had a significant impact on public health. Pasteurization by irradiation of select animal products could have a similar positive impact.

- **Radiolytic products and toxicity:** Activists claim the chemical changes that occur when food is irradiated creates toxic compounds. In fact, however, most if not all of the free radicals and other compounds produced during irradiation are identical to those formed during cooking, steaming, roasting, pasteurization, freezing, and other forms of food preparation. Free radicals are even produced during the natural ripening of fruits and vegetables. All reliable scientific evidence, based upon animal feeding tests and consumption by human volunteers indicates these products pose no unique human risk. In fact, people requiring the safest food, astronauts and hospital patients undergoing cancer therapy, are given irradiated foods.
- **Irradiation and spices:** Spices are naturally contaminated with insect eggs and bacteria. Treatment with irradiation can replace ethylene oxide and producing a

higher quality product without chemical residues. Activists claim that neither treatment is needed because spices could be steamed to make them safe. Again the activist is reaching for good sounding alternatives. The fact that steam is used to extract flavor components is easily ignored. It is unlikely that steamed dry spice would have the same flavor impact of irradiated or fumigated spices.

- **Nutritional value:** Activists claim that nutrients are significantly destroyed during gamma processing, making the food "worthless." They often cite early work showing significant losses of vitamin C in changes in irradiation are comparable to these in other food processing procedures. Early work was often done on doses higher than permitted in the USA and using procedures which failed to measure all biologically active forms of the vitamin. WHO and other health authorities considers nutrient changes that result from irradiation to be so small they are insignificant.

Not all consumers will select irradiated food, some have a value conflict and prefer unprocessed foods. It is imperative, however, that consumers be provided with accurate information so choice can be made based upon facts, not fear and innuendo.

For further reading:

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# Updates . . .

## ***Deibel Laboratories, Inc. Announces Food Safety Management Training Program***

Deibel Laboratories, Inc. will conduct a comprehensive, two day training program on food safety management in Madison, Wisconsin. This program will teach the HACCP system of food safety and its relationship to other parts of an ISO 9000 quality management system.

Presenters for this extensive training program will be Robert H. Deibel, Ph.D., President of Deibel Laboratories; and William H. Sperber, Ph.D., Director of Microbiology and Food Safety for the Pillsbury Company.

Four dates are available for this program in 1993: May 25-26, June 29-30, September 28-29, and November 16-17.

For further information, contact Dave Sullivan at 608-241-1177 or FAX to 608-241-2252.

## ***New This Year at the IAMFES Annual Meeting Baking Equipment Standards and General Sanitation in Baking Operations Symposium***

At the 1993 Annual Meeting, for the first time, there will be a Baking Equipment Standards and General Sanitation in Baking Operations Symposium. This symposium will be held on Monday Afternoon, August 2nd, with Martyn Ronge as convener. Presentations will include an overview of the Baking Industry Sanitary Standards Committee (BISSC), OSHA Requirements, HACCP, and Sanitary Equipment Design.

Prior to this Symposium, on Sunday, August 1st, the IAMFES Professional Development Group on Baking Industry Sanitary Standards will hold a meeting from 10:00 - 11:00am. Anyone interested in attending this meeting is encouraged to do so, and may receive more information on the group and its agenda by contacting Martyn Ronge at 708-272-7626.

## ***Silliker to Present Short Course in Chicago, IL***

Silliker Laboratories Group, Inc., will offer a presentation of its newest and most popular short course, "Principles of FOOD Microbiology", in Chicago, IL, on July 7-9, 1993.

This 2-1/2 day course is designed for practicing food technologists responsible for the microbiological safety and quality of foods, and for those individuals whose job function requires a knowledge of these areas.

Designed and coordinated by Dr. John H. Silliker, the course combines lectures, discussions, and an informal evening session to provide a basic understanding of the factors that affect microbial growth in the safety and survival of food products. Special emphasis is placed upon the microbial ecology of foods, the influence of processing techniques on microflora, and the influence of these factors on the safety and quality of various foods.

For additional information, or to register, contact Silliker's Education Department at (708) 957-7878.

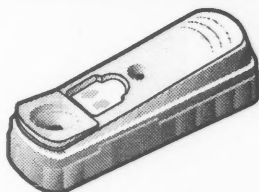
## ***Dairy, Food and Environmental Sanitation Column Undergoes Name Change Newly Titled "HAZCON-Based Total Quality Management" Slated to Begin in May***

The column, "HACCP - An Industry Food Safety Self-Control Program", which did not appear in the March or April issues of *Dairy, Food and Environmental Sanitation*, will be re-named and return in the May 1993 issue. To better reflect the column's content, its new title will be "HAZCON-Based Total Quality Management."

Dr. O.P. Snyder, Jr., President of the Hospitality Institute of Technology and Management, and author, has contributed over a dozen columns in the past year. This number should continue to grow as the re-titled "HAZCON-Based Total Quality Management" column begins in May.



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# News

## ***New Study Shows Wood Cutting Boards, Not Plastic, Are Safer for Food Preparation***

*Despite the prevailing wisdom, bacteria die much more quickly on wood*

For decades now, cooks in homes and restaurants have been urged to use plastic rather than wood cutting boards in the name of food safety.

The fear is that disease-causing bacteria — salmonella from raw chicken, for example — will soak into a cutting board and later contaminate other foods cut on the same surface and served uncooked, such as salad ingredients. It's become an article of faith among "experts" that plastic cutting boards are safer than wood for food preparation because, as the thinking goes, plastic is less hospitable to bacteria.

It seems reasonable, but it just ain't so, according to two scientists at the University of Wisconsin-Madison's Food Research Institute.

Dean O. Cliver and Nese O. Ak, food microbiologists in the College of Agricultural and Life Sciences, have found that in some as yet unknown way wooden cutting boards kill bacteria that survive well on plastic boards.

"This flies in the face of the prevailing wisdom," says Cliver. "It isn't what I expected. Our original objectives were to learn about bacterial contamination of wood cutting boards and to find a way to decontaminate the wood so it would be almost as safe as plastic. That's not what happened."

Cliver is quick to point out that cooks should continue to be careful when they handle foods and wash off cutting surfaces after they cut meat or chicken that may be contaminated with bacteria.

"Woods may be preferable in that small lapses in sanitary practices are not as dangerous on wood as on plastic," he says. "This doesn't mean you can be sloppy about safety. It means you can use a wood cutting board if that is the kind you prefer. It certainly isn't less safe than plastic and appears to be more safe."

Cliver and Ak began by purposely contaminating wood and plastic boards with bacteria and then trying to recover those bacteria alive from the boards. They also tested boards made from seven different species of trees and four types of plastic. They incubated contaminated boards overnight at refrigerator and room temperatures and at high and typical humidity levels. They tested several bacteria — *Salmonella*, *Listeria* and enterohemorrhagic *Escherichia coli* — known to produce food poisoning.

The results consistently favored the wooden boards, often by a large margin over plastic boards, according to Cliver.

The scientists found that three minutes after contaminating a board that 99.9 percent of the bacteria on wooden boards had died, while none of the bacteria died on plastic. Bacterial numbers actually increased on plastic cutting boards held overnight at room temperature, but the scientists could not recover any bacteria from wooden boards treated the same way.

So where did we get the idea that wood isn't safe? Cliver and Ak don't know. They did a literature search and have not found any studies that evaluated the food safety attributes of wood and plastic cutting boards.

Although Ak, a graduate student at the Food Research Institute, will soon return to Turkey, Cliver hopes to continue the studies. A major question now, he says, is why wood is so inhospitable to bacteria. He and Ak have tried unsuccessfully to recover a compound in wood that inhibits bacteria.

The first year of the study was funded by the Food Research Institute with unrestricted food industry gift funds; other funding sources are now being sought. Cliver and Ak will soon submit an article based on the research to a refereed scientific journal.

For more information, contact Dean O. Cliver at (608)263-6937.

## ***IICA Elects New Officers***

The Executive Committee of the International Ice Cream Association, the Washington, DC-based trade association representing manufacturers and distributors of ice cream and related frozen products, recently elected a new slate of officers. This action was necessitated by IICA Chairman Richard Fowlkes' retirement from Borden, Inc. Fowlkes had served as IICA Chairman for a year and a half.

Robert W. Allen, Wessanen USA Dairies, Binghamton, NY, who served previously as IICA's Vice Chairman, was elected to Chairman. Ralph Denisco, Nestle Dairy Systems, Columbus, OH, IICA's former Secretary, moved in to the Vice Chairman slot.

Elected to fill the vacant Secretary position was Michael J. Paxton of the Häagen Dazs Company, Inc., Teaneck, NJ. Robert L. Keller, H.P. Hood Inc., Boston, MA, will remain as Treasurer.

IICA is the trade association for manufacturers and distributors of ice cream and other frozen dessert products. The Association's activities range from legislative and regulatory advocacy to market research, education, and training. Its 175 member companies manufacture and distribute an estimated 85 percent of the ice cream and ice cream related products consumed in the United States.

For more information, contact Susannah Gaylord Stoll at (202)296-4250.

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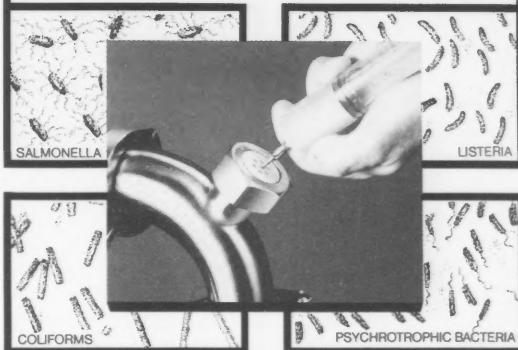
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## Legislative Experts say Meat Inspection will be a Top Food Safety Concern this Congress

Recent health hazards resulting from consumers eating food contaminated with "*E. coli*" will significantly affect the 103rd Congress' interest in meat and poultry inspection, according to senior Capitol Hill staffers speaking at a recent Animal Health Institute meeting.

Congressional aides Stan Ray, staff director for Rep. Charles Stenholm's (D-Texas) Agriculture Subcommittee on Department Operations and Nutrition, and Dale Moore, Republican staff legislative coordinator for the House Agriculture Committee, spoke at the February 10 meeting. The occasion was a quarterly meeting of the AHI Food Safety Network, which highlights food safety issues in animal agriculture. Current and potential legislative activities that could affect food safety and animal agriculture were the focus of the discussion.

The *E. coli* outbreak will most likely lead to meat and poultry inspection hearings this Congress, Ray said, with issues surrounding seafood inspection also picking up steam as a result of the added attention on inspection.

"You're also going to be hearing a lot more about integrated pest management from Capitol Hill and the Department of Agriculture," Moore added. Integrated pest management is a system where producers carefully manage conditions in livestock production facilities so animals safely regulate their own *E. coli* levels. This practice is outlined in most food animal quality assurance programs.

Likewise, Moore said, government research on meat safety will focus less on chemicals and more on contamination and handling of food before and after cooking.

"The media is hot on these issues," he said. "There seems to be a risk of becoming sick from *E. coli* contamination if food is not handled and prepared properly. Consumers, of course, want to minimize their risks, and Congress will care about that."

Moore also mentioned figures from a recent study conducted by the government's Committee on Food, Agricultural and Forestry Research that estimates that the federal government spends \$200 million on food safety research conducted by 21 separate federal entities. The study also showed that at least 50 laws govern food safety research and \$1 billion is spent by the federal government alone in regulating the food supply.

On other topics, Ray and Moore said:

- Extra-label drug use legislation originated by the American Veterinary Medical Association will be reintroduced this Congress by Rep. Charles Stenholm (D-Texas), but will face a tough fight for Congress' attention in a year of many legislative concerns. Sen. Howell Heflin (D-Ala.) has already introduced the Senate version.
- U.S. Department of Agriculture Secretary Mike Espy will soon present plans to the House Agriculture Committee for USDA reorganization. The restruc-

turing plan will be designed to improve and streamline the department, and will probably result in congressional hearings later this year.

- Animal welfare concerns will continue to be a major issue within the committee, focusing in part on the "Humane Poultry Slaughter Act."
- If bovine somatotropin is approved during this Congress, it will spark much discussion on Capitol Hill. The staffers said groups are lobbying hard both for and against BST, adding that Food and Drug Administration approval is expected soon.
- Issues about identifying minor use pesticides in food production will also draw attention. The staffers said minor use pesticide legislation could allow Congress to "set scientific law" if not approached carefully.
- Legislation for reforming the controversial Delaney anti-cancer clause of the federal "Food, Drug and Cosmetic Act" will be reintroduced this Congress, with leaders from both the House Agriculture Committee and the House Energy and Commerce Committee cosponsoring the legislation. The idea is to bridge this legislation among these two powerful committees charged with food safety issues.
- Much work remains before completion of either the North American Free Trade Agreement or the General Agreement on Tariffs and Trade. The staffers said the trade agreements are indicative of the importance now placed on environmental issues in trade agreements. They said the environmental stipulations in the GATT and NAFTA have received nearly as much attention as the trade boundary issues.
- Recent reorganization of the House Agriculture Committee's six subcommittees provides the restructuring necessary to "really accomplish some things," in this Congress, the staffers said. The reorganization resulted in more comprehensive areas of oversight--including food safety--for the respective subcommittees.

AHI represents manufacturers of animal health products -- the pharmaceuticals, vaccines and feed additives used in modern food production, and the medicines that keep pets healthy.

For more information please contact the Animal Health Institute at (703)684-0011.

## Frozen Food Predictions for 1993 and Beyond

Aquaculture, exotic meats, fat substitutes, ethnic foods and increased club store sales are trends that mark the future of the frozen food industry, according to an article in the January/February issue of *Frozen Food Report*, the national magazine of the American Frozen Food Institute.

Six experts offered their predictions in the retail, foodservice and distribution areas of the frozen food industry.

Chris Wolf, editor of *The Food Channel*, sees more exotic frozen foods hitting the market. "What we're watching right now is the use of exotic meats. Maybe we'll see frozen ostrich meat in the supermarket soon, or perhaps iguana meat," Wolf told *Frozen Food Report*.

Wolf also predicts that such exotic frozen foods as armadillo eggs will go retail. Deep fried and stuffed with cheese and vegetables, armadillo eggs are very popular in the Southwest, according to Wolf.

"Even more interesting will be the wild and crazy ice cream flavors coming up from Mexico," said Wolf. "Wild, that is, for less adventurous tastes....there is a Mexican company that is doing some very spicy flavors like chili, shrimp, alfalfa and agave worm."

While competition in the pizza category is great, pizza remains a hot frozen food item, according to Laurie Richter, director of market research, Retail Convenience Foods, Quaker Oats Company.

"Frozen pizza will always do well because consumers can have it on hand for when a pizza occasion arrives. It's midnight, you're watching a movie, and you crave pizza, so you go to the freezer. It's a market that's solid," said Richter.

Here are some other trends highlighted in the article:

- Warehouse membership clubs will continue to spring up on a national basis. Expect to see sales increase six to seven percent, reaching as high as \$78 billion by 1996.

Gourmet and specialty foods will continue to thrive. The 1991 market for specialty frozen foods was \$26 billion.

Aquaculture will turn a new generation to shellfish and seafood. Over 5,200 people were employed in aquaculture in 1991, with 2,800 raising and marketing seafood and 2,400 in supplies and services.

Foodservice will keep growing. From 1970 to 1990, sales rose 458 percent in restaurants.

Frozen retail snacks, yogurts, ice creams and sherbets will grow consistently in the next five years.

— Saul Beck, publisher, *Frozen Food Digest*

- Computerized distribution -- more companies will streamline operations by using warehouses with computer capabilities.

Trends in distribution begin and end with relationships. "In 1980 you were probably dealing with 100 carriers. Now you're dealing with four. Everyone becomes an extension of everyone else."

— Bill Filomena, BF Consultants

- Pressure on profits will cause manufacturers to proceed with increasing caution on new introductions.

In this competitiveness atmosphere, companies will move away from trade promotions and back to media advertising.

— Al Rosenfeld, founder, *Frozen Food Age*

- Ethnic foods will permeate every nook of the market, including flavors with a Thai, Cajun, Caribbean and even Hawaiian bent.

While the floor size of a supermarket has decreased and stabilized, the amount of space for the freezer will grow. "People have more money to buy frozen foods."

— David Weiss, president, Packaged Facts

*Frozen Food Report* offers industry executives in-depth feature articles and news briefs on topics that impact their businesses.

AFFI is the national trade association that has represented the interests of the frozen food industry for over 50 years. Its 550 corporate members account for approximately 90 percent of the total frozen food production in the U.S.

## Special Host Service for Visitors Available at Interpack 93

The organizers of Interpack 93, 13th International Trade Fair for Packaging Machinery, Packaging Materials and Confectionery Machinery, offer a special host service for visitors at the show. The event will take place at the fairgrounds in Dusseldorf, Germany, from May 6 - 12, 1993.

By responding to the offer as soon as possible, visitors will have the opportunity to get a guest host acting as their trade fair guide, offering the following services:

- Tour guide and assistance during the visitor's stay at the fairgrounds;
- Assistance with any language problems;
- Help in planning and setting up cultural programs.

In addition, the following service facilities can be used free of charge by the visitors taking part in this program:

- Use of a room with telephone, fax, typewriter and copy machine;
- Use of the International Lounge for refreshments and business meetings.

Rates for the visitor host program are DM 250 (approx. \$160) per day and DM 500 (approx. \$320) for two days. A 15 percent Value Added Tax (VAT) will be added to these rates.

Neither the interpack organizer (NOWEA) nor the visitor guide will be liable for actions caused by the client.

Reservations for the special host service for visitors at interpack 93 should be made as soon as possible. To sign up for this program and for further information on visiting or exhibiting at the show, contact Dusseldorf Trade Shows, Inc., 150 North Michigan Avenue, Suite 2920, Chicago, IL 60601. Telephone: (312) 781-5180; Fax: (312) 781-5188.

To make hotel and travel arrangements, contact the Dusseldorf Travel Service, 110 Painters Mill Road, Owings Mills, MD 21117-0497. Telephone: (800) 234-2929, (410) 363-1300 in Maryland; Fax: (410) 363-1816.

## Show Seminars Offer Profit — Generating Tips

Running a profitable foodservice operation is not easy given the challenges of the industry and economy. To be a successful foodservice manager in today's market requires professional skills in a variety of operational areas--from security to staff retention.

At the 74th Annual National Restaurant Association Restaurant, Hotel-Motel Show in Chicago, The Educational Foundation of the National Restaurant Association will present two days of professional development seminars for managers, owners and operators from all segments of the foodservice industry. Seminars will run Saturday, May 22, and Sunday, May 23, on the lower level of McCormick Place North, adjacent to the complimentary shuttle drop-off site. Registration fees are separate from general Show admission and include course materials and a certificate of completion from The Educational Foundation. In addition, the seminars are approved for continuing education credits by numerous industry groups and meet the education maintenance requirement of the Foodservice Management Professional (FMP) certification program.

As always, this year's 32 two-day, and full- and half-day seminars, will be led by top industry speakers and consultants. Twelve new topics are included in the schedule:

- Building Foodservice Sales and Accommodating Guests
- Communication Skills for Foodservice Managers
- Cost Control for Foodservice Managers
- Foodservice Security
- Managing Employee Performance
- Marketing and Promoting Your Operation
- Menu Magic
- Planning Effective On-the-Job Group Training
- Restaurant Computer Systems
- Retaining and Motivating Your Winning Team
- SERVSAFE Managing a Food Safety System (HACCP Update)
- Staff Planning and Recruiting

Advance registration is strongly recommended to ensure availability of space and training materials. For further information and a free brochure, contact The Educational Foundation's customer service department at 1-800-765-2122.

## Foundation Updates Training Products Catalog

The Educational Foundation of the National Restaurant Association has just released its 1993 EXCEL catalog of training products and services for foodservice managers and employees. The catalog includes several new products, including Foodservice Security training and the Building Foodservice Sales video series.

The catalog also features all existing Educational Foundation programs, including the SERVSAFE Risk Management Programs for food safety, responsible alcohol service and operational safety; Customer Service Training; and the Managing Human Resources Program. All Foundation training programs include materials for manager and employee training, and several incorporate both written and video components.

Details on Foodservice Management Professional (FMP) certification, in-house seminars, and choices for management-level, independent study are also included.

Quantity discounts and special package pricing are available for many products. In addition, National Restaurant Association members receive discounts on all purchases.

To receive a free, 30-page, full-color catalog, contact The Educational Foundation's customer service department at 1-800-765-2122.

## National Mastitis Council Produces New Video Tape

*Mastitis Prevention and Control*, a new video tape produced by the National Mastitis Council, is now available. This new video tape is ideal for one-on-one or small group presentations and is available on two video tapes for only \$49.95. Each 45-minute tape (VHS format) contains four sections — Mastitis Pathogens, Host Defense, Monitoring Mastitis, Mastitis Therapy, Recommended Milking Procedures, Postmilking Teat Dip Protocols, Milk Quality and Milking Systems. This tape is available from Nasco, 901 Janesville Avenue, Fort Atkinson, WI 53538; Phone: (414)563-2446, FAX: (414)563-8296.



# Food and Environmental Hazards to Health

## Outbreak of Pharyngoconjunctival Fever at a Summer Camp — North Carolina, 1991

On July 19, 1991, the Communicable Disease Section of the North Carolina Department of Environment, Health, and Natural Resources (DEHNR) was notified that an outbreak of acute upper respiratory illness had occurred in campers and counselors at a 4-week summer camp. Manifestations of the illness included pharyngitis, cough, fever to 104°F (40°C), headache, myalgia, malaise, and conjunctivitis. On August 2, the DEHNR was notified of a similar outbreak during a second 4-week session at the camp. The epidemiologic investigation, initiated by the DEHNR on August 7, identified the cause as pharyngoconjunctival fever (PCF) associated with infection with adenovirus type 3. This report summarizes findings from the investigation.

The first camp session (June 16-July 12) was attended by 768 boys aged 7-16 years and 300 counselors aged 17-22 years. On July 12, first-session campers returned home, but counselors remained at the camp for the second session (July 14-August 9), which 800 boys attended. Approximately 700 persons swam each day in a 1-acre, manmade pond that had a maximum depth of 10 feet. Well water was continuously pumped into the pond at multiple sites through pipes located one foot below the surface of the water; the water overflowed, through a spillway, into an adjacent river. An automatic chlorination system treated the water before it entered the pond. The pond water was turbid, and plants grew in the bottom of the pond.

During the first session, 226 persons (175 campers and 51 staff members [i.e., counselors, administrative staff, and infirmary personnel]) visited the camp infirmary because of onset of symptoms of upper respiratory illness. During the second session, 369 campers and 86 staff members visited the infirmary with the same upper respiratory manifestations noted during the first session.

A convenience sample of 181 campers from the second session and 40 staff members at the camp was interviewed. A case of PCF was defined as two of four symptoms - sore throat, fever, cough, and red eyes - lasting more than 1 day. The attack rate for those surveyed was 112 (52%) (88 campers and 24 staff members) of 216; duration of illness was unknown for five persons.

Every camper swam at least once during the 4 weeks; 158 (90%) of 175 swam one or more times per day. The attack rate for campers who swam daily (74 [48%] of 153) did not differ significantly from that for campers who swam less than once per week. The attack rate for staff who swam was higher than that for staff who did not swim. The attack rate for nonswimmers was 54% (13 of 24); for infrequent swimmers (i.e., those who swam once per week or less), was 75% (six of eight); and for frequent swimmers (i.e., those who swam three or more times per week), was 80% (four of five). Of the 221 campers and staff members interviewed, 75 (41

campers and 34 staff members) reported whether they had shared a towel with another person. Towel sharing increased the risk for illness (11 of 12 who shared versus 31 of 63 who did not).

Of viral cultures (nasopharyngeal and throat swabs) obtained from 25 ill persons, 19 grew adenovirus serotype 3. Convalescent geometric mean titers (GMT) to adenovirus for persons with cases during sessions one and two (GMT 14 and GMT 28, respectively) were each significantly higher ( $p < 0.01$ ) than the GMT of persons not meeting the case definition (GMT 6). Bacterial analysis of grab samples of water obtained from the pond yielded 80 colonies per 100 cc of fecal coliforms, 200 colonies per 100 cc of enterococcus, and 9000 colonies per 100 cc of staphylococcus. A concentrated sample of pond water drawn approximately 6 feet below the surface yielded adenovirus serotype 3. Residual chlorine was not detectable.

One week after the end of the second session the pond was drained, and most counselors left. No further outbreaks were reported following the second session; however, all subsequent sessions during the summer and fall were of maximum 1-week duration.

**Editorial Note:** The illness described in this outbreak is consistent with PCF, a syndrome caused by adenovirus (especially serotypes 3 and 7). As in previous reports, three routes (person to person, fomites, and water contact) probably transmitted virus in this outbreak.

Because of the turbidity of water in soil-bottom reservoirs, chlorination is ineffective. Turbid water contains organic molecules (e.g., humic and fulvic acids from plant decay) that react with chlorine, generating trihalomethanes (THM), especially chloroform; THM molecules have no antiviral activity. Viruses may attach or embed in suspended particles in turbid water, and these virus-containing particles precipitate into the sediment on the bottom where they may remain viable in the cooler temperatures. The virus containing particles may become resuspended when the water is agitated by swimmers. Natural bodies of water may have inherent virucidal properties possibly related to certain species of bacteria. Consequently, chlorination of natural waters may actually slow elimination of virus from the water.

Outbreaks of both bacterial and viral diseases have been linked to swimming in streams and reservoirs. Although North Carolina monitors the microbiologic quality of streams and reservoirs, it does not regulate swimming in these waters; furthermore, there are no uniformly accepted microbiologic standards for swimming in streams and reservoirs. Regulation of swimming in these streams and reservoirs could be based on a variety of parameters such as swimmer density, water turbidity, or bacterial counts (e.g., fecal coliforms, fecal streptococcus, or staphylococcus).

Morbidity and Mortality Weekly Report 5/15/92

# Federal Register

## Department of Health and Human Services

### Food and Drug Administration

#### Conference on Chemical Contaminants in Seafood; Notice of Public Meeting

**Agency:** Food and Drug Administration, HHS.

**Action:** Notice of public meeting

**Summary:** The Food and Drug Administration's (FDA) Office of Seafood in the Center for Food Safety and Applied Nutrition will hold a conference on contaminants in seafood — both marine and fresh water species. The purpose of this conference is to bring together representatives of Federal and State regulatory agencies, researchers, consumers, industry representatives, and others from throughout the United States to discuss issues relating to chemical contaminants in seafood. FDA will use the information that it obtains from the conference as part of its risk assessment, risk management, and risk communication activities involving chemical contaminants in seafood.

**Dates:** The conference will be held on Wednesday and Thursday, April 21 and 22, 1993, 8 a.m. to 5 p.m. Those interested in making oral presentations must submit one page abstracts of their presentations by March 15, 1993. Written comments and supplementary information by May 21, 1993.

**Addresses:** The conference will be held at the Washington, DC Renaissance Hotel, 999 Ninth St., NW, Washington, DC 20001-9000. Written comments and one page abstracts should be submitted to Sharon Kirksey (address below).

**For Further Information Contact:** Regarding oral presentations at the conference, written comments, one page abstracts, and all preregistration and hotel accommodation arrangements:

Sharon Kirksey, Crosspaths Management Systems, Inc., Two Wisconsin Circle, Suite 660, Chevy Chase, MD 20815, (301)654-4600, FAX (301)654-6334.

Regarding any other questions relating to the conference: Gregory Cramer, Center for Food Safety and Applied Nutrition (HFS-416), Food and Drug Administration, 200 C St., SW, Washington, DC 20204, (202)254-3888.

Those persons interested in attending this conference should call the contact person listed above to preregister. Early registration is suggested because space for the conference is limited. The closing date for preregistration is March 15, 1993. Limited onsite registration will be allowed each day at 8 a.m., provided attendance does not exceed a maximum of 250 people.

**Supplementary Information:** FDA is sponsoring a conference on chemical contaminants in seafood. The agency is holding this conference to obtain information on a broad range of issues involving chemical contaminants, including the significance of the quality of the environment from which the seafood is harvested, and the potential for harm from consuming seafood

containing contaminants at levels below those presently considered to be of concern. The Office of Seafood believes that this conference will provide it with significant new information on chemical contaminants in seafood. The meeting is not intended to establish consensus or to formulate agency policy. In addition, the conference is not intended to consider substances, such as additives and microbiological and natural toxins, that are not chemical contaminants.

Information that is gathered at the meeting and that is received in written comments will be used by FDA in risk assessment, risk management, and risk communication activities involving chemical contaminants in seafood.

The conference will include presentations on Federal, regional, and local monitoring efforts with respect to chemical contaminants in seafood. Workgroup sessions will address risk assessment, risk management, and risk communication. Because of time constraints, these workgroup sessions will occur concurrently.

Interested persons are encouraged to provide written comments on issues involving chemical contaminants in seafood, such as risk assessment, risk management, and risk communication as well as the related issues of monitoring priorities, toxicology, exposure, chemical form, breakdown products, area closures, bans, advisories, tolerances, action levels, effectiveness of warnings, and other related topics. Written comments should be submitted to Sharon Kirksey (address above) by May 21, 1993.

Part of the meeting will be devoted to presentations by conference attendees. Persons wishing to make oral presentations on any of the topics outlined above will be permitted up to 10 minutes each during the general session if they submit a one page camera-ready abstract of their presentation by March 15, 1993. Audiovisual equipment will be available for these presenters as needed. Presenters will be scheduled on a first-come, first-served basis as time for presentations permits.

State representatives, members of industry, representatives of professional and consumer groups, academics, and any other person interested in issues involving chemical contaminants in seafood are invited to attend. A nominal registration fee of \$50 will be charged to help defray expenses. In addition, a block of rooms has been reserved at the meeting site for conference attendees at government rates of \$110 single and \$130 double, inclusive of District of Columbia sales and occupancy tax.

Persons wishing to make oral presentations must submit written comments and abstracts of their presentations by March 15, 1993. All other written comments, including supplementary information developed by those wishing to make presentations, should be submitted by May 21, 1993. All written comments and abstracts should be submitted to Sharon Kirksey (address above). Audiovisual need requests, as well as any questions about the meeting, registration, and hotel reservation requests, should also be directed to Sharon Kirksey. Any other questions related to the conference should be directed to Gregory Cramer (address above).

Dated: February 12, 1993.

**Michael R. Taylor,**  
*Deputy Commissioner for Policy.*  
(FR Doc. 93-3964 Filed 2/16/93; 3:50 p.m.)

# Sanitary Design



## A Mind Set

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

### **A CHECKLIST - PART 4 - EQUIPMENT - IS IT DESIGNED TO BE SANITARY AND CLEANABLE? (CONTINUED)**

7. Are all dead ends and cross-connections between processed and unprocessed product eliminated?

Unless the piping designers have the sanitary design mind set for pipelines handling food ingredients or products they can easily end up with valve clusters, transfer points, or pump connections with a bad design and installation. Bad design is the creation of dead end points, or possible cross-connections between unprocessed product and processed product. The dead legs or dead ends allow product to accumulate with no place to go. As the product sits, bacteria may start to grow and reproduce if the conditions are right as to pH, temperature, moisture, and nutrients. Once growing and reproducing the process is rapid. Bacteria reproduce by division so that one cell becomes two, two become four, four become eight, eight become sixteen etc. Bacteria double every 15 to 30 minutes. Based on a 30-minute reproduction cycle, one bacterial cell surviving in accumulated product in a pipe line becomes one million cells in only 10 hours. If this scenario happens, the contaminated product can siphon off into good product and contaminate it as it passes to the next stage of production. Dead legs and crossovers occur most frequently around tanks and kettles located in pairs allowing alternating from one vessel to another to keep downstream processes operating. Observed in one facility were two tanks piped to one pump. The flow from each tank was controlled by hand valves. A valve was located about 6 feet from the exit point of each tank. When empty, the first tank's valve was closed and the valve from tank two was opened to the pump. The main problem was that the tank was empty but the line was not. The six feet of line between the tank outlet and

the valve would sit, for up to 4 hours at a time, packed with product at an optimum growth temperature.

Repositioning the valves so they were flush with the tank bottom allowed the line to drain after the valve closed eliminating that particular dead leg. Capped off pipe spurs left after repiping a system are another example of dead legs. These spurs are probably the most prevalent dead end than any other type in a food plant. Any place in a pipeline where product can accumulate and sit for a long period of time at a growth temperature is a potential contamination point and should be eliminated.

8. Are sharp corners, cracks, crevices and other hard-to-clean areas eliminated on your food contact equipment?

A positive answer to this question may be difficult. Processing equipment has traditionally been engineered and constructed to be functional and efficient. Not a lot of thought went into its cleanability unless it had to be USDA approved. However, today's equipment manufacturers are becoming more aware of the necessity of designing easily cleanable equipment. Maintenance of this equipment not only means adequate lubrication etc., but it also means replacing worn or damaged parts that house cracks and crevices that are difficult or impossible to clean. They then become homes for microorganism growth and continually contaminate the product as it flows past the damaged area.

Product contact surfaces in equipment should have rounded corners to prevent the product from hanging up there for long periods of time. Contact surfaces in or on the equipment should be inspected periodically for crazing and cracking. Surface cracks can become focal points for bio-film accumulation which protects microorganisms from cleaning and sanitizing compounds. Nooks, crannies, ledges, small open tube supports, slotted screw heads, exposed threads, set screws and

nonwelded metal-to-metal joints are all potential microbial growth areas and should be eliminated where possible or, better yet, not even designed into the equipment.

9. Has your organization demanded that equipment vendors provide a system to adequately and easily clean the equipment they provide to your operation?

All bid packages for food processing equipment should state that the equipment must be of sanitary design and must be able to be dismantled, cleaned, sanitized and reassembled in the length of time available to the production team or clean up crew. There are many, many pieces of equipment in our processing plants today that are extremely difficult to clean and sanitize because of their complexity and the inability of the processor to easily and quickly dismantle them. I often hear a food processing plant's sanitation crew or QC Department wish that the engineer who designed a particular piece of equipment was there to clean it. A well-designed processing line using easily cleaned and sanitized equipment reduces clean up time significantly and makes the clean up more efficient and thorough.

10. Is all product handling equipment located inside buildings or penthouses?

Normally this question is only asked of fresh fruit and vegetable producers or processors of field crops. Initial processing of products coming in from the field is often done in an open air facility. In today's environment, this practice is becoming frowned upon by FDA because both the processing equipment and the product are exposed to the elements as well as dust, bird, insect and rodent contamination. Processing steps such as destemming, washing, peeling, coring, husking etc., all make the product vulnerable to contamination. Therefore, these operations must be carried out in an enclosed area that can be controlled, washed down and kept relatively free of pests.

11. Is your equipment arranged and located to permit easy access and cleaning: at least 6" off the floor, 18" from the ceiling and 36" from the wall and other equipment?

As food plants grow and add new processes and processing equipment, the envelope or building becomes more and more crowded. Equipment is often shoehorned into place. When this happens, the cleaning of the facility can be difficult and less thorough. Access is not only needed for cleaning and sanitation but also for repair and maintenance. Part 110 of 21 CFR states that equipment should be installed and maintained to facilitate the cleaning of the equipment and of all adjacent spaces. If the cleanup crew must be comprised

of contortionists, or risks being burned by steam or hot water pipes to scrub the kettle or batch tank, then they are not going to do a very good job. Recommended distances are:

- Pumps, motors, control panels, fillers and any other piece of equipment in the process area should be at least 6 inches off the floor in order to clean under it. An alternative to elevating the equipment is to seal it to the floor so water, dirt and debris, insects etc., cannot get under it.
- Conveyors, elevators, fillers and other processing equipment should be at least 18 inches away from the ceiling.
- Unless a greater distance is required for maintenance, any processing equipment should be at least 36 inches from the walls and other pieces of processing equipment. Items such as tube and shell heat exchangers require additional space so the tubes can be pulled when necessary.

Each piece of equipment must be evaluated as to the peripheral area required for maintenance and sanitation. The numbers given here are the minimum for good sanitary design.

12. Are floor attachments minimized?

When installing equipment, the preferred method is to elevate it off the floor so it can be cleaned underneath. Bins, tanks, and catwalks should be mounted, whenever possible, from the ceiling or roof supports. However, this is not always possible. Machinery supports can be mounted so they become a part of the floor, eliminating any joints at the floor that are difficult to keep clean. Tanks that are floor mounted can sit on ball feet, provided the seismic code allows it. Larger tanks may have to sit on a pad and be sealed to it. Structural members supporting platforms should be tubular and sealed into the floor. If they have to be bolted, then a section should be cut out of the tubular support, a bolt secured inside the tube and the section welded back into place leaving a smooth surface on the outside and the bolt hidden on the inside of the support. If pads are used, they must be compatible with the conditions and they must be sealed to the floor. I observed a facility that had a stainless steel platform that was mounted on mild steel pads in a wet area. The mild steel pads were rusty and detracted from the cosmetic appearance and sanitation of the installation. They also had to be replaced since they could not stand up to the daily application of cleaning solutions to the floor. Floor attachments for equipment and structures must be designed to be compatible with the piece they are supporting as well as the environment in which they are located.

The final section of part 4 of the checklist will be completed in next month's issue.



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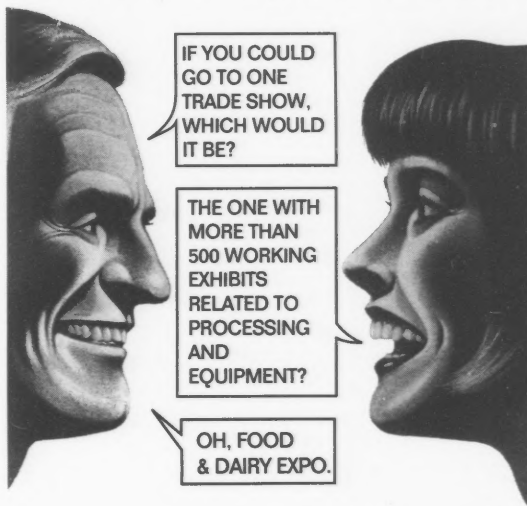
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### FOOD & DAIRY EXPO 93

# Industry Products



## Delco's Equalizer Hot Pressure Washers Make Fast Work of the Biggest Cleaning Jobs

Delco's EQUALIZER Series is a complete line of hot water pressure washers designed to handle the tough jobs. Delco Equalizers maximize cleaning power making them ideal for truck/car fleets, automotive shops, oil fields, construction sites, and an endless variety of applications.

As standard equipment, all of Delco's Equalizers are equipped with ceramic plunger pumps producing from 2.0 gpm at 1,000 psi up to 4 gpm at 2,000 psi. Adding to the performance and long life of Delco's Equalizers are stainless steel fuel and float tanks which eliminate carbon steel deterioration causing contamination of fuel tanks and water reservoirs found on competitive units. Also standard on select models are stainless steel coil wraps.

Operator safety is insured with the Equalizer's Ground Fault Circuit Interrupter (G.F.C.I.) ... unexpected power surges create no dangers for the operator. Delco Equalizers are equipped with an automatic, electronic, high-temperature shut-off switch which maintains machine temperature parameters, as well as insuring operator safety.

Clarke Industries, Inc. - St. Louis, MO

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## Highly Effective Environmentally Designed Insecticide Now Available in Volume

Diatomaceous earth and pyrethrins combine to produce a new, highly effective insecticide.

PermaGuard Agricultural Products, Inc. (PGAP), located near Salt Lake City, Utah, is marketing a new line of "earth-care" insecticides and an anti-caking agent for commercial farm animals.

The primary ingredient is food-grade quality diatomaceous earth (DE), composed of the skeletal remains of ancient microscopic plants. This special DE is combined with pyrethrum, an

extract of a certain variety of the chrysanthemum flower.

The company offers one formulation for outdoor use on agricultural crops, in gardens and nurseries; another is designed to control insect pests indoors, and another for use on household pets.

Company officials say the products have proven to be much more effective than chemical insecticides, since many strains of insects are developing resistance to chemicals. In addition, PermaGuard "kills" in a physical way—the particles of DE absorb the waxy coating from the insect's body, causing dehydration; while the pyrethrum stuns the insect by penetrating the body and attacking the nervous system, causing it to stop eating, reproducing, etc. The company believes insects will not be able to develop a resistance to this one-two punch.

The insecticide products can be applied by hand or with any common garden sprayer. As an added bonus, PermaGuard can be applied to crops and fruit trees, also ornamental flowers. Vegetables and fruits can be picked and eaten immediately after application. It can also be applied to lawns, where children and pets can play immediately.

PermaGuard insecticide products are registered with the EPA.

In February of 1967, the Applied Biological Sciences Laboratory conducted LC50 tests, which determine how much of the material would kill 50 percent of a standard group of test animals.

The laboratory issued the following statement: "As you will note in reading the report, we could not produce any toxic effects of any consequence, even when we exposed the animals to concentrations of as high as 50,000 parts per million of air. This is far in excess of the greater than 20,000 ppm referred to by the Department of Agriculture as safe...Furthermore, gross pathological determinations revealed no damage to tissues and/or organs which could be directly attributed to the compounds."

(LC50 Determinations Report, J.B. Michaelson, Ph.D. Applied Biological Science Laboratory, Inc., February 1967.)

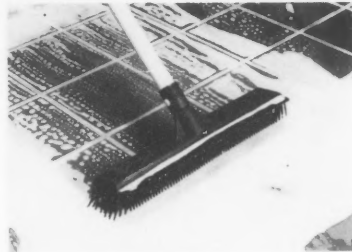
Another of the firm's products is "Fossil Shell Flour," a formulation of DE, registered with the U.S. Food and Drug Administration as an anti-caking agent. The product prevents feed from clumping during storage and digestion. It can be added to the ration of beef and dairy cattle, horses, sheep, hogs, poultry, dogs and cats and exotic animals.

PGAP enjoyed much success during 1991, assisting state and local governments with insect infestations. The firm has also been finding great acceptance for its line of products with farm supply stores, cities and county governments, as well as retail department and grocery store chains.

PGAP is selling its products in several states, and is preparing to export its products to several countries in Asia, Europe and Africa.

PermaGuard™ - Salt Lake City, UT

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## Sparta Introduces the Squeeper®

Jim Dunn, Executive Vice President of Marketing and Sales for Sparta Brush Company, has announced that the company is now distributing the Squeeper hygienic broom & brush line to the U.S. Food Processing and Food Service Industries.

The Squeeper is a unique molded synthetic rubber broom, brush, and squeegee—all in one piece. It works equally well on wet or dry floors, indoor or out; tile, concrete, terrazzo, marble, wood, even carpet.

The Squeeper is available in three Sparta Tri-zone colors: black, red and yellow, allowing users to segregate brush usage and avoid cross-contamination from one area of a restaurant or food plant to another. The polyisoprene synthetic rubber head withstands tough use, harsh cleaning chemicals, heat to +225°F, and cold to -65°F and very tough cleaning jobs. Food and other debris is easily rinsed from the Squeeper. The Squeeper comes with a two year warranty.

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

Sparta Brush Co. - Sparta, WI

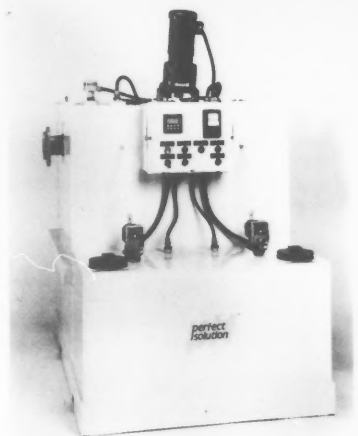
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## Dresser Industries Instrument Division Introduces the Heise® HPO Precision Pressure Transducer

Heise® HPO Precision Pressure Transducers provide +/-0.05% of span accuracy. This new transducer provides measurement coverage over pressure ranges from 5 psi through 10,000 psi. HPO Transducers are available for gauge, absolute and compound pressures as well as vacuum measurements. The HPO can be configured with either a standard 3 wire voltage output or with an optional isolated 4 wire output. Standard outputs include 0/5 Vdc, 0/10 Vdc, -5/+5 Vdc and 4/20 mA.

Dresser Industries - Newtown, CT

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### *The Off-the-Shelf Solution to Your pH Problems*

#### THE BUDA PERFECT SOLUTION IS:

- Self sustaining and compact,
- Installs quickly, connects to existing drainlines,
- Minimal maintenance,
- Polypropylene construction, corrosion resistant,
- Long life expectancy,
- Easy operator interface with self diagnosis.

The Perfect Solution™ is one of the most convenient, economical and reliable off-the-shelf pH systems available. Advanced pH controls continuously adjust pH by proportionally adding reagents to meet discharge requirements. The system requires no additional transfer pumps or controls, assuring minimal maintenance. Runs on standard 110VAC for maximum convenience and minimum installation costs.

Constructed of all polypropylene wetted materials, the Perfect Solution™ can accommodate the widest range of pH applications and has flow capacities of up to 150 GPM. The system offers a series of options including:

- permanent record documentation
- secondary containment
- pressurized discharge for non-gravity installations.

#### Applications:

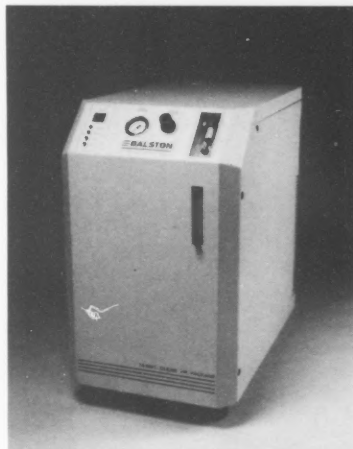
- Applications include pH adjustment for: independent facilities with chemical problems
- large facilities with segregated waste problems where pH management is done in more than one location
- plating shops or other similar operations with waste processing and waste storage problems
- laboratory waste
- etching operations
- the semi-conductor industry
- consulting firms or environmental engineers responsible for equipment specification

The Perfect Solution™ is manufactured by BUDA Equipment and Controls, Inc., one of the foremost fabricators of pollution control systems

and waste treatment equipment. The company was founded in 1983, and its corporate headquarters and manufacturing facilities are located in East Syracuse, New York.

Buda Equipment and Controls, Inc. -  
E. Syracuse, NY

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### *Portable, Self-Contained FT-IR Purge Gas Generator Produces Ultra Dry, Purified CO<sub>2</sub>-Free Purge Gas for FT-IR Spectrometers!!*

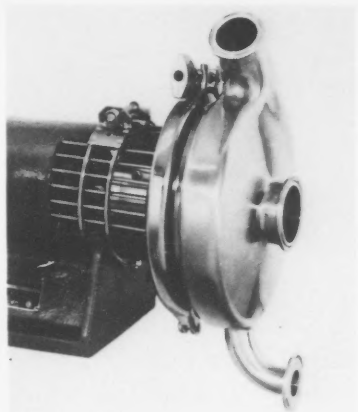
Replace costly, inconvenient nitrogen Dewars and cylinders with a new Self Contained FT-IR Purge Gas Generator now available from Balston Inc.

The Balston Model 74-5041 Self Contained FT-IR Purge Gas Generator is designed to produce a purified purge gas and air bearing gas supply from compressed air. The Generator provides FT-IR's with a continuous supply of CO<sub>2</sub> - free compressed air at less than -100°F pressure dew point with no suspended impurities larger than 0.1 µm. The Balston unit improves the signal-to-noise ratio and offers cleaner backgrounds in a shorter period of time than Dewars or cylinders. Typical payback is less than one year!

The Generator is designed for installation in laboratories. It is compact, easy to install, and is specifically designed for quiet operation. Standard features for the Balston Model 74-5041 Self-Contained FT-IR Purge Gas Generator include a new, state-of-the-art, oil-less compressor, aftercooler, liquid and solids removal filters, heatless desiccant dryer, and pressure and flow regulators.

Balston, Inc. - Haverhill, MA

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### *Threat of Contamination Eliminated by Tri-Clover's WFI Pump*

The Tri-Clover WFI centrifugal pump, with pharmaceutical-type seals, virtually eliminates the threat of contamination in handling pyrogen-free Water For Injection.

Even though the Tri-Clover WFI pumps were originally manufactured for pharmaceutical applications, the pump is suitable wherever pure, sterile deionized or pyrogen-free water is used, either for human consumption, as process water, or as a cleansing or rinsing agent.

The WFI pumps are manufactured of 316L stainless steel, and are polished to an equivalent of 150 grit, with polishes up to 320 grit and/or electro-polish available. The pumps accommodate maximum flow rates of 200-700 GPM, and are CIP-able. Optional 90° or 45° discharge casing drain ensures complete draining of lines.

The WFI pump is available in three seal styles: 1) the Tri-Clover "DG," a balanced seal that can handle up to 18 megohms of water and can be used where no sterile barrier is required; 2) the John Crane Double 9 seal, for use in applications where a sterile barrier is required; 3) the Chesterton 241 seal, also for use where a sterile barrier is required. Both the John Crane Double 9 and Chesterton 241 seals resist deterioration caused by pyrogen-free water, and provide greater protection from airborne contamination. Seal flush piping is also available as an option for sterile barrier applications. A back-shrouded impeller option insures positive pressure on the stuffing box to prevent entrance of external contaminants through the seal face.

Headquartered in Kenosha, Wisconsin, Tri-Clover, Inc. is a leading manufacturer of sanitary stainless steel valves, pumps and fittings, as well as flow control, batch/weight and Clean-In-Place (CIP) systems. Founded in 1919, Tri-Clover, Inc. is now a member of the Alfa-Laval Group, a \$3 billion multi-national organization headquartered in Sweden that operates more than 160 companies in 130 countries around the world.

Tri-Clover, Inc. - Kenosha, WI

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### **New Compact High Pressure Washer**

The new HDS 600C and HDS 700C cold-hot-steam high pressure washers are designed to save time and money. They feature infinitely variable operating pressure, water volume, and temperature control and precise chemical metering.

Each unit offers: A + 90% fuel efficient burner system for maximum fuel savings; complete machine shut-off at the trigger gun for safe and convenient operation; direct drive motor (no belts to wear or replace); removable corrosion resistant detergent tank; and a durable, impact and corrosion resistant cover for maximum protection.

The HDS 600C and 700C are part of a complete line from Kärcher, the world's largest manufacturer of high-pressure cleaning equipment.

**Alfred A. Kärcher, Inc. -  
West Paterson, NJ**

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### **New Comprehensive Guide to Turbidity Measurement**

A new 30-page catalog, "The Standard in Turbidity Measurement," provides a comprehensive overview of Hach process, laboratory and portable turbidimeters. The catalog covers many technical aspects of turbidity, laboratory measurement techniques, calibration procedures, preparing Formazin standards as well as selecting the appropriate instrument based upon application requirements.

Featured in this catalog is the new 2100P Portable Turbidimeter. This instrument combines the advantages of microprocessor-controlled key functions and Hach's patented Ratio optics to bring greater accuracy, sensitivity and reliability to field testing.

Also included is information about Hach's 1720C Low Range Turbidimeter, featuring low maintenance and a NEMA-4X control unit enclosure. The economical 1720C's sensitivity to low turbidity levels (down to 0.0001 NTU) helps meet stringent regulatory standards.

**HACH Co. - Loveland, CO**

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### **Bioremediation Quickly Restores a Food-Waste Contaminated Lagoon to Recover its Natural Splendor**

Thick, greasy globules of chicken fat, routinely discharged by a Canadian poultry processing plant turned a beautiful nearby lagoon into chicken soup which resulted in foul (fowl!) odors and a despoiled, contaminated site. Local residents and environmental officials were demanding action. Clearly, a better way to treat the process wastewater was required.

Sybron Chemicals Inc.'s naturally occurring, selectively adapted microbes were introduced into the lagoon. The bacteria, which produce enzymes to break down the hydrocarbons in the wastewater of the lagoon, worked to restore the lagoon to its clear, natural state in just 23 days.

Rapid reclamation of the lagoon was accomplished in large part by the bioaugmentation

method developed and employed by Sybron Chemicals. In this process, naturally occurring bacteria are isolated and selectively adapted to provide superior degradation and kinetic properties that result in faster, more efficient biological treatment systems. These cultures are then blended together to form standard blends which can then be introduced at the site or stored in a controlled environment, ready for future use.

**Sybron Chemicals Inc. -  
Birmingham, N.J.**

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### **Conductivity Instrumentation Described in New Brochure**

A complete conductivity instrumentation product line, described in a new photo-illustrated brochure, is available from Great Lakes Instruments, Inc. Operating principles and diagrams explain GLI's contacting and electrodeless conductivity measurement technologies. Resistivity measurement is also discussed. Featured products in Bulletin SB-6 include microprocessor-based electrodeless conductivity analyzers and transmitters, basic and full-featured menu-driven cooling water controllers, boiler blowdown controllers, and condensate monitors. Various models offer a variety of enclosure styles and analog meter or digital LCD displays.

Great Lakes Instruments, Inc., is a leading specialist in the measurement and control of pH, ORP, conductivity, flow, level, dissolved oxygen and turbidity for the process, power, water and wastewater industries. It is a member of the Schott Group (Germany), which employs more than 17,700 people worldwide and has sales exceeding \$1.5 billion. The Schott Corporation (New York) is the Group's holding company in North America, where its ten subsidiaries employ nearly 2,000 people for the manufacture and distribution of instruments, special glass, systems and components for industrial and highly technological applications, and crystalware.

**Great Lakes Instruments, Inc. -  
Milwaukee, WI**

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# Synopsis of Papers for the 80th Annual Meeting

The following are abstracts of papers to be presented at the 80th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc., to be held in Atlanta, Georgia, August 1-4, 1993.

**OCCURRENCE OF FALSE POSITIVE TESTS FOR STAPHYLOCOCCAL ENTEROTOXIN USING THE TECRA KIT**, R.H. Deibel\*, P.F. Bina, W.L. Rose, K.A. Hedlof, R.F. Reiser, Deibel Laboratories/Toxin Technology, 7165 Curtiss Avenue, Sarasota, FL 34231

Ninety-five of 147 raw, in-process and finished (heated shelf-stable or cold packed) pickles tested positive for staphylococcal enterotoxin using the TECRA kit. Some brines of various ages and pickle relish were also positive for enterotoxin using TECRA. All samples were negative for toxin using the SET-EIA KIT. All samples were negative for thermostable nuclease. Thirty-five of the TECRA positive samples were negative for toxin using the FDA microslide procedure. Some other plant foods gave a positive TECRA test. Subsequently, it was demonstrated that the false-positive TECRA tests were due to the natural peroxidase in the plant foods thus mimicking the peroxidase conjugate in the test. In contrast, the SET-EIA conjugate is a phosphatase. This study indicated that extreme care must be exercised when interpreting results obtained with the TECRA kit.

**TIME/TEMPERATURE RESPONSE OF ACID PHOSPHATASE IN COOKED BROILER BREAST USING A FLUOROMETRIC ASSAY**, C.E. Davis\*, Research Food Technologist, W.E. Townsend, and C.E. Lyon, USDA, ARS, Russell Research Center, P. O. Box 5677, Athens, GA 30613

U.S. Department of Agriculture, Food Safety and Inspection Service requires uncurd poultry to be heat processed to 160° F/71.1° C if labeled fully cooked. Breast acid phosphatase (ACP) activity at five end-point temperatures (EPT) and three dwell times was measured by a fluorometric assay. The experiment was replicated two times with triplicate ACP instrument readings. A time/temperature curvilinear decrease in mean (N=12) ACP activity occurred. There were time/temperature differences ( $P < .05$ ) among EPT's and dwell times. EPT means  $\pm$  S.E. for ACP activity (mU/Kg) at 62.8, 65.6, 68.3, 71.1, 73.9° C, and 0, 15, 30 min dwell were as follows: 11915.3  $\pm$  98.2, 5387.4  $\pm$  193.3, 1669.5  $\pm$  24.0, 706.6  $\pm$  27.0, 573.2  $\pm$  23.0; 3582.8  $\pm$  66.6, 1191.9  $\pm$  43.9, 443.2  $\pm$  22.6, 388.6  $\pm$  13.9, 318.7  $\pm$  22.4; 1881.5  $\pm$  42.6, 584.28  $\pm$  17.1, 346.2  $\pm$  11.9, 298.6  $\pm$  9.64, 289.9  $\pm$  21.6, respectively. This procedure provides a rapid (3 min instrument time), sensitive analytical method for quality assurance process control technicians or regulatory analysts to monitor EPT in cooked poultry.

**CHARM PESTICIDE TEST: RAPID SCREENING METHOD FOR THE DETECTION OF ORGANOPHOSPHATE AND CARBAMATE PESTICIDES FOR WATER, DAIRY PRODUCTS, FRUITS, VEGETABLES AND OTHER FOOD PRODUCTS**, Steven Saul\*, E. Zomer and S. E. Charm, Charm Sciences, Inc., 36 Franklin Street, Malden, MA 02148-4120

A rapid screening method has been developed for the single test detection of cumulative organophosphate and carbamate pesticides in water and food materials. Results are measured using the

Charm II system. In water, no extraction is required and assay time is 15 min. For raw/pasteurized milk a pretreatment step increases assay time to 20 min. Other food materials require an additional simple two phase extraction and drying procedure of about 15 min. Limit of detection in water for more than 20 representative pesticides range from 0.1 to 20 ppb. For some organophosphates the natural active metabolites that are found in the field are detected with greater sensitivity than the parent compound. For example, guthionoxon, malaoxon, methyl paraoxon, and paraoxon are detected in water at 0.1 ppb, 0.7 ppb, 0.1 ppb and 0.3 ppb, respectively. These are the active metabolites to guthion, malathion, methyl parathion and parathion, respectively. Sensitivity of the test may be adjusted by dilution of the matrix.

For water, a survey of bottled water and city water samples were found negative with ethion at 2.5 ppb used as the control detection level. Market milk samples and raw milk samples over a two week period were tested and using a control point of 30 ppb ethion all samples were detected as negative. Various plain yogurts and fruit yogurts from various supermarkets were tested. All plain yogurts tested negative. For fruit yogurts 4 samples out of 20 were positive with the control point set at 100 ppb ethion. Apples were tested from local orchards and supermarkets. Using 100 ppb ethion as the control point there were 4 positives out of 23 apples tested.

Confirmation of positive samples is being performed using HPLC. One yogurt sample demonstrated 4 positive peaks by HPLC analysis. Further HPLC confirmation and confirmation by HPLC and mass spectrophotometry is ongoing.

**COMPARISON OF AFLATOXIN PRODUCTION IN MODIFIED CZAPEK'S SOLUTION AGAR, AFPA, AND DYE MEDIA**, R.A. Hart, Ph.D. candidate and D.Y.C. Fung, Kansas State University, Department of Animal Science and Industry, Call Hall, Manhattan, KS 66506-1600

Aflatoxins are potent mycotoxins and carcinogens produced by strains of *Aspergillus flavus*, *A. nomius*, and *A. parasiticus*. These mycotoxins continue to be a public health hazard due to their high toxicity and the ubiquitous nature of aspergilli in the environment as well as in the food chain. Modified Czapek's Solution Agar and *Aspergillus flavus* / *A. parasiticus* agar (AFPA) have been used for screening of potential aflatoxin producing aspergilli. However, these agars are time consuming to prepare. Recently we developed simple basic violet agars such that only species of *Aspergillus* and/or *Penicillium* will grow. We compared all of these agars for the ability to grow aflatoxin-producing strains of aspergilli. Veratox™ test kits (NEOGEN) and Ultraviolet light were used to screen for aflatoxin.

Representative strains known from mycotoxin investigations at the Northern Regional Research Laboratory to be either aflatoxin-positive (NRRL 465, NRRL 2999, NRRL 3251, NRRL 5520) or aflatoxin-negative (NRRL 1957) as well as various aspergilli isolated from contaminated food & feed were examined. All three types of agar were suitable for growing toxin-producing strains of aspergilli, although preparation of the AFPA or dye media was easier and less time consuming than preparation of the Modified Czapek's Solution Agar.



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### PROFESSIONAL DEVELOPMENT GROUPS

#### **APPLIED LABORATORY METHODS**

Jim Dickson, Chair  
Dept. of Food Science  
2312 Dairy Industry Building  
Iowa State University  
Ames, IA 50011  
515-294-4733

#### Members:

Sidney Barnard	David Baker
Mary Ann Barron	Harold Bengsch
Dee Benesh	Rusty Bishop
Jeff Bloom	Robyn Boling
Richard Brazis	Michael Brodsky
Jerry Bushong	Eugene Butzer
Helen Carr	James Chambers
Shirley Charm	Stanley Charm
Charles Davidson	K. H. Deah
James Detolla	Ann Draughon
Gordon Finley	Sonya Gambrel
Tom Graham	Janine Hansen
Judy Heady	Gerald Hein
Gary Houghtby	Bonnie Humm
Connie Humphrey	Leon Jensen
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Wayne Knudson	Laure Larkin
Les Latchford	Duncan Macaulay
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C. Lewis Terrill  
Gary Trimmer  
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Robert Zail  
Ed Miller

Greg Carmichael  
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Norman Schuring  
James DeTolla  
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#### AUDIO VISUAL LIBRARY

Ronald Schmidt, Chair  
Food Science and Human Nutrition Department  
University of Florida  
Gainesville, FL 32611  
904-392-8003

#### Members:

Tom Gilmore  
P. C. Vasavada  
Gloria Swick

#### BAKING INDUSTRY SANITARY STANDARDS

Martyn Ronge, Chair  
Martyn Ronge and Associates  
2400 Farnsworth Lane  
Northbrook, IL 60062  
708-272-7626

#### Members:

Everett Johnson  
Perry Fisher  
Tom Gilmore  
Shurla Dickinson

#### COMMUNICABLE DISEASE AFFECTING MAN

Frank Bryan, Ph.D., Chair  
8233 Pleasant Hill Road  
Lithonia, GA 30058  
404-760-1569

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#### DAIRY QUALITY AND SAFETY

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USFDA  
200 C Street, SW  
Washington, DC 20204  
202-205-9175

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#### ENVIRONMENTAL ISSUES IN FOOD SAFETY

Roy Carawan, Chair  
Box 7624  
N.C. State University  
Raleigh, NC 27695  
919-515-2956

#### FOOD SAFETY NETWORK

Robert Clarke  
Agriculture Canada  
Health and Animals Lab  
110 Stone Road, West  
Guelph, Ontario, Canada N1G 3W4  
(519)822-3300

#### FOOD SERVICE SANITATION

Charles Felix  
Charles Felix Associates  
P. O. Box 1581  
Leesburg, VA 22075  
703-777-7448

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Bennett Armstrong  
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#### MEAT SAFETY AND QUALITY

John Cerveny  
Oscar Mayer Foods Corp.  
P. O. Box 7188  
Madison, WI 53707-7188  
(608)241-3311 ext. 4056



**POULTRY SAFETY AND QUALITY**

Stan Bailey  
 USDA, ARS, Russell Research Center  
 P. O. Box 5677  
 Athens, GA 30613  
 (404)546-3356

**SANITARY PROCEDURES**

Joe W. Hall, Chair  
 SC State Board of Health  
 2600 Bull Street  
 Columbia, SC 29201  
 803-734-4970

**Members:**

Robert Ryan	Norris Robertson, Jr.
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Randy Chloupek	A. Keith Glover
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**SEAFOOD SAFETY AND QUALITY**

Cameron Hackney  
 Department of Food Science  
 Virginia Polytech Institute and State University  
 Blacksburg, VA 24061

**Members:**

John Kvenberg	Roy Martin
Mike Moody	Ranzell Nickelson
Bob Price	Donn Ward

**TASK FORCES****AWARDS**

Damien A. Gabis, Chair  
 Silliker Laboratories  
 900 Maple Drive  
 Homewood, IL 60430  
 708-957-7878

**CONSTITUTION AND BY-LAWS**

Ronald Case, Chair  
 Kraft USA  
 1701 W. Bradley Avenue  
 Champaign, IL 61821  
 217-378-2035

**Members:**

Charlie Price	Leon Townsend
---------------	---------------

**FINANCE**

Damien A. Gabis, Chair  
 Silliker Laboratories  
 900 Maple Drive  
 Homewood, IL 60430  
 708-957-7878

**LONG RANGE PLANNING**

Damien A. Gabis, Chair  
 Silliker Laboratories  
 1304 Halsted Street  
 Homewood, IL 60411  
 708-756-3210

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Ron Case	John Cerveny
Warren Clark	Ruth Fuqua
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Robert Marshall	Mike Stringer
Michael P. Doyle	Harold Bengsch
C. Dee Clingman	Ann Draughon
Steven Halstead	Margie Marble
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**SPEAKER FUNDING SYMPOSIA**

Paul Martin  
 Educational Foundation of the NRA  
 2250 S. Wacker Drive, Suite 1400  
 Chicago, IL 60606  
 312-782-1703

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Steven Halstead	

**UNDERGRADUATE RECOGNITION**

P. C. Vasavada, Chair  
 Animal and Food Science Department  
 College of Agriculture  
 University of Wisconsin  
 River Falls, WI 54022  
 715-425-3150

**Members:**

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John Bruhn	Ron Schmidt
Anand Rao	Linda Yu
Dan Fung	

**COUNCIL OF AFFILIATES**

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 502-426-6455

**FOUNDATION**

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 12013 Cantrell Dr.  
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# IAMFES

## Preliminary Program

### *80th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc.*

*In Cooperation with the Georgia Association of Food and Environmental Sanitarians*

**Stouffer Waverly Hotel, Atlanta, Georgia  
August 1-4, 1993**

#### REGISTRATION TIMES

Saturday, July 31 ..... 12:00 - 5:00 p.m.  
Sunday, August 1 ..... 12:00 - 7:00 p.m.  
Monday, August 2 ..... 8:00 a.m. - 4:00 p.m.  
Tuesday, August 3 ..... 8:00 a.m. - 4:00 p.m.  
Wednesday, August 4 ..... 8:00 a.m. - 12:00 p.m.

#### EXHIBITOR HOURS

Sunday, August 1 ..... 7:45 - 10:00 p.m.  
(Following the Opening Session)  
Monday, August 2 ..... 9:30 a.m. - 3:30 p.m.  
Tuesday, August 3 ..... 9:30 a.m. - 3:30 p.m.

#### PRE-MEETING WORKSHOPS\* (See page 374 for more information)

#### QUALITY ASSURANCE IN MICROBIOLOGY

Instructor: Michael Brodsky

Friday, July 30 - 1:00 - 5:00 p.m.  
Saturday, July 31 - 8:30 a.m. to 5:00 p.m.

and

#### RAPID MICROBIOLOGICAL METHODS

Instructor: Daniel Y.C. Fung and James Dickson

Friday, July 30 - 1:00 - 5:00 p.m.  
Saturday, July 31 - 8:30 a.m. to 5:00 p.m.

\*Separate Workshop Fee Applies

#### IAMFES BOARD MEETING

Saturday, July 31 ..... 8:00 a.m. to 5:00 p.m.  
Tuesday, August 3 ..... 7:00 a.m. to 8:30 a.m.  
Thursday, August 5 ..... 7:00 a.m. to 9:00 a.m.

#### COMMITTEE/PROFESSIONAL DEVELOPMENT GROUP MEETINGS

You need not be a member to attend.

#### SUNDAY, AUGUST 1

6:45 - 10:00 a.m. Affiliate Council  
10:00 - 11:00 a.m. Dairy Quality and Safety (Farm Section)  
10:00 - 11:00 a.m. Audio Visual Library  
10:00 - 11:00 a.m. Baking Industry Sanitary Standards  
10:00 - 11:00 a.m. Past Presidents Advisory  
10:00 a.m.-5:00 p.m. Communicable Diseases Affecting Man  
11:00 - 12:00 a.m. Poultry Safety and Quality  
11:00 - 12:00 a.m. Dairy Quality and Safety (Plant Section)  
11:00 - 12:00 a.m. Foundation Fund  
11:00 - 12:00 a.m. Nominating  
1:30 - 2:30 p.m. Sanitary Procedures  
1:30 - 3:30 p.m. Seafood Safety and Quality  
1:30 - 5:00 p.m. Meat Safety and Quality  
1:30 - 2:30 p.m. Dairy, Food & Environmental Sanitation  
1:30 - 3:30 p.m. Applied Laboratory Methods  
1:30 - 3:00 p.m. Food Sanitation  
2:30 - 3:30 p.m. Environmental Issues in Food Safety  
2:30 - 3:30 p.m. Journal of Food Protection Management  
3:00 - 5:00 p.m. Food Safety Network  
4:00 - 6:00 p.m. Program Advisory

#### WEDNESDAY, AUGUST 4

12:00 - 4:00 p.m. Program Advisory (members only)

## SUNDAY EVENING, AUGUST 1

### OPENING SESSION

- 7:00 **Welcome to the 80th Annual Meeting** - M. DOYLE, President of IAMFES and R. BRACKETT and J. FRANK, Co-Chairpersons of the Local Arrangements Committee
- 7:15 **Introduction of the Ivan Parkin Lecture** - H. BENGSCHE, President-Elect of IAMFES
- 7:20 **"The Challenge of Epidemiology in Food Protection"** - M. POTTER, Assistant Director for Bacterial and Mycotic Diseases at the Centers for Disease Control, National Center for Infectious Disease, Atlanta, GA.
- The Ivan Parkin Lecture is sponsored by the IAMFES Foundation Fund and is supported by the Sustaining Members.
- 8:00 **Cheese and Wine Reception** - Held in the Exhibit Hall. An opportunity to greet old friends, make new ones and view the excellent technical displays.

## MONDAY MORNING, AUGUST 2

### **LISTERIA MONOCYTOGENES: CURRENT ISSUES AND CONCERNS SYMPOSIUM**

*Sponsored by the International Life Sciences Institute*  
Convener: G. EVANCHO

- 8:10 **Listeria monocytogenes: State of the Science** - J. ROCOURT, Institut Pasteur, Paris, France
- 8:30 **Industry Perspectives on Listeria monocytogenes in Foods: Raw Meat and Poultry** - J. MARSDEN, American Meat Institute, Washington, DC
- 8:50 **Industry Perspectives on Listeria monocytogenes in Foods: Manufacturing and Processing** - D. BERNARD, National Food Processors Association, Washington, DC
- 9:10 **Industry Perspectives on Listeria monocytogenes in Foods: Retail Distribution** - C. ADAMS, Grocery Manufacturers of America, Washington, DC
- 9:30 **Regulatory Concerns of the U. S. Department of Agriculture** - A. MCNAMARA, U.S. Department of Agriculture, Washington, DC
- 9:50 **Regulatory Concerns of the U. S. Food and Drug Administration** - J. MADDEN, U. S. Food and Drug Administration, Washington, DC

- 10:10 Break
- 10:30 **Epidemiology of Listeriosis in the United States** - A. SCHUCHAT, Centers for Disease Control and Prevention, Atlanta, GA
- 10:50 **European Perspectives on Listeria monocytogenes** - P. TEUFEL, BGA Institute for Veterinary Medicine, Berlin, Germany
- 11:10 **Status of Listeria monocytogenes in the Canadian Food Industry** - A. LAMMERDING, Agriculture Canada, Guelph, Ontario, Canada
- 11:30 **Listeria monocytogenes and Food: the UK Approach** - D. ROBERTS, Public Health Laboratory Service, London, UK
- 11:50 **Australian Perspectives on Listeria monocytogenes** - M. EYLES, CSIRO Food Research Laboratory, North Ryde, New South Wales, Australia

### TECHNICAL SESSION ANALYTICAL METHODS

Co-Conveners: R. NICKELSON and N. STERN

- 8:30 **The value of a DNA probe - HGMF procedure to detect Shigella/enteroinvasive E. coli and VTEC in food** - E. TODD, J. MacKenzie and C. Munro, Health and Welfare Canada, Ottawa, Ontario, Canada
- 8:45 **Development of a simple Reverse Transcriptase-Polymerase Chain Reaction method for the Detection of Enteric Viruses in Oysters** - L. JAYKUS, R. DeLeon and M. Sobsey, University of North Carolina, Chapel Hill, NC
- 9:00 **Automated ELISA detection of Listeria from Meat and Poultry Products using the VIDAS System** - J. BAILEY and N. Cox, U. S. Department of Agriculture, ARS, Russell Research Center, Athens, GA
- 9:15 **Use of Immunomagnetic Capture on Beads to Recover Listeria from Environmental Samples** - B. JACKSON, B. Mitchell, J. Milbury and A. Brookins, VICAM, Somerville, MA
- 9:30 **Identification of Factors Involved in the CAMP Reaction for Listeria monocytogenes** - R. MCKELLAR, Agriculture Canada, Ottawa, Ontario, Canada
- 9:45 **Enhanced Recovery and Isolation of Salmonella using a Novel Culture and Transfer Device** - K. ECKNER, W. Dustman, A. Rys-Rodriguez, J. Myrick and R. Smittle, Silliker Laboratories, Chicago Heights, IL
- 10:00 Break

- 10:20 **Enzyme Immunoassay for the Detection of Staphylococcal Thermonuclease in Foods** - P. BINA, R. Deibel, K. Hedlof, W. Rose and R. Reiser, Toxin Technology/Deibel Laboratories, Sarasota, FL
- 10:35 **Occurrence of False Positive Tests for Staphylococcal enterotoxin using the TECRA kit** - R. DEIBEL, Deibel Laboratories/Toxin Technology, Sarasota, FL
- 10:50 **Time/temperature Response of Acid Phosphatase in Cooked Broiler Breast using a Fluorometric Assay** - C. DAVIS, W. Townsend and C. Lyon, U.S. Department of Agriculture, ARS, Russell Research Center, Athens, GA
- 11:05 **Charm Pesticide Test: Rapid Screening Method for the Detection of Organophosphate and Carbamate Pesticides for Water, Dairy Products, Fruits, Vegetables and Other Food Products** - S. SAUL, E. Zomer and S. Charm, Charm Sciences, Inc., Malden, MA

**WATER REUSE IN ANIMAL  
PROCESSING PLANTS SYMPOSIUM**  
Co-Conveners: R. CARAWAN  
and K. RAJKOWSKI

- 8:30 **Water Use and Reuse in Animal Processing Plants** - R. CARAWAN, North Carolina State University, Raleigh, NC
- 8:50 **FSIS Perspective of Water Reuse (USDA's Regulations)** - M. ROSE, U. S. Department of Agriculture, Washington, DC
- 9:20 **EPA's Definitions/Regulations of Water** - A. DUFOUR, Environmental Protection Agency, Cincinnati, OH
- 9:40 **Drinking Water Associated with Waterborne Disease: Hemorrhagic Colitis** - E. RICE, Environmental Protection Agency, Cincinnati, OH
- 10:00 Break
- 10:25 **Mechanical Disinfection of Reuse Water in Poultry Plants** - C. HUXSOLL, U. S. Department of Agriculture, Albany, CA
- 10:45 **Chemical Disinfection of Reuse Water in Poultry Plants** - L. TSAI, U. S. Department of Agriculture, Albany, CA
- 11:15 **Filtration and Reconditioning of Process Water for Reuse** - B. SHELDON, North Carolina State University, Raleigh, NC
- 11:35 **Microbial Safety of Use of Reconditioned Plant**

**Water** - K. RAJKOWSKI, U. S. Department of Agriculture, Philadelphia, PA

- 11:55 **Industry's Point of View for Use of Reconditioned Plant Water** - D. ATWOOD, American Meat Institute, Washington, DC

**FUMONISIN SYMPOSIUM**  
Co-Conveners: L. BULLERMAN  
and A. DRAUGHON

- 8:30 **Fumonisin Production by Toxicogenic Strains of *Fusarium moniliforme* and *Fusarium proliferatum* in Corn** - C. BACON and P. Nelson, U. S. Department of Agriculture, ARS, Russell Research Center, Athens, GA
- 9:00 **Toxicity and Role of Fumonisin in Animal Diseases and Human Esophageal Cancer** - W. NORRED, U. S. Department of Agriculture, ARS, Russell Research Center, Athens, GA
- 9:30 **Mechanisms of Fumonisin Toxicity and Carcinogenesis** - R. RILEY, U. S. Department of Agriculture, ARS, Russell Research Center, Athens, GA
- 10:00 Break
- 10:20 **Methods for Detection and Quantitation of Fumonisin in Corn and Cereal Products** - L. RICE and P. Ross, U. S. Department of Agriculture, National Veterinary Services Laboratory, Ames, IA
- 10:50 **Incidence and Levels of *Fusarium moniliforme*, *Fusarium proliferatum* and Fumonisin in Corn Based Foods and Feeds** - L. BULLERMAN and W. Tsai, University of Nebraska, Lincoln, NE

**SCIENTIFIC POSTER SESSION**  
Convener: B. LANGLOIS

Posters will be on display from  
8:30 a.m. to 3:30 p.m. on Monday and Tuesday  
Authors Present 10:00 a.m. — Noon,  
Tuesday, August 3, 1993

**Evaluation of different media for recovery of thermally-injured *Escherichia coli* O157:H7** - N. AHMED and D. Conner, Auburn University, Auburn University, AL

**Fate of Enterohemorrhagic *Escherichia coli* O157:H7 in Unpasteurized Apple Cider With and Without Preservatives** - T. ZHAO, M. Doyle and R. Besser, University of Georgia, Griffin, GA

**Storage Temperature and Heat Resistance of *Escherichia coli* O157:H7 in Ground Beef Patties** - T. JACKSON, G.



Acuff and R. Miller, Texas A&M University, College Station, TX

**Growth of *Escherichia coli* O157:H7 in Ground, Roasted Beef as Affected by pH, Acidulant and Temperature** - U. ABDUL-RAOUF, L. Beuchat, and M. Ammar, University of Georgia, Griffin, GA

**Competitive Growth in Biofilm of *L. monocytogenes* with Cultures Isolated from a Meat Plant Environment** - D. JEONG and J. Frank, Kon-Kuk University, Seoul, Korea

**Interactions of Diacetate with Nitrite, Lactate, and Pediocin on Viability of *Listeria monocytogenes* in Turkey Slurries** - J. SCHLYTER, J. Loeffelholz, K. Glass, A. Degnan and J. Luchansky, Food Research Institute, Madison, WI

**Microbial Inhibition of *Listeria monocytogenes* by other Bacteria in a Commercial Milk and a Buffer Broth System** - C. MURDOCK and K. Chung, Memphis State University, Memphis, TN

**Interaction of Citric Acid Concentration and pH on the Kinetics of *Listeria monocytogenes* Inactivation** - M. GOLDEN and R. Buchanan, USDA, ARS, Eastern Regional Research Center, Philadelphia, PA

**Comparative Growth Rates of *Listeria monocytogenes* on Raw and Cooked Muscle Tissues** - T. SHERMAN and M. Harrison, University of Georgia, Athens, GA

**Growth of *Listeria monocytogenes* at Fluctuating Temperatures** - I. WALLS, R. Goins, K. Rajkowksi and R. Buchanan, USDA, ARS, Eastern Regional Research Center, Philadelphia, PA

**Comparison of Methods for Isolation of *Listeria* from Rainbow Trout (*Oncorhynchus mykiss*)** - B. ANTHONY, F. Draughon, M. Denton and T. Wei, University of Tennessee, Knoxville, TN

**Enhanced Recovery and Isolation of *Listeria* using a Novel Culture and Transfer Device** - R. SMITTLE, K. Eckner, W. Dustman, A. Rys-Rodriguez, and J. Myrick, Silliker Laboratories, Chicago Heights, IL

**Comparison of Oxygen Scavengers for Their Ability to Enhance Resuscitation of Heat-injured *Listeria monocytogenes*** - J. PATEL, C. Hwang, M. Doyle, L. Beuchat and R. Brackett, University of Georgia, Griffin, GA

**Advanced Genotypic Typing of *Listeria monocytogenes* using Clamped Homogeneous Electric Fields (CHEF) Electrophoresis** - R. BROSCHE and J. Luchansky, Food Research Institute, Madison, WI

**Determining Differences in Microbial Growth Rates using Linear Regression** - D. SCHAFFNER and R. Dogra, Rutgers University, New Brunswick, NJ

**Acid enhancement of *Clostridium perfringens* Sporulation** - D. WRIGLEY, Mankato State Univ., Mankato, MN

**Thermal Resistance of Spores of Non-proteolytic Type B and Type E *Clostridium botulinum*** - B. EBLEN, V. Juneja, S. Palumbo, A. Williams and A. Miller, U. S. Department of Agriculture, ARS, Eastern Regional Research Center, Philadelphia, PA

**Effect of Sodium Lactate on Toxigenesis of *Clostridium botulinum* in 'Sous Vide' Products** - J. MENG and C. Genigeorgis, University of Georgia, Griffin, GA

**Relationship of *Vibrio* spp. in Soft Clams and Water with *Clostridium perfringens* and Fecal Indicators** - M. AROCHA, C. Barjas, J. Rupnow, L. Bullerman and C. Abeyta, University of Nebraska, Lincoln, NE

**Control of Thermophilic Spore Activity with Pressurized Carbon Dioxide and Egg White Lysozyme** - A. SIKES and C. Roskey, U. S. Army Natick RD&F Center, Natick, MA

**Chemical Changes of Pre-packaged Sheephead during Frozen Storage** - Y. HUANG, M. Zheng and K. Gates, University of Georgia, Athens, GA

**Effects of trisodium phosphate and Lactic Acid on Microbiological and Physical Quality of Packaged Rainbow Trout** - Y. HUANG, L. Bolton, M. Harrison and R. Toledo, University of Georgia, Athens, GA

**Antimicrobial Containing Edible Films as an Inhibitory System to Control Microbial Growth on Meat Products** - J. BARON and S. Sumner, University of Nebraska, Lincoln, NE

**The Effectiveness of the Bacteriolytic Organism, *Bdellovibrio bacteriovorus* 109J, at Reducing the Level of Gram-Negative Foodborne Pathogens** - P. FRATAMICO, R. Whiting, R. Goins and B. Marmer, U. S. Department of Agriculture, ARS, ERRC, Philadelphia, PA

**Inhibition of *Salmonella typhimurium* by the Lactoperoxidase System in a Broth System and on Poultry** - L. WOLFSON and S. Sumner, University of Nebraska, Lincoln, NE

**Visualization of Bioluminescent *Salmonella enteritidis* in Food Samples and Penetration of *Salmonella enteritidis* to Whole-shell Eggs** - J. CHEN, R. Clarke and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

**Effect of NaCl or Water Content on the Survival of *Salmonella typhimurium* on Irradiated Meat** - D. THAYER, G. Boyd, J. Fox and L. Lakritz, USDA, ARS, Philadelphia, PA

**Attachment of *Salmonella typhimurium* and *Campylobacter jejuni* to skins of Chicken Scalded at Various Temperatures** - J. KIM, M. Slavik, J. Walker and C. Griffiths, University of Arkansas, Fayetteville, AR

**Evaluation of a Nitrocellulose Membrane Lift Method for the Detection of *Campylobacter* spp. attached to Chicken Carcasses** - M. SLAVIK and H. Tsai, University of Arkansas, Fayetteville, AR

**An ELISA Method for the Detection of *Campylobacter* in Raw and Processed Foods** - M. PLANK, R. Durhan and B. Butman, Organon Teknika/Biotechnology Research Institute, Rockville, MD

**Comparison of Tecra VIA Kit with Oxoid and CHO Cell Assay for the Detection of *Bacillus cereus* diarrheal Enterotoxin** - F. SCHULTZ and R. Buchanan, U. S. Department of Agriculture, ARS, ERRC, Philadelphia, PA

**Evaluation of Rapid Test Methods for Direct Detection of *Vibrio cholerae* O1** - M. WIER, J. Hasan, A. Hug, D. Bernstein, L. Loomis and R. Colwell, New Horizons Diagnostics, Columbia, MD

**Detection of Coliforms in Food using Colilert — An Assessment of the effect of different sugars found in various Foods** - G. DICHTER, H. Gu and P. Coombs, Enviro-netics, Inc., Branford, CT

**Bioluminescent Method for Measuring Total Viable Counts** - M. WIER, D. Miller, L. Loomis and D. Bernstein, New Horizons Diagnostic, Columbia, MD

**Occurrence and Production of Enterotoxin Producing Strains of *Staphylococcus aureus* in Bakery Products** - D. PETERS, S. Sumner and J. Albrecht, University of Nebraska, Lincoln, NE

**Yeasts Associated with Fruit Juice Concentrates** - T. DEAK and L. Beuchat, University of Georgia, Griffin, GA

**Use of Aerobic Plate Counts Incubated at Elevated Temperatures for Detecting Temperature-Abused Refrigerated Foods: Effectiveness under Transitory Abuse Conditions** - L. BAGI and R. Buchanan, U. S. Department of Agriculture, ARS, ERRC, Philadelphia, PA

**Assessment of previous Heat Treatment of Beef and Pork Products using a dry Chemistry Enzyme System** - W. TOWNSEND, C. Davis and C. Lyon, U. S. Department of Agriculture, ARS, Russell Research Center, Athens, GA

**Fermentation and Sensory Characteristics of Kimchi Containing KCl as a Partial Replacement for NaCl** - S. CHOI, L. Beuchat, L. Perkins and T. Nakayama, University of Georgia, Griffin, GA

**Characterization of Attached, Psychrotropic Bacteria Isolated from a Water Distribution System** - C. DAVIDSON, P. Noble, E. Ashton, R. Andrews and W. Albritton, University of Alberta, Edmonton, Alberta, Canada

**Degradation of Ochratoxin A by *Acinetobacter calcoaceticus*** - C. HWANG and F. Draughon, University of Tennessee, Knoxville, TN

**The PHLS Food Microbiology External Quality Assessment Scheme** - D. ROBERTS, P. Van Netten, J. Russell and R. Gilbert, Food Hygiene Laboratory, London, England, U.K.

**Partial Purification, Characterization and Potential Applications of Jensenin G, a bacteriocin produced by *Propionibacterium jensenii* P126** - D. GRINSTEAD, D. Weinbrenner and S. Barefoot, Clemson University, Clemson, SC

#### VIDEO THEATRE

All day Monday, Tuesday morning and all day Wednesday

A list of titles and presentation times will be published at a later date

### MONDAY AFTERNOON, AUGUST 2

#### CAMPYLOBACTER UPDATE SYMPOSIUM

Sponsored by the International Life Sciences Institute

Convener: L. POST

- 1:30 **Human Campylobacteriosis: Clinical and Epidemiological Aspects** - P. DEMOL, University Hospital St. Pierre, Brussels, Belgium
- 1:50 ***Campylobacter*: A European Perspective** - M. STRINGER, Campden Food & Drink Research Association, Gloucestershire, U.K.
- 2:10 **Campylobacters and Their Epidemiological Markers** - H. LIOR, Laboratory Centre for Disease Control, Ottawa, Ontario, Canada
- 2:30 ***Campylobacter jejuni*: The U.S. Department of Agriculture Perspective** - A. MCNAMARA, U. S. Department of Agriculture, Washington, DC
- 2:40 ***Campylobacter jejuni*: The U. S. Food and Drug Administration Perspective** - J. MADDEN, U. S. Food and Drug Administration, Washington, DC
- 2:50 Break

#### INTERNATIONAL PERSPECTIVES ON ESCHERICHIA COLI O157:H7 SYMPOSIUM

Sponsored by the International Life Sciences Institute

Convener: P. HALL

- 3:10 ***E. coli* O157:H7 Time Capsule: What Do We Know and When Did We Know It** - M. NEILL, Brown University School of Medicine and Memorial Hospital of Rhode Island, Pawtucket, RI

- 3:30 *E. coli* O157:H7 and Verotoxigenic *E. coli* - H. LIOR, Laboratory Centre for Disease Control, Ottawa, Ontario, Canada
- 3:50 *E. coli* O157:H7 - The British Experience - B. ROWE, Central Public Health Laboratory, London, UK
- 4:10 *E. coli* O157:H7 Outbreak in the Western United States - P. TARR, University of Washington and Children's Hospital and Medical Center, Seattle, WA
- 4:30 *E. coli* O157:H7: The U.S. Department of Agriculture Perspective - A. MCNAMARA, U. S. Department of Agriculture, FSIS, Washington, DC
- 4:50 *E. coli* O157:H7: The U.S. Food and Drug Administration Perspective - J. MADDEN, U.S. Food and Drug Administration, CFSAN, Washington, DC

**TECHNICAL SESSION  
GENERAL FOOD MICROBIOLOGY  
Co-Conveners: J. CERVENY and K. GLASS**

- 1:30 Comparison of Aflatoxin Production in Modified Czapek's Solution Agar, AFPA, and Dye Media - R. HART and D. Fung, Kansas State University, Manhattan, KS
- 1:45 Influence of Aflatoxin and Nutrient Concentration on the Degradative Ability of *Flavobacterium aurantiacum* - J. LINE and R. Brackett, University of Georgia, Griffin, GA
- 2:00 Determination of cytosolic aflatoxin B<sub>1</sub>-degrading activity of *Flavobacterium aurantiacum* - R. PHEBUS and F. Draughon, Kansas State University, Manhattan, KS
- 2:15 Level of *Campylobacter* spp. on Broiler Farms and after Chicken Transport - R. CLAVERO, N. Stern, J. Bailey, N. Cox and M. Robach, University of Georgia, Athens, GA
- 2:30 Influence of Season and Storage on *Campylobacter* spp. contaminating Broiler Carcasses - N. STERN, U.S. Department of Agriculture, ARS, Athens, GA
- 2:45 Incidence of *Clostridium botulinum* in Modified Atmosphere Packaged Vegetables - E. RHODEHAMEL, T. Lilly, H. Solomon and D. Kautter, Food and Drug Administration, Washington, DC
- 3:00 Break
- 3:20 Prevalence of *Salmonella* in rainbow trout

(*Oncorhynchus mykiss*) - M. DENTON, F. Draughon, B. Anthony and T. Wei, University of Tennessee, Knoxville, TN

- 3:35 Rates of Adherence to Stainless Steel by Foodborne Microorganisms - S. HOOD and E. Zottola, University of Minnesota, St. Paul, MN
- 3:50 Bacteria on Beef Briskets and Ground Beef: Association with Slaughter Volume and Antemortem Condemnation - A. HOGUE and D. Dreesen, U. S. Department of Agriculture, FSIS, Washington, DC
- 4:05 Compressed Air, City Water and Dust as Sources of contamination of a Dairy Aseptic Processing System - C. LERBS, Brooklyn Center, MN

**NEW HORIZONS IN DAIRY FOOD  
SAFETY AND QUALITY  
Co-Conveners: T. KLAENHAMMER  
and C. WHITE**

- 1:30 An Overview of the Southeast Dairy Foods Research Center's Program - T. KLAENHAMMER, North Carolina State University, Raleigh, NC
- 1:45 Microbial Indicators for Dairy Food Processing - P. FOEGEDING, North Carolina State University, Raleigh, NC
- 2:15 Predictive Methodologies to Rapidly Assess Shelf Life - C. WHITE, Mississippi State University, Mississippi State, MS
- 2:45 Break
- 3:00 Immunological Technologies/Rapid Methods to Detect Microbial Pathogens - M. JOHNSON, A. Bhunia, R. Wang, W. Cao and P. Steele, University of Arkansas, Fayetteville, AR
- 3:30 Antimicrobial Proteins for Dairy Food Systems - T. KLAENHAMMER, North Carolina State University, Raleigh, NC
- 4:00 Panel Discussion - What Research is Needed to Assure Dairy Food Safety and Quality?

**BAKING EQUIPMENT STANDARDS  
AND GENERAL SANITATION IN BAKING  
OPERATIONS SYMPOSIUM  
Convener: M. RONGE**

- 1:30 BISSC Overview - S. DETORA, Nabisco Bisquit Company, East Hanover, NJ
- 2:00 Sanitary Design - A Mind Set - D. GRAHAM, Sverdrup Corp., St. Louis, MO

2:30 **OSHA Regulatory Requirements** - J. DYKES, American Institute of Baking, Manhattan, KS

3:00 Break

3:20 **Hazard Analysis and Critical Control Points (HACCP): Concept and Use** - R. VAIL, Consultant, Minneapolis, MN

3:50 **Maintaining a High Standard of Sanitation through Equipment Design** - J. ANDERSON, American Institute of Baking, Manhattan, KS

## TUESDAY MORNING, AUGUST 3

### MICROBIAL CONCERNS OF THE INTERNATIONAL COMMUNITY SYMPOSIUM

*Sponsored by the International Life Sciences Institute*  
Convener: A. BAIRD-PARKER

8:30 **Microbiological Safety of Foods in Europe of the Nineties: What Does That Imply?** - M. VAN SCHOTHORST, NESTEC Ltd., Lausanne, Switzerland

9:00 **Microbial Concerns of the North and South American Countries and Scientific Implications for Harmonizing Free Trade** - L. CRAWFORD, National Food Processors Association, Washington, DC

9:20 **Food Microbiological Criteria of the South American Countries** - S. MENDOZA, Simon Bolivar University, Caracas, Venezuela

10:00 Break

10:30 **Microbial Concerns of the Pacific Rim Countries and Scientific Implications for Harmonizing Free Trade** - M. BYLES, CSIRO Food Research Laboratory, North Ryde, New South Wales, Australia

11:00 **Safety and Quality Management through HACCP and ISO 9000** - M. STRINGER, Campden Food and Drink Research Association, Gloucestershire, UK

### TECHNICAL SESSION ANTIMICROBIALS

Co-Conveners: J. SCOTT and H. GOURAMA

8:30 **Antimicrobial Activity of Lactic Acid Bacteria isolated from Ready-to-Eat Turkey Products** - J. AULIK and A. Maurer, University of Wisconsin-Madison, Madison, WI

8:45 **Efficacy of Using Antagonistic Microorganisms to Inhibit Psychrotrophic Pathogens in Refrigerated, Cooked Poultry** - Y. HAO, R. Brackett and M. Doyle, University of Georgia, Griffin, GA

9:00 **The Role of Metabolic Intermediates in the Inhibition of *Salmonella enteritidis* by a *Veillonella* Species** - A. HINTON, M. Hume and J. DeLoach, Auburn University, Auburn, AL

9:15 **Inhibition of *Listeria monocytogenes* and other Bacteria by Sodium Diacetate** - L. SHELEF and L. Addala, Wayne State University, Detroit, MI

9:30 **Antimicrobial Effects of Trisodium Phosphate Against Bacteria Attached to Beef Tissue** - J. DICKSON, Iowa State University, Ames, IA

9:45 **Antilisterial Activities of Lactic Acid Salts in Sausage and the Relationship to pH and Water Activity** - L. SHELEF, Wayne State University, Detroit, MI

### TECHNICAL SESSION DAIRY

Co-Conveners: D. MARSHALL and R. SCHMIDT

8:30 **Keeping Quality of Commercially Processed Fluid Milks Held at 7.2°C (45°F) for 10, 12 and 14 days** - S. BARNARD, Penn State University, University Park, PA

8:45 **Control of Biofilm Bacteria in Dairy Sweet Water (Cooling Water) Systems** - M. CZECHOWSKI and M. Banner, Diversey Corporation, Livonia, MI

9:00 **Inhibition of Gram-Positive Pathogens in Cold-Pack Cheese Made from Cheese Containing Nisin** - T. YEZZI, A. Ajao and E. Zottola, University of Minnesota, St. Paul, MN

9:15 **Antimicrobial Use and Dairy Disease Patterns** - R. BENNETT, University of California, Santa Rosa, CA

9:30 **A Rapid Dipstick Biosensor for Beta-Lactams in Milk** - R. ROCCO, S. Deshpande, S. Kharadia and L. Lang, Idetek, Inc., Sunnyvale, CA

9:45 **Use of the Pig as a Model to Study Colonization of the Gastrointestinal Tract by Bifidobacteria and *Lactobacillus acidophilus*** - D. TOOP, C. Duitschaever, C. Buteau, C. Gyles and B. Allen, University of Guelph, Guelph, Ontario, Canada

10:00 **Problem Solving in a Dairy Quality Control Laboratory** - D. BLOMQUIST and R. L. Bakka, Klenszade, a Service of Ecolab, Tampa, FL



**TECHNICAL SESSION  
RISK ASSESSMENT AND EDUCATION**  
Co-Conveners: R. CARAWAN and E. BERRY

- 8:30 **Analysis of *Listeria* Risk Management for Food Processors** - L. JAYKUS and D. Amaral, University of North Carolina, Chapel Hill, NC
- 8:45 **The Impact of Employee Food Sanitation Knowledge and Handling Practices on Supermarket Deli Profitability** - R. GRAVANI, G. Thomas, E. McLaughlin and H. Lawless, Cornell University, Ithaca, NY
- 9:00 **Educating Fifth Graders About Food Safety through the Use of a Video** - G. SWICK, Columbus Health Department, Columbus, OH
- 9:15 **Reliability of Pop-up Timers in Turkeys** - M. LEE, Ryerson Polytechnical Institute, Toronto, Ontario, Canada
- 9:30 **Food Sanitation in the Ice Age** - C. FELIX, Charles Felix Associates, Leesburg, VA

**SCIENTIFIC POSTER SESSION**  
Authors Present 10:00 — Noon

**TUESDAY AFTERNOON,  
AUGUST 3**

**GENERAL SESSION —  
COMMUNICATING FOOD  
SAFETY IN THE NEWS**  
Co-Conveners: M. DOYLE and N. STERN

- 1:30 **Making a Food Safety Story** - K. FLOWERS, WXIA TV, Atlanta, GA
- 1:45 **Impact of a News Story on the Food Industry** - L. CRAWFORD, National Food Processors Association, Washington, DC
- 2:00 **Criteria for a Good News Item** - S. BRONSTEIN, Atlanta Journal and Constitution, Atlanta, GA
- 2:15 **Do's and Don'ts for Industrial Spokespersons** - M. ROBACH, Continental Grain Co., Duluth, GA
- 2:30 **Public Education to Enhance Food Safety** - R. GRAVANI, Cornell University, Ithaca, NY
- 2:45 **Roundtable Discussion**

**ANNUAL IAMFES BUSINESS MEETING**

- 3:15 **Welcome and Introduction** - H. BENGSCHE, President-Elect
- 3:30 **Report from the President** - M. DOYLE
- 3:45 **Business Meeting** - M. DOYLE, Presiding
- Moment of Silence in Remembrance of Departed Association Members
  - Minutes of Previous Business Meeting
  - Report of Executive Manager
  - Affiliate Council Report
  - Journal Management Committee Report
  - Old Business
  - New Business
  - Presentation of Resolutions - D. GABIS, Past President

**WEDNESDAY MORNING,  
AUGUST 4**

**ILSI SPONSORED RESEARCH UPDATE**  
*Sponsored by the International Life Sciences Institute*  
Convener: D. ZINK

- 8:30 ***Escherichia coli* O157:H7 Diarrhea in the United States: A Multicenter Surveillance Project** - P. GRIFFIN, Centers for Disease Control and Prevention, Atlanta, GA
- 9:00 **Establishment of Bovine Surveillance Program for *E. coli* O157:H7 in Washington State** - D. HANCOCK, Washington State University, Pullman, WA
- 9:30 **Insertion Sequence Fingerprinting: A New Subtyping System for *E. coli* O157:H7 Strains** - T. WHITTAM, The Pennsylvania State University, University Park, PA
- 10:00 Break
- 10:20 **Use of *In Vitro* Primer-directed Enzymatic Amplification of DNA for Rapid Detection of *Listeria monocytogenes*: Studies with Food Samples** - R. ELLISON, University of Massachusetts Medical Center, Worcester, MA
- 10:50 **Development of DNA Probes Specific for Virulent *Listeria* by Amplification of Virulence-related Genes of *Listeria monocytogenes*** - S. KATHARIOU, University of Hawaii at Manoa, Honolulu, HI
- 11:20 **Microbial Ecology of *Listeria monocytogenes* Biofilms Associated with the Food Processing Plant Environment** - J. FRANK, University of Georgia, Athens, GA

**CONTROL OF BACTERIA AND PUBLIC  
HEALTH SIGNIFICANCE IN  
FOODS OF ANIMAL ORIGIN SYMPOSIUM**  
Co-Conveners: I. WESLEY and J. DICKSON

- 8:30 **Competitive Exclusion** - N. COX, U. S. Department of Agriculture, ARS, Athens, GA
- 9:00 **Control in Live Animals - Swine** - H. HARRIS, Iowa State University, Ames, IA
- 9:30 **Control by Processing** - D. THENO, Theno and Associates, Modesto, CA
- 10:00 Break
- 10:20 **Control by Natural Antimicrobials-Bacteriocins** - G. SIRAGUSA, U. S. Department of Agriculture, ARS, Clay Center, NE
- 10:50 **Regulatory Concerns** - A. MCNAMARA, U. S. Department of Agriculture, FSIS, Washington, DC
- 11:20 **Overall Aspects and Future Applications** - M. POTTER, Centers for Disease Control, National Center for Infectious Disease, Atlanta, GA

**VIRAL FOODBORNE DISEASE SYMPOSIUM**  
Convener: J. GUZEWICH

- 8:30 **Viral Foodborne Disease Agents of Concern** - D. CLIVER, University of Wisconsin-Madison, Madison, WI
- 9:00 **The Epidemiology of Viral Foodborne Disease** - R. GLASS, Centers for Disease Control, Atlanta, GA
- 9:30 **Norwalk Virus Gastroenteritis** - C. MOE, University of North Carolina, Chapel Hill, NC
- 10:00 Break
- 10:20 **Detection Methods for Viral Agents** - M. SOBSEY, University of North Carolina, Chapel Hill, NC
- 10:50 **Hepatitis A Foodborne Disease** - T. CROMEANS, O. Nainan and H. Margolis, Centers for Disease Control and Prevention, Atlanta, GA

**FDA COMPUTER DATA BASE AND  
REPORTING SYSTEMS SYMPOSIUM**  
Convener: J. SMUCKER

- 8:30 **Third Party Data Base for Drug Residue Testing in Milk** - J. SMUCKER, Food and Drug Administration, Washington, DC

- 9:00 **National Drug Residue Milk Monitoring Program** - R. CHILDERS, Food and Drug Administration, Washington, DC

- 9:30 **Prime Connection** -

- 10:00 Break

- 10:20 **Feed Contamination and Aflatoxins Data Base Reporting** - P. RAYNES, Food and Drug Administration, Rockville, MD

- 10:50 **FDA Electronic Inspection System** - A. SAYLER, Food and Drug Administration, Washington, DC

- 11:20 **Evaluation of Vitamins in Milk-Inspection and Reporting** - R. CHILDERS, Food and Drug Administration, Washington, DC

**WEDNESDAY AFTERNOON,  
AUGUST 4**

**ECONOMICS OF FOODBORNE  
DISEASE SYMPOSIUM**  
Co-Conveners: E. TODD and T. ROBERTS

- 1:40 **Costs of Bacterial Foodborne Disease: A Review** - E. TODD, Health and Welfare Canada, Ottawa, Ontario, Canada
- 2:10 **Economic Losses Caused by Foodborne Parasitic Diseases: A Review** - T. ROBERTS, U. S. Department of Agriculture, Washington, DC
- 2:40 **Impact of Shellfish-Associated Viral Diseases in the United States** - J. ROSE, University of South Florida, Tampa, FL
- 3:05 Break
- 3:25 **Human Illness Costs Associated with Salmonella Infections in the United States** - T. GOMEZ and R. Tauxe, Centers for Disease Control, Atlanta, GA
- 3:50 **The Value of a Human Life** - A. HADDIX, Centers for Disease Control, Atlanta, GA
- 4:15 **Sequelae of Foodborne Diarrheic Disease: The Reactive Arthritides** - J. SMITH, U. S. Department of Agriculture, ARS, Philadelphia, PA
- 4:40 **Summary: Where Do We Go From Here?**

**FOOD SAFETY RESEARCH  
NETWORKS SYMPOSIUM  
Convener: R. CLARKE**

- 1:30 **Food Safety Networking in the USDA and the Modelling Network** - R. BUCHANAN, U. S. Department of Agriculture, ARS, Washington, DC
- 2:00 **Networking in the Southern Extension Research Activity Information Exchange Group** - S. BAREFOOT, Clemson University, Clemon, SC
- 2:30 **Rapid Methods Networking** - D. FUNG, Kansas State University, Manhattan, KS
- 3:00 Break
- 3:20 **Food Safety Networks in Canada** - R. CLARKE, Agriculture Canada, Guelph, Ontario, Canada
- 3:50 **Food Safety Applications of the Public Health Laboratory Information System** - N. BEAN, Centers for Disease Control, Atlanta, GA

**SELECTED TOPICS IN  
FOOD SAFETY SYMPOSIUM  
Convener: A. DRAUGHON**

Late Breaking Topics will be included

**NEWS TOPICS IN DAIRY SYMPOSIUM  
Convener: R. BISHOP**

Topics to be announced

## Spouse/Companion Tours and Special Events

### ATLANTA — A "PEACH" OF A TOWN

\*Buckhead\* \*Martin Luther King, Jr.\*

\*Cyclorama\* \*Lenox Square\*

Monday, August 2, 1993 — 9:00 a.m. - 2:30 p.m.

Cost: \$22, Lunch on your own,  
Lenox Square (\$27 on-site)

The results are in and as you probably are aware, Atlanta has been chosen to host the 1996 Olympic games in addition to being the site of the 1994 Super Bowl and the 1993 IAMFES Annual Meeting. What an outstanding opportunity to view some of the sites where the games will be held, in addition to viewing some of Atlanta's most well known attractions.

Your ride through downtown will take you to the location of the new Georgia Dome, the Omni sports complex

and the massive World Congress Center. We'll then move on through Georgia State University, the State Capitol and Government complex, and Martin Luther King, Jr.'s Memorial and Birth Home as you ride down "Sweet Auburn." You'll have an opportunity to see the Inman Park area, the first garden suburb developed in the 1880's.

You will relive the Battle of Atlanta as you stop and tour the Cyclorama, an awe inspiring three dimensional diorama depicting the Battle of Atlanta during the Civil War. This is the world's largest panoramic painting measuring 50' high and 400' in circumference.

Next, you'll drive up world famous Peachtree Street where among other sights, you'll see the fabulous Fox Theatre, Colony Square and the majestic Woodruff Arts Center.

As you continue your trip, you will drive through Atlanta's elegant Northwest residential area, noted throughout the country for its breathtaking homes set amid acres of glorious greenery and spectacular landscaping. You will see the Governor's Mansion, the Atlanta History Center's Swan House plus the stunning homes of many influential and famous Atlantans.

Your destination is to the most famous shopping area on Peachtree Street — Lenox Square. 200 shops and restaurants of all varieties, including Ralph Lauren, Doris Vitton and Laura Ashley, make this shopping mall anchored by Rich's, Macy's and Neiman Marcus a favorite of Atlantans. There you can enjoy a dutch treat lunch.

### THE CHARM OF THE OLD SOUTH

\*Covington, Georgia\*

Tuesday, August 3, 1993 — 9:00 a.m. - 3:30 p.m.

Cost: \$37, including lunch (\$42 on-site)

Take a trip back in time to the quiet serenity of Covington, Georgia, one of the few areas whose magnificent plantations and town homes were spared by General Sherman on his "march to the sea."

You will be greeted in Covington by a local guide who will take you down historic tree-shaded streets lined with antebellum homes.

Let your imagination soar as you visit the majestic Regency Hall, constructed before the turn of the century with 18 inch thick solid brick walls. This elegant Old South mansion is furnished with an extensive collection of fine American Empire furniture from the 1800-1840 period and Victorian and Empire Revival furniture from the 1870-1885 period. There is a marvelous collection of antiques and fine porcelain.

Sound enchanting? Wait till you see what's next as we move on to Whitehall, a 13,000 square foot antebellum home build in 1830. One of the most outstanding examples of Greek Revival architecture in Georgia, Whitehall has been beautifully renovated and furnished to reflect its original grandeur. In fact, Margaret Mitchell, author of *Gone With the Wind*, personally lobbied MGM to use Whitehall as "Twelve Oaks" in the famous movie.

You'll enjoy a delicious Southern buffet lunch amid the breathtaking splendor of the Blue Willow Inn. This antebellum home converted into a wonderful restaurant is

located in Social Circle, Georgia, just five miles from Covington.

You'll be charmed by your visit to the Old South and your glimpse of days that are truly Gone With the Wind!

#### **ATLANTA'S HOMEGROWN HITS**

\*CNN\* \*Underground Atlanta\*

\*World of Coca-Cola\*

Wednesday, August 4, 1993 — 10:00 a.m. - 4:00 p.m.

Cost: \$26, Lunch on your own (\$31 on-site)

Take a ride on one of Atlanta's longest escalators as you begin to experience the electricity of the world's foremost news service in action. Tour the Atlanta Headquarters of CNN and CNN Headline News, the two 24 hour all news networks that have revolutionized television journalism. You will see Ted Turner's dream blossomed into reality. See how many CNN personalities you recognize as you walk through the studios and production areas. Learn the behind-the-scenes activities that lead to the finished product you see on the air.

Next, your bus will whisk you to Underground Atlanta, the setting which bridges the past to the present for the journey into Atlanta's future. You'll enjoy touring the six city blocks which have been transformed into a spirited urban market place featuring 200,000 square feet of specialty shops, restaurants, entertainment, and push carts. Treat yourself to lunch at one of Underground's many eateries.

After lunch, encounter the past, present and future as you begin your exciting tour of the World of Coca-Cola. You will be greeted at the door by the world's most remarkable Coca-Cola sign, a revolving neon spectacular. Inside, you'll see priceless memorabilia tracing the more than 100-year history of the world's best-known consumer product. Through dazzling exhibits, you'll travel to the more than 160 countries of Coca-Cola. Enjoy a taste of timeless refreshment at a fanciful soda fountain of the future, and you'll shop in a one-of-a-kind Coca-Cola store.

#### **MONDAY NIGHT SOCIAL EVENT**

##### **"GRANITE" — You'll Love the Stone Mountain Plantation Evening**

Monday, August 2, 1993 — 6:00 p.m. - 11:30 p.m.

Cost: \$35 (\$40 on-site)

Children \$20 (\$25 on-site)

Hop on board your transit buses for your ride to one of the true wonders of the world — breathtaking Stone Mountain. As you arrive at the resort park, you'll truly be in awe at the magnificence of this 3,200 acre site of scenic beauty.

"Granite" you'll love Stone Mountain as you look up at the world's largest granite monolith with the images of Jefferson Davis, Robert E. Lee and "Stonewall" Jackson

captured forever in a sculpture larger than an entire football field and carved meticulously over the years.

You will be fascinated by the typical Southern Plantation of the 1800's where your lawn party will be held. Stroll through a completely restored antebellum plantation, including the plantation house, overseer's house, cabins and outbuildings. All are completely and authentically furnished.

Then proceed to the Meadow of the Plantation where dinner will be served under a tent erected especially for our group. Your Old South Barbecue Buffet will include Fried Chicken, BBQ Pork, Brunswick Stew, Cole Slaw, Potato Salad, Baked Beans, Corn on the Cob, Rolls and Butter, Cobbler, and Iced Tea. There will be a cash bar available throughout the evening.

And if that's not enough, experience Stone Mountain's spectacular show of luminous lasers projected on the Mountain's North face. From special reserved seating, you'll delight in seeing comical characters, dramatic stories, and graphic images choreographed to popular music on this one million square foot screen.

You'll treasure the scenic beauty and pure Southern style fun of this night at Georgia's Stone Mountain Park!

#### **ATLANTA BRAVES BASEBALL OUTING**

Tuesday, August 3, 1993 — 6:00 p.m.

Cost: \$18 (\$20 on-site)

The Atlanta Braves will be hosting the Philadelphia Phillies on Tuesday, August 3. We have now purchased a block of tickets for this game which includes your bus ride to and from the ball game. Sign up now for an enjoyable time at the baseball game - seats are limited!!

#### **NEW THIS YEAR!**

##### **CHILDREN'S SUPERVISED ACTIVITIES**

'Get Away Room'

Monday, 8:45 a.m. - 2:45 p.m.

Tuesday, 8:45 a.m. - 3:45 p.m., and

Wednesday - 9:45 a.m. - 4:15 p.m.

Free

Plans are being made this year to provide supervised activities for the children who accompany their parents to the IAMFES Annual Meeting. They are on vacation after all, right? Right! So let's make it fun for them also.

There will be a 'Get Away Room' on Monday, Tuesday and Wednesday for the children to play video games, pinball machines, watch movies, etc. Also, on Wednesday Evening, there will be a 'Kids Banquet' for the children while the parents attend the IAMFES Annual Awards Banquet. All children's activities will be properly supervised.

Please watch for more details on these events in the upcoming issues of IAMFES' Journals.

Wednesday Kids Banquet: \$10 (\$15 on-site)



## TRADITIONAL IAMFES GATHERINGS

### Ivan Parkin Lectureship

Sunday, August 1, 1993 7:00 p.m.

Dr. Morris Potter, "The Challenge of Epidemiology in Food Protection"

Dr. Potter is the Assistant Director for Bacterial and Mycotic Diseases at the Centers for Disease Control, National Center for Infectious Diseases, Atlanta, GA

Followed by the **Cheese and Wine Reception** for the opening of the Educational Exhibits.

An opportunity to greet old friends, make new ones and view the excellent technical displays.

### IAMFES Annual Awards Reception and Banquet

Wednesday, August 4, 1993

Reception 6:00 p.m.

Banquet 7:00 p.m.

Cost: \$30 (\$35 on-site)

## EVENTS BY INVITATION

### Monday Morning, August 2, 1993

7:00 IAMFES Committee/Professional  
Development Group Breakfast Meeting

### Tuesday Evening, August 3, 1993

5:30-6:30 Presidential Reception  
7:00 Past President's Dinner

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## PROGRAM COMMITTEE

IAMFES Chairperson.....Harold Bengsch  
Scientific Content.....Ann Draughon  
Program Coordinators.....Joe Frank and Bob Brackett

## IAMFES EXECUTIVE BOARD

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Executive Manager.....Steven Halstead, Des Moines, IA

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Vice President.....Jim Ayres, Atlanta  
Secretary.....Mark Harrison, Athens  
Treasurer.....Jim Camp, Douglasville  
Past President.....Al Fain, Stone Mountain

## LOCAL ARRANGEMENTS COMMITTEE

Companion Tours.....Bob Brackett  
Monday Night Gala.....Al Fain  
Banquet.....Estes Reynolds  
Sunday Cheese and Wine.....Joe Huseman  
George Gibson  
Product Contributions.....Joe Huseman  
George Gibson  
Registration/Volunteers.....Mark Harrison  
Karen Schmidt  
Past-Presidents Diner.....Dave Fry  
Audio/Visual.....Dave Hamilton  
Publicity.....Dave Hamilton  
Photography.....Dave Hamilton  
Door Prize Coordinator.....Yao-Wen Huang  
Exhibit Coordinator.....Jim Camp  
Frank Pool  
Industry Donations.....Jim Camp  
Frank Pool

## JOURNAL OF FOOD PROTECTION

Editor.....Dr. Lloyd Bullerman, Lincoln, NE  
Associate Editor.....Dr. Steve Taylor, Lincoln, NE  
Managing Editor.....Steven Halstead, Des Moines, IA

## DAIRY, FOOD AND ENVIRONMENTAL SANITATION

Managing Editor.....Steven Halstead, Des Moines, IA  
Associate Editor.....Margie Marble, Des Moines, IA  
Technical Editor.....Henry Atherton, Burlington, VT

## AFFILIATE OFFICERS

Chairperson.....Ruth Fuqua, Mt. Juliet, TN  
Secretary.....Charlie Price, Lombard, IL



# 1993 IAMFES Workshops

## Quality Assurance in Microbiology

Conducted by Michael H. Brodsky,  
Ontario Ministry of Health

July 30-31, 1993, Stouffer Waverly Hotel, Atlanta, GA

If an auditor paid a surprise visit to your laboratory, would your QA program and your practices be adequate for accreditation purposes? Are your SOP's documented? Have you been meaning to develop or introduce a QA program but "haven't found the time" or are unsure how to do it?

If any of these questions make you feel uncomfortable, uneasy or embarrassed, register for the one-and-a-half day Quality Assurance Workshop for Microbiology Laboratories and put your mind at ease.

Learn how to confidently describe the QA program operating within your laboratory and outline procedures related to specific analytical protocols. Be confident in the results generated by your laboratory and ensure that your clients will not doubt the validity of the data.

## Rapid Microbiological Methods

Conducted by Daniel Y.C. Fung, Kansas State University and James Dickson, Iowa State University

July 30-31, 1993, Stouffer Waverly Hotel, Atlanta, GA

A one-and-a-half day workshop on Rapid Microbiological Methods will be conducted under the direction of Daniel Y.C. Fung and Jim Dickson. The program will include lectures and hands-on experience on some systems. Commercial companies will be invited to demonstrate their systems and instruments in the workshop. With increasing awareness and concern about food safety, rapid methods in microbiology are essential as a first step to help monitor the microbial safety of our food supply and when problems arise these methods are needed to quickly pin-point the source of the problem so that actions can be taken. The workshop is designed for laboratory directors, food scientists, applied microbiologists and consultants. Appropriate hand-out materials will be provided for the participants in the workshop

*The 1993 Workshop topics are a result of suggestions from the Applied Laboratory Methods Professional Development Group.*

Informational  
Brochures  
will be  
available soon

**Workshop Hours will be:**  
Friday, July 30 - 1:00 to 5:00 p.m.  
Saturday, July 31 - 8:30 a.m. to 5:00 p.m.

Informational  
Brochures  
will be  
available soon

<b>Workshop Registration Fees are:</b>		<b>After June 1, 1993</b>	
<b>Before June 1, 1993</b>		<b>Member</b>	<b>\$225</b>
Member	\$195	Non-Member	\$265
Non-Member	\$235		

For further information, please contact IAMFES at  
(800)369-6337 (US), (800)284-6336 (Canada), FAX (515)276-8655

## REGISTRATION FORM

- Rapid Microbiological Methods Workshop**  
 **Quality Assurance in Microbiology Workshop**  
**Stouffer Waverly Hotel — Atlanta, GA — July 30-31, 1993**

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# 80th IAMFES Annual Meeting Registration Form

Stouffer Waverly Hotel — Atlanta, Georgia — August 1-4, 1993

(Use photocopies for extra registrations)

FOR OFFICE USE

Date Rec'd. \_\_\_\_\_ First initial \_\_\_\_\_ Last name \_\_\_\_\_  
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### Registration

IAMFES Member (Banquet included) \$145 (\$180 on-site)  
 Non-Member (Banquet included) \$195 (\$230 on-site)  
 IAMFES Student Member \$ 20 (\$ 25 on-site)  
 IAMFES Member One Day (Circle: Mon/Tues/Wed) \$ 75 (\$ 95 on-site)  
 Non-Member One Day (Circle: Mon/Tues/Wed) \$100 (\$125 on-site)  
 Spouse/Companion (Name): \_\_\_\_\_ \$ 20 (\$ 20 on-site)  
 Children (14 & Under), Name: \_\_\_\_\_ FREE

### \*New Membership Fees:

Membership (Dairy, Food & Environmental Sanitation) \$ 50  
 Membership Plus (Dairy, Food & Env. Sanitation & Journal of Food Protection) \$ 80  
 Student Membership  Dairy, Food & Env. San. or  Journal of Food Protection \$ 25  
 Student Membership Plus (Dairy, Food & Environmental Sanitation & Journal of Food Protection) \$ 40

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### Other Fees: (Per Person)

Cheese & Wine Reception (Sun., 8/1) \_\_\_\_\_  
 Stone Mountain Plantation Evening (Mon., 8/2) \_\_\_\_\_  
 Atlanta Braves vs. Philadelphia Phillies Baseball Game (Tues., 8/3) \_\_\_\_\_  
 IAMFES Awards Banquet (Wed., 8/4) \_\_\_\_\_  
 IAMFES Kids Banquet (Wed., 8/4) \_\_\_\_\_  
 Atlanta — A "Peach" of a Town (Mon, 8/2) \_\_\_\_\_  
 The Charm of the Old South (Tues., 8/3) \_\_\_\_\_  
 Atlanta's Homegrown Hits (Wed., 8/4) \_\_\_\_\_

### Spouse/Companion Events:

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### Registration Information

Send payment with registration to IAMFES, 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, IA 50322. Make checks payable to IAMFES. Pre-registration must be post-marked by July 9, 1993. The pre-registration deadline will be strictly observed. For additional information contact Julie Heim at 1-800-369-6337 (US), 1-800-284-6336 (Canada).

### Refund/Cancellation Policy

The IAMFES policy on meeting cancellation/refunds is as follows: "Registration fees, minus a \$15.00 processing fee, will be refunded for written cancellations post-marked at least two (2) weeks prior to the start of the meeting. No refunds will be made for cancellations made less than two (2) weeks prior to the start of the meeting, however, the registration may be transferred to colleague with written notification to IAMFES."

### Exhibitor Information

An exhibition of products and consultant services will be at the Stouffer Waverly Hotel. For more information on exhibiting at the conference, please contact Scott Wells at 1-800-369-6337, 1-800-284-6336 (Canada).

### Please check where applicable:

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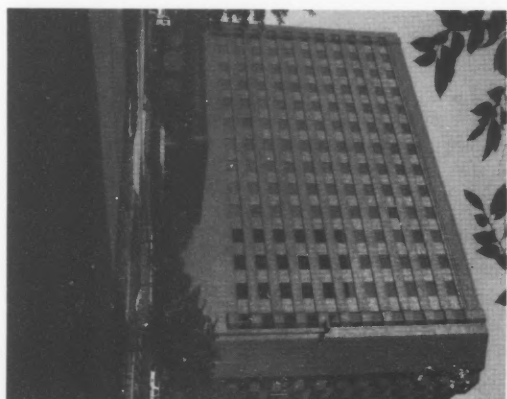
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August 1-4, 1993  
Stouffer Waverly Hotel  
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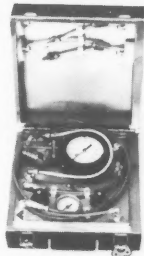
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The Preliminary Program for the 1993 Annual Meeting begins on page 244 of this issue. Registration forms may be found on pages 258-259.

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For Information on becoming a member of the **International Association of Milk, Food and Environmental Sanitarians**, please refer to page 264 of this issue.

# Coming Events

1993

## 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.

•**18-20, Milk Pasteurization Controls and Tests**, sponsored by the USPHS/FDA State Training Branch and the North Carolina Department of Environmental Health, to be held at North Carolina State University, Raleigh, NC. For more information call Richard Eubanks (301)443-5871 or Tom Williamson (919)733-3123.

•**17-20, 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.

•**26-28, National Conference on Health Education and Health Promotion** will be held in Atlanta, GA. For more information regarding submitting an abstract or on the conference, please contact Lydia Pendley, Health Promotion Bureau/PHD/DOH, 1190 St. Francis Drive, P.O. Box 26110, Santa Fe, NM 87502.

## June

•**4, Tennessee Association of Milk, Water and Food Protection's Annual Meeting** will be held at the Airport Ramada in Nashville, TN. For more information, please contact Dennis Lampley at (615)360-0157.

•**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)458-7281.

•**13-14, 47th Annual Rocky Mountain Region Foodservice and Lodging Convention** to be held at the Currigan Hall, Denver, CO. For more information contact the Colorado Restaurant Association, 899 Logan Street, Suite 300, Denver, CO 80203-9989.

•**15-17, Low Calorie Food Product Development (with IFT & CFDR)**, 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.

•**15-18, Advanced Workshop in Milk Processing**, sponsored by the USPHS/FDA State Training Branch and the Minnesota Department of Agriculture to be held in St. Paul, MN. For more information contact Richard Eubanks (301)443-5871 or Mike Krim (612)296-3647.

•**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).

•**10-11, Mini Workshop on the Management of Refrigerated and Frozen Foods in the Distribution System**, sponsored by Purdue, Michigan State and Ohio State Universities, will be held at the Hilton Inn at the Airport, Indianapolis, IN. For program information please contact James V. Chambers, Purdue University, at (317)494-8279, William C. Haines, Michigan State University, at (517)355-2176 or Winston D. Bash, Ohio State University at (614)292-7004.

•**16-20, Special Problems in Milk Protection**, sponsored by the USPHS/FDA State Training Branch and the Pennsylvania Department of Agriculture to be held in Harrisburg, PA. For course information contact Richard Eubanks (301)443-5871 or Paul Hogue (717)787-4316.



•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.

## September

•9-10, **Wisconsin Laboratory Association Annual Meeting** will be held at the Paper Valley Hotel, Appleton, WI. For more information please contact Wisconsin Laboratory Association, P. O. Box 28045, Green Bay, WI 54304.

•16-17, **Minnesota Sanitarians Association, Inc.'s Annual Meeting** will be held at the Earl Brown Center, St. Paul, MN. For more information contact Paul Nierman at (612)785-0484.

•20-22, **New York State Association of Milk and Food Sanitations 70th Annual Conference** will be held at the Holiday Inn, Genesee Plaza, Rochester, NY. For more information contact Janene Gargiulo at (607)255-2892.

•20-24, **Special Problems in Milk Protection**, sponsored by the USPHS/FDA State Training Branch and the Nevada Department of Human Resources to be held in Reno, NV. For more information contact Richard Eubanks (301)443-5871 or Joseph Nebe (702)687-4750.

•28-30, **Wyoming Environmental Health Association Annual Education Conference**, in conjunction with the Wyoming Public Health Association, will be held at the Casper Hilton Inn, Casper, WY. For further information contact Kenneth Hoff at (307)235-9340.

## October

•3-8, **1993 National Safety Council Congress and Exposition "World Class Solutions"** will be held at the McCormick

Place, Chicago, IL. For more information, please contact Robin L. Ungerleider at (708)775-2303.

•6-8, **Kansas Association of Sanitarians 64th Annual Educational Conference** will be held at the Doubletree Hotel, Overland Park, KS. For more information contact Galen Hulsing at (913)233-8961.

•13-14, **Annual Conference of the North Central Cheese Industries Association** to be held at the Sheraton Inn Airport Hotel, Minneapolis, MN. For further information contact E.A. Zottola, Executive Secretary, NCCIA, PO Box 8113, St. Paul, MN 55108.

•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.

## November

•14-16, **The Food Industry Environmental Conference and Exhibition**, presented by the Environmental Science and Technology Laboratory and Georgia Tech Research Institute, will be held at the Omni Hotel at CNN Center, Atlanta, GA. For more information contact Edd Valentine or Charles Ross at (404)894-3806.

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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# IAMFES

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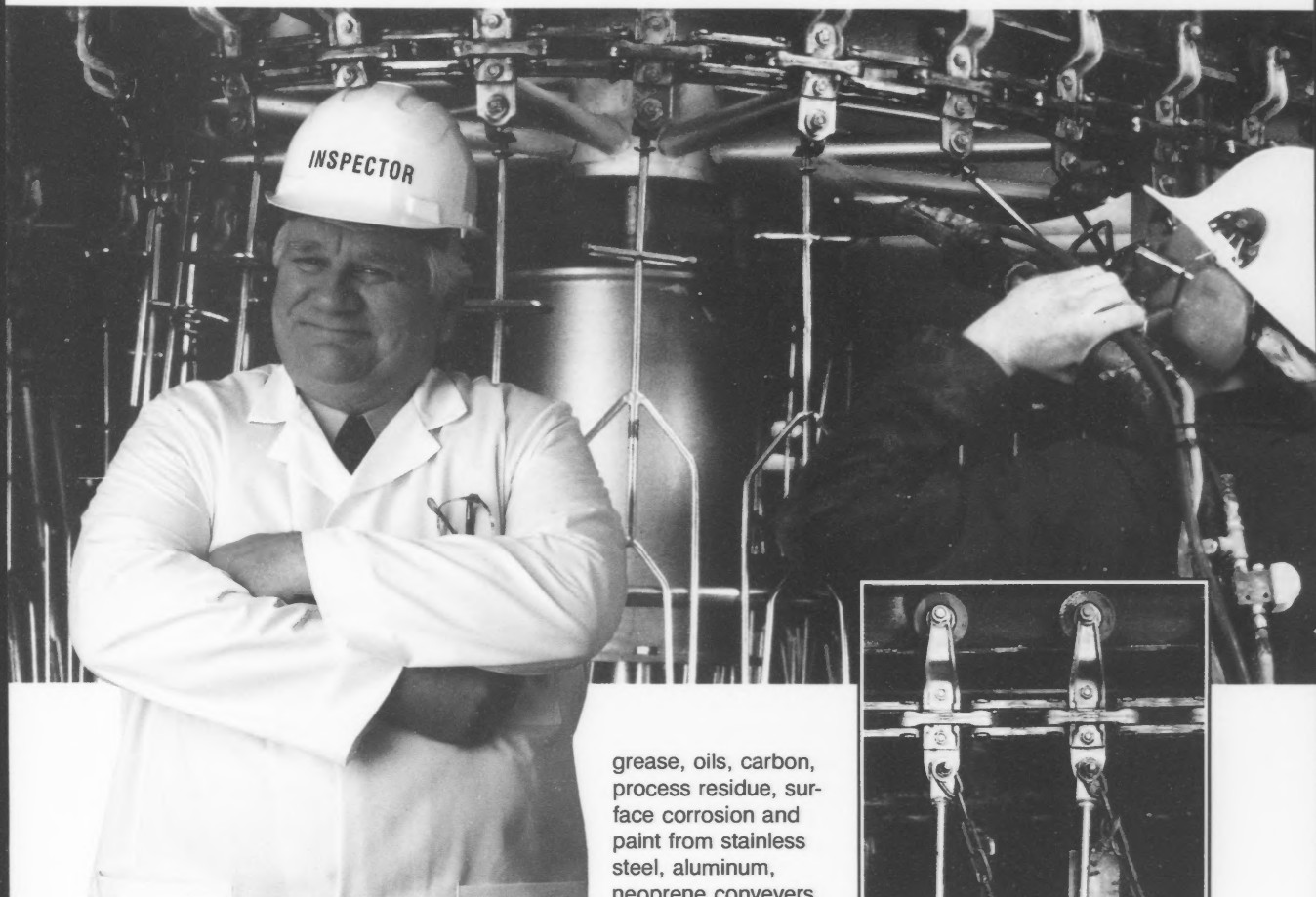
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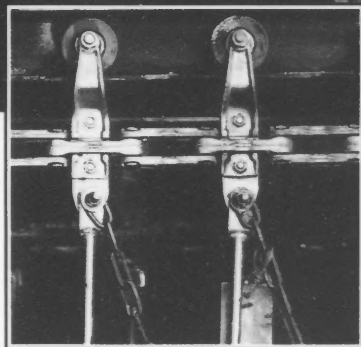
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# Take It Easy.

You know that the plant is under control. You've got a great HACCP program in place — centered on one reliable, comprehensive test system. Your Charm II.

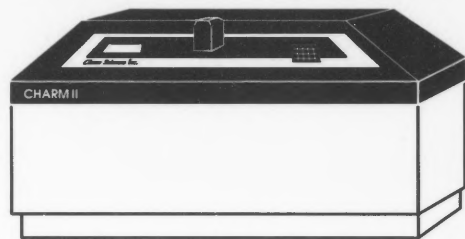
You use your Charm II for 8 families of antibiotics. Aflatoxins. Pesticides. Sanitation monitoring. Bacteria in raw and finished products. Alkaline phosphatase.



## *And now you know:*

- ✓ Your existing Charm Test System can be adjusted to meet changing regulatory requirements.
- ✓ The same Charm antibiotic tests that are used in the U.S. to match "safe levels" can be used in the Common Market to meet MRLs — only the control point differs.

So relax. No matter where you are in the world, no matter what you need to do...  
*nothing works like a Charm.*



# CHARM SCIENCES INC.

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Please circle No. 185 on your Reader Service Card  
Stop by our display at the 1993 IAMFES Annual Meeting

**Nothing works like a Charm.**



