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DAIRY, FOOD AND ENVIRONMENTAL

# Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

MARCH 1997

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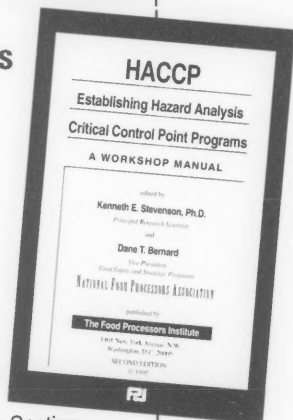
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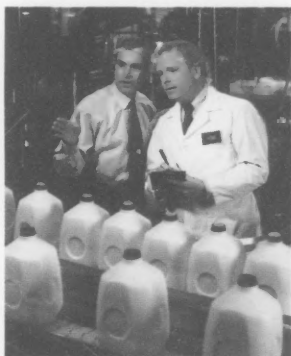
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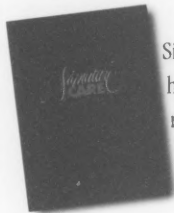
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# OFF THE TOP

## FROM THE PRESIDENT



By MICHAEL H. BRODSKY  
IAMFES President

### “Thinking strategically, planning for the future”

The Executive Board, in cooperation with IAMFES staff, have resurrected the Strategic Plan developed in 1993. That long range plan established four priority objectives for the organization. A number of strategies for achieving each of these objectives were identified and action plans were developed. In his column, published in the December 1993 issue of *DFES*, President Harold Bengsch presented an overview of the recommendations. Considering the number of changes that have transpired within IAMFES since then, it seems the time is appropriate to review these objectives, assess our achievements and plan a course for the future:

#### **Objective A: Expand the Membership**

##### **Strategy: A1. Identify other potential member pools.**

Action Plans: (i) Identify publications and other associations who have members/subscribers who may be attracted to IAMFES. (ii) Identify groups with similar interests whose members may benefit from IAMFES membership.

##### **Strategy: A2. Develop a membership recruitment/retention program.**

Action Plans: (i) Establish and charge a volunteer membership committee to assist staff with membership recruitment/retention program.

##### **Strategy: A3. Develop an effective membership data base.**

Action Plans: (i) Redesign membership renewal form to include both current demographic and professional information.

#### **Objective B: Develop Enhanced Education Program**

##### **Strategy: B1. Develop a speakers' bureau/panel of experts.**

Action Plans: (i) Get input from affiliates on their speakers and programs. (ii) Identify expertise of IAMFES Executive Board to serve as spokespersons, lecturers, etc.

##### **Strategy: B2. Encourage PDGs as developers of new programs/symposia/workshops.**

Action Plans: (i) Ensure that each PDG develop/submit specific programs/symposia/workshops to the Program Advisory Committee.

##### **Strategy: B3. Have IAMFES develop white papers on food safety/sanitation issues of significance.**

Action Plans: (i) Appoint and charge a "White Paper Development Group."

##### **Strategy: B4. Develop a tracking system for all requests for information, programs assistance, etc.**

Action Plans: (i) Develop an information specific request log.

#### **Objective C: Enhance Product and Service Offerings**

##### **Strategy: C1. Write a journal editorial policy.**

Action Plans: (i) Staff editor to work with volunteer editor to write formal editorial guidelines.

##### **Strategy: C2. Use formal research approach to define program content for education program development.**

Action Plans: (i) Develop a request for a proposal for a research organization to conduct research for education programing.

##### **Strategy: C3. Develop marketing plans for major project and service areas.**

Action Plans: (i) Develop marketing plans for membership development, educational programs and publications.

#### **Objective D: Develop a Formal Financial Plan**

##### **Strategy: D1. Incorporate investment policy, review of dues policy, identification of reserve target and policy regarding all revenue and expense streams to the association.**

Action Plans: (i) Write a preliminary plan for review by the Executive Board.

We will be devoting a significant amount of time to strategic thinking at our next meeting in Des Moines, April 27-29 and I would like to know your thoughts. Have we met your expectations in meeting these objectives? What new directions do you want IAMFES to take? Are there any strategies you would like to help develop? Your input is welcomed and encouraged.

As always, if you have any comments on this column, please don't hesitate to contact me (e-mail: brodskm@gov.on.ca, telephone (416) 235-5717, Fax (416) 235-5951).



## IAMFES GOLF TOURNAMENT AT THE GRAND CYPRESS GOLF CLUB

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**Come early and enjoy 18 holes of golf at the famous golf course designed by Jack Nicklaus.**

Before we deal with problems involving food safety and protection, let's get together for some fun and a GREAT round of golf! IAMFES has organized a FUN, BEST-BALL Tournament with you in mind. EVERYONE IS WELCOME, regardless of skill.

**About the Golf Course:** We are scheduled to play the "New Course" at the Grand Cypress Golf Club designed by Jack Nicklaus. The New Course pays tribute to the great courses of Scotland with features replicated in such a way as to conjure visions of the Old Course at St. Andrews. Similarities include large undulating greens, bridges, walls and long, grassy mounds. Golfers on the New Course will have the feeling of playing in an open meadow.

To join your friends and colleagues in a round of golf, call the IAMFES office at (800) 369-6337; (515) 276-3344 or Fax us at (515) 276-8655 to request a registration form. Hurry! Registration deadline is June 6, 1997!

**Companies:** Are you looking for a unique way to promote your company at the IAMFES Annual Meeting? IAMFES is looking for sponsorship support for this event. If you would consider providing quality prizes (or cash prizes) for the IAMFES Golf Tournament, we would like to hear from you. Call David Tharp at the phone numbers listed above for more details.

## MAKE PLANS NOW TO ATTEND THE 1997 IAMFES ANNUAL MEETING

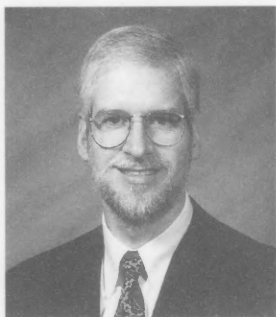
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# COMMENTARY

## FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP  
IAMFES Executive Director

### “Now is the time to review and revise the long range plan for IAMFES”

January 10th, I was appointed Executive Director of IAMFES. For those of you I haven't personally met, allow me to introduce myself. I'm David Tharp and I have had the pleasure of serving as the IAMFES Director of Finance and Administration for the past four years. During that time, my involvement has covered just about every aspect of our Association's operations. Prior to my employment with IAMFES, I worked in public accounting. My business and administrative experi-

ence will blend well with the new duties as Executive Director.

There are plenty of challenges ahead for our Association, but with input from members, the oversight of the Executive Board, and hard work from our staff, our goals can be attained! Besides, without challenges, life can become quite stale and boring.

Speaking of challenges and goals, setting goals already has become a priority. In 1992, or maybe even earlier, IAMFES embarked upon a strategic planning process. A professional consultant was hired to survey our Members' needs. Their report was issued in early 1993 detailing the survey results. In the December 1993 President's Column, Harold Bengsch outlined the objectives that resulted from the planning process. See President Michael Brodsky's column in this issue for a review of those objectives.

The objectives and the survey results have influenced our direction and decisions over the years, but there is now a need to redefine long range goals for IAMFES. These long range goals should be ones that we arrive at through studying all information that we have available. Most of the survey information is still applicable and useful. Some of the objectives and related plans have been implemented; other suggestions from the report are still in their infancy.

Now is the time to review and revise the long range plan for IAMFES. Without goals and planning how to achieve such goals, an association (or an individual for that matter), will just go along, doing what they have been doing, without ever improving or striving for higher levels. We, as an association, must set our goals, make them known and then work together to realize our goals. Much of the work will fall back upon our staff to actually carry out,

and we will need your help and support.

Coming up at the April 1997 Executive Board meeting, time will be set aside for our staff and Executive Board to work together on the long range plan for IAMFES. This will provide controlled growth that is necessary for the advancement of our Association. If you have input that you would like to share, feel free to contact me or a member of the Executive Board.

Related to our long range plan and the implementation of such a plan, I want to point out the size of our office staff. Members, and people in association management, are quite surprised when they find out the IAMFES staff consists of nine full-time and three part-time people! We are producing two monthly journals with a staff equivalent of 10.5 full-time employees. Many associations producing one monthly publication have a publication department of six to ten persons (or more). The quality and quantity of information that is disseminated through our Journals and other publications is just outstanding considering our staff size.

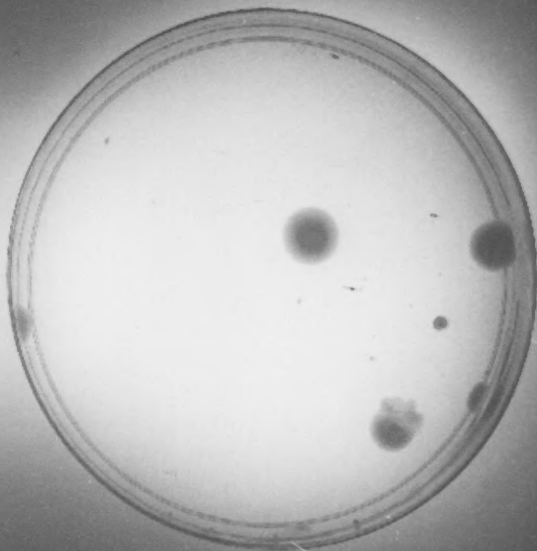
We are very fortunate to have a GREAT staff that puts forth excellent efforts on your behalf. Let me introduce them now (titles are shown on page 138): Lisa Backer, Donna Bahun, Julie Cattanach, Darci Davenport, Karla Jordan, Bryan Ladd, Rick McAtee, Carol Mouchka, Tanya Smith, Michelle Sproul, and Pam Wanninger. I have enjoyed working with each person of our staff and certainly look forward to working together to reach our common goals.

Many challenges ahead. An energetic Executive Board, involved Members and enthusiastic staff. When these factors come together, everything becomes possible! See you next month.

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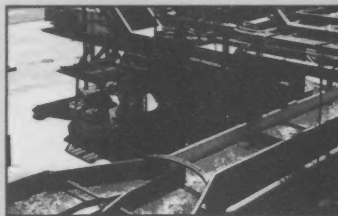
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# Disinfection of Kitchen Sponges and Dishcloths by Microwave Oven

P. K. Park<sup>1</sup> and D. O. Cliver<sup>2\*</sup>

## SUMMARY

Sponges and dishcloths are commonly suspected of harboring bacteria and cross-contaminating other food-contact surfaces in the kitchen, resulting in foodborne illnesses. Here, we report disinfection of food-contact materials using a common microwave oven. Exposures of 60 s were sufficient to kill  $10^7$  bacteria. Microwave heating appears to be a very efficient method for decontaminating cellulose sponges and cotton cloths

## INTRODUCTION

Earlier studies have shown that cloths, sponges, and other kitchen food contact surfaces (together with hands) were important factors in cross-contamination (3, 4, 5, 8). Random samples of domestic cloths and sponges showed that 74% were contaminated with either *Escherichia coli*, *Staphylococcus aureus*, *Streptococcus* (now *Enterococcus*) *faecalis*, or *Clostridium perfringens*. More than half of these positive samples had  $\geq 10^5$  colonies (9). Furthermore, it has been shown that bacteria can grow in these environments (from  $1.7 \times 10^2$  to  $2.5 \times 10^6$  CFU/cm<sup>2</sup> in 3 days) (7). Transfer of bacteria from these and other contaminated surfaces, such as sinks and cutting boards, in significant numbers has been shown (6), and demonstrating that these cleaning wipers served as

bacterial reservoirs and also as cross-contaminating agents. It is believed that this problem is responsible for a significant portion of foodborne illnesses each year.

In nonfood-related areas, both infant-bath sponges and loofah sponges have been implicated in harboring and promoting *Pseudomonas aeruginosa* that causes the skin disease folliculitis (1, 2).

In spite of the serious nature of this problem, there have not been serious attempts to find effective methods to disinfect these and other food-contact surfaces in the home (10).

During the past two decades, the microwave oven has become a very common appliance in kitchens of the developed world. This study addressed the effectiveness of the microwave in disinfecting cellulose

sponges and cotton dishcloths in the home kitchen.

## MATERIALS AND METHODS

### Bacterial cultures

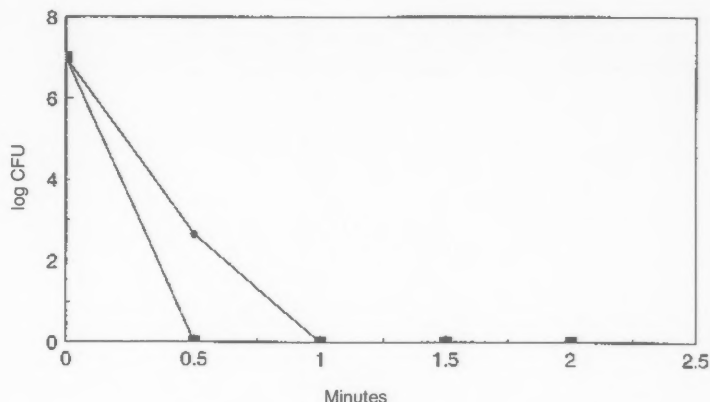
Overnight cultures (at 37°C) of *E. coli* K12 Hfr (ATCC 23631), *E. coli* O157:H7 (provided by Dr. Charles Kaspar, Food Research Institute, University of Wisconsin-Madison) and *S. aureus* (provided by K. A. Glass, Food Research Institute, University of Wisconsin-Madison) were used. The cultures were grown in brain heart infusion (BHI) broth or skim milk (Difco, Detroit, MI). Bacteria were inoculated onto the surface by depositing 1.0 ml of the culture (at  $10^5$  to  $10^9$  CFU/ml) with a 1.0 ml disposable pipette over an area of 25 cm<sup>2</sup>. Plate counts were done on BHI agar (Difco, 1.5%).

### Preparation of sponge and cloth

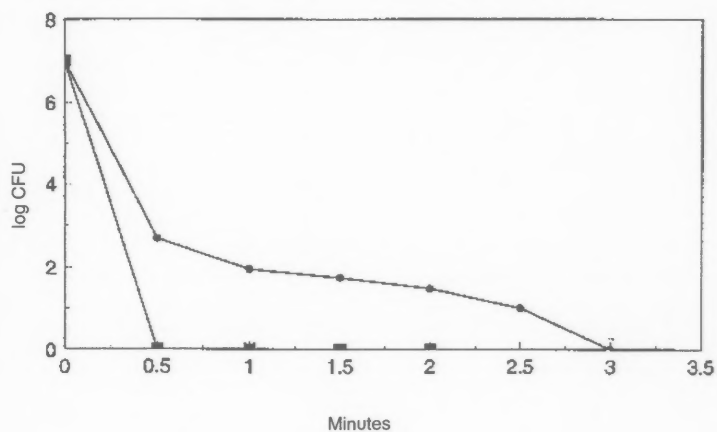
Cellulose sponges (National Sanitary Co., Sacramento, CA) and cotton dishcloths (Darra Inc., N. Hollywood, CA) were purchased at retail outlets. Sponges were cut into  $5 \times 5 \times 2$  cm pieces (face area 25 cm<sup>2</sup>). Dishcloths were cut into  $5 \times 5 \times 0.3$  cm pieces (face area 25 cm<sup>2</sup>). Full-size sponges ( $17.5 \times 10 \times 4$  cm) and dishcloths ( $40 \times 35 \times 0.3$  cm) were also tested. All were sterilized in an autoclave for 20 min at 121°C before use.



**Figure 1.** Recovery of *E. coli* from dry (•) and wet (□) full-size sponges. Approximately  $1 \times 10^7$  CFU was inoculated (volume of 1.0 ml) on an area of 25 cm<sup>2</sup> in the middle of the sponge and exposed in the microwave oven (800 W) for 0.5, 1.0, 1.5, and 2.0 min. Both the ogor syringe (direct contact) and liquid rinse sampling methods were used. The composite values are presented in the figure. The dry and wet sponges weighed 50.3 g and 111.1 g, respectively. A value of 0 indicates that no viable bacteria were detected.



**Figure 2.** Recovery of *E. coli* from dry (•) and wet (□) full-size dishcloths. Approximately  $1 \times 10^7$  CFU was inoculated (volume of 1.0 ml) on an area of 25 cm<sup>2</sup> in the middle of the cloth and exposed in the microwave oven (800 W) for 0.5, 1.0, 1.5, and 2.0 min. Both the agar syringe (direct contact) and liquid rinse sampling methods were used. The composite values are presented in the figure. The dry and wet dishcloths weighed 50.1 g and 138.4 g, respectively. A value of 0 indicates that no viable bacteria were detected.



### Microwave treatment

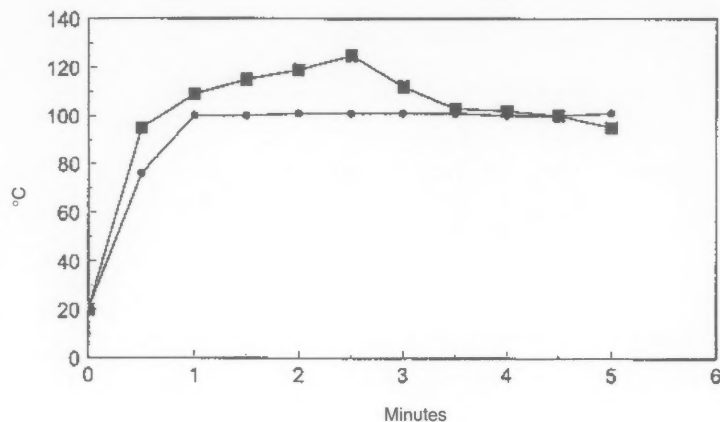
A General Electric (Louisville, KY) Spacemaker microwave oven, model JEM31M, with an output of 800 W at 2450 MHz and a built-in temperature probe, was used. Samples were placed in the center (to avoid cold spots) and were heated at the highest setting. Temperatures of sponges were monitored during microwave heating by fiber optic probe and sensing units (Model 1400, Metricor Inc., Woodinville, WA). The probes were inserted through the rear of the oven and implanted into the contact material. A thermocouple (Atkins Technical Inc., Gainesville, FL, Model 38653-K) was used to determine the temperature of dishcloths.

### Sampling methods

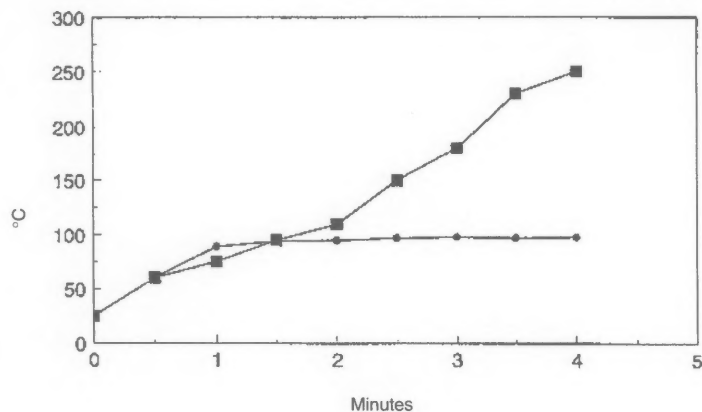
**Direct contact:** BHI agar plates (1.5%) were used to make contact impression by putting the contact material face down on the agar surface and pressing gently for 20 s so that all four corners made an imprint on the agar. With cloth, a forceps was used to lift it onto the agar surface and to apply pressure. On full size sponges and cloths, an agar-filled syringe with an open-ended barrel was used for sampling. The agar end of the syringe was placed over the contact area and pressed gently for 20 s. Then, the protruding end was sliced off with a sterile knife and placed in a petri dish for incubation. Pushing on the plunger made a new agar surface available for surface sampling.

**Liquid rinsing:** After microwave exposure, the sponge or cloth was saturated with 10.0 ml of sterile water, and then, manually squeezed (with sterile gloves) to push the maximum amount of extractant liquid onto an individual sterile petri dish. For cell enumeration, 100  $\mu$ l of the liquid was plated on BHI agar for overnight incubation at 37°C and counted with a Quebec Colony Counter. For plates with very high numbers (i.e. greater than 1000 CFU), an estimate was acquired by counting one-eighth of the plate and then multiplying by eight.

**Figure 3.** Temperature profile of dry (•) and wet (□) full-size sponges during microwave heating measured with a fiber optic thermometer system.



**Figure 4.** Temperature profile of dry (•) and wet (□) dishcloths during microwave heating measured with a thermocouple.



## RESULTS AND DISCUSSION

### Normal growth at room temperature

Both dishcloths and cellulose sponges promoted growth of *E. coli* at room temperature (22°C). Bacteria inoculated at 10<sup>3</sup> CFU per piece of dishcloth or cellulose sponge grew about 2 logs in 24 h in skim milk and about 1.5 logs in water (data not shown).

### Microwave kill on sponge

On a test sponge inoculated with 10<sup>9</sup> CFU of *E. coli*, *E. coli* O157:H7, or *S. aureus*, no CFU were detectable by the direct plate contact or liquid rinse sampling methods after ≥ 30 s of microwaving. With full-size sponges inoculated with 10<sup>7</sup> CFU of *E. coli*, no viable cells were found after 30 s on dry surfaces, but with wet (saturated with water, then wrung) sponges, equal kill took 60 s (Figure 1). Dry natural sponge (of marine *Demospongiae* species) did not heat in the microwave oven, whereas wet natural sponges were apparently damaged by microwave heating (data not shown).

### Microwave kill on dishcloth

On test cloths inoculated with 10<sup>9</sup> CFU and sampled via the direct contact plate method, viable *E. coli* counts reached 0 after 30 s of full-power microwaving. On a full-size dishcloth inoculated with 10<sup>7</sup> CFU of *E. coli*, no viable cells were detectable after 30 s on a dry cloth surface, but on a wet surface, 2 log CFU were still detectable after 120 s. Full 3 min exposure was required to kill all remaining bacteria (Figure 2).

### Temperatures

Temperatures during microwave exposure of cellulose sponges were measured using special fiber optic probes. Temperatures rose near 100°C in about 1 min for both dry and wet sponges, but the former rose to 135°C before returning to 100°C about 2 min later (Figure 3). A wet sponge

remained at ~100°C throughout the 5 min heating period. A wet dishcloth showed a similar profile by climbing to 100°C during the first min and remaining there for the rest of the 4 min (Figure 4). A dry cloth, however, heated steadily until it reached ~250°C after 4 min. It started to smoke at this stage. The dry sponge, on the other hand, never showed any sign of burning or smoking. We have demonstrated that a microwave oven is very effective in killing bacteria in cellulose sponges and cotton dishcloths. In most cases, exposure of about 1 min was sufficient to eliminate 10<sup>7</sup> bacteria. The high temperature induced by the microwave energy may be responsible for the high kill. We believe that this method is a simple and potent way of disinfecting these food-contact surfaces in the home kitchen.

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#### ACKNOWLEDGMENTS

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# HACCP, Statistical Process Control Applied to Post-mortem Inspection and Risk Analysis in Canadian Abattoirs

Jean-Robert Bisailon,<sup>\*1</sup> Robert Charlebois,<sup>2</sup> Tom Feltmate,<sup>3</sup> and Yves Labbé<sup>4</sup>

## SUMMARY

Control measures currently used in federally registered abattoirs and new inspection tools are briefly described. The application of HACCP (Hazard Analysis Critical Control Point), covering all steps at the abattoir in the processing of animals into meat products, allows better control over microbial, physical, and chemical hazards related to food production. Control of zoonotic conditions per se is still best achieved through organoleptic inspection (postmortem inspection). The latter may be subject to considerable change in Canada, including the use of Statistical Process Control to assess the application of policy related to pathological defects and the use of Risk Analysis in developing these policies.

## INSPECTION OF FEDERALLY REGISTERED CANADIAN ABATTOIRS: REVIEW OF THE EXISTING SITUATION

Canada has approximately 160 federally registered abattoirs. Of these establishments, 62 slaughter adult cattle, 56 slaughter calves, 51 slaughter hogs, 40 slaughter sheep, lambs, and goats, 5 slaughter horses, 69 slaughter poultry (hens, chickens, and turkeys), and 37 slaughter other species. Federal

establishments slaughter annually approximately 2,500,000 adult cattle (primarily dairy culls in Eastern Canada and beef cattle in Western Canada), 250,000 calves, 14,500,000 hogs, 14,000 sheep, 85,500 lambs, 60,000 horses, 450,000,000 chickens, 30,000,000 hens, and 19,000,000 turkeys (4). Approximately 95% of Canada's commercial livestock is slaughtered in federally registered establishments for the international and interprovincial trade in meat

products and by-products. The remainder is slaughtered in provincially or municipally inspected establishments. Slaughtering conditions are regulated primarily by the Health of Animals Act and Regulations, the Meat Inspection Act and Regulations, and the Food and Drugs Act and Regulations. The first two of these Acts are administered by Agriculture and Agri-Food Canada (AAFC) and the third by Health Canada. All animals slaughtered in federal establishments are inspected before and after slaughtering by primary product inspectors (PPIs) employed by AAFC under veterinary supervision. Carcasses showing serious anomalies are examined by a veterinarian, who determines whether the carcass is fit for consumption and, provided the entire carcass is not condemned, how the lesions are to be eliminated. Approximately 1150 primary product inspectors and 250 veterinarians are employed in federally registered abattoirs, under the supervision of a chief veterinarian in each establishment.

In addition to the organoleptic inspection of the carcasses performed to assess public health conditions or to protect export

markets for live animals and meat products, AAFC conducts an annual program of microbiological and chemical monitoring of carcasses. This program identifies the microbial agents or chemical residues requiring particular attention. Then, more intensive surveillance program or an inspection program to identify offending producers and take corrective measures is put in place. One of the organisms of particular interest in abattoirs is *Trichinella spiralis* in hogs and horses. To protect export markets for meat products, 25,000 to 30,000 hog carcasses (2) are tested each year. All horse carcasses exported to the European Union must also be tested and declared free of *Trichinella*. To date, all horse samples collected and analyzed by AAFC have tested negative and only four hogs have tested positive. Chemicals monitored include:

- antibiotics and sulfa drugs in all species - nearly 100,000 specimens analyzed, including rapid tests (see below);
- carbadox in hogs, chickens, and turkeys - 855 specimens;
- dimitridazol in hogs, chickens, and turkeys - 413 specimens analyzed;
- nitrofurans in cattle, hogs, chickens, and turkeys - 215 specimens analyzed;
- ivermectin in cattle, sheep, and hogs - 551 specimens analyzed;
- in cattle, sheep, hogs, and horses: zeranol - 837 specimens analyzed; DES and other stilbenes - 837 specimens analyzed; trenbolone acetate - 97 specimens analyzed; melengestrol acetate - 213 specimens analyzed; other growth stimulants - 27 specimens analyzed; clenbuterol and other beta agonists - 576 specimens analyzed;
- antithyroid drugs in cattle - 175 specimens analyzed;
- tranquilizers in cattle and hogs - 50 specimens analyzed;

- coccidiostats in cattle, chickens, and turkeys - 1087 specimens analyzed;
- pesticides and polychlorinated biphenyls (PCBs) in all species - 2166 specimens analyzed;
- chlorophenols in cattle, sheep, hogs, chickens, and turkeys - 2100 specimens analyzed; and
- heavy metals in all species - 8217 specimens analyzed.

Each year, AAFC publishes the detailed results of these analyses in the Annual Report on Chemical and Biological Testing of Agri-Food Commodities (2).

Regular surveys are also performed in federal abattoirs to obtain information on public health conditions or to protect export markets for live animals and meat products. These include serological surveys to determine the prevalence of *Trichinella spiralis* in sows or *Toxoplasma gondii* (8) in market hogs or the prevalence of microbial agents, such as *Salmonella* spp., *Campylobacter* spp., or *E. coli* O157:H7 in animal carcasses.

Finally, a number of rapid tests are performed in abattoirs to detect drug residues in animals. These include the STOP (Swab Test On Premises) and CAST (Calf Antibiotic Sulfa Test) tests, which are used to detect residues of antibiotics or sulfa drugs in suspected animals. If the test is positive and is subsequently confirmed by a reference laboratory, the carcass and offal are condemned. In the case of sulfa residues in market hogs, an intensive screening program permits identification of the producers responsible and follow-up efforts in cooperation with them to correct the situation. The program begins with random screening tests. When an offending producer is identified, a waiting period is established, after which a number of hogs, representative of the lot, are sent to the abattoir for testing. If these sentinel hogs are free of sulfa drugs, the rest of the lot may be slaughtered. Otherwise, the

submitted carcasses will be condemned, and other hogs must be submitted. The test used is the SOS (Sulfa On Site), performed on urine. Positive tests at the abattoir must be confirmed in the laboratory.

Inspection programs must be adapted to meet today's realities, particularly the financial pressures created by the budget deficit and shared by most Western governments and the fact that organoleptic inspection methods were not designed to eliminate the principal microbial hazards associated with the consumption of meat products (10). These pressures are forcing governments to redefine their activities, particularly in terms of the most effective and economical ways of providing inspection services in abattoirs. Three tools to satisfy these requirements are currently being developed in Canada: the HACCP program, Statistical Process Control of postmortem inspections, and Risk Analysis applied to the conditions encountered in abattoirs.

#### **DISTINCTION BETWEEN FOOD HAZARDS RELATED TO THE PROCESSING OF CARCASSES IN ABATTOIRS, AND THOSE ASSOCIATED WITH CONDITIONS OR DISEASES AFFECTING ANIMALS SENT TO THE ABATTOIR**

Before we proceed with our discussion of the HACCP program, Statistical Process Control, and Risk Analysis, an important distinction must be made. The 1985 report of the National Research Council (NRC) (10), pertaining to meat and poultry inspection in the U.S., criticized government inspection agencies primarily for their inability to protect consumers from diseases caused by the contamination of food by microbial agents, despite the extensive human and financial resources devoted to meat inspection. It is our opinion that the recent episode of food poisoning linked to *E. coli* O157:H7 (11)

clearly illustrates the gap between consumer expectations with respect to food safety and the inability of government agencies to guarantee pathogen-free foods. Consumers have misinterpreted the nature of the inspection services provided in abattoirs by governments to date. The responsibility for producing safe and wholesome foods lies with producers, not with government agencies. In addition, the ante- and postmortem inspection services have been concerned, as they still are, primarily, with detecting and eliminating defects or pathological conditions in animals. The NRC report did not question the value of this aspect of the work performed by the government agencies, but rather the wisdom of devoting such extensive resources to it, in view of the fact that the risks associated with animal diseases were lower than those related to processing. For example, does it make sense for a government agency to have three full-time inspectors on a chicken evisceration line, watching for animal diseases which probably have little impact on consumer health? Is this really the most useful role which these agencies can play? Should the responsibility for screening animals for conditions which, in virtually all cases, affect the organoleptic quality of the carcass rather than its safety, lie with the producer instead (under government supervision)? Should the human and financial resources devoted to meat inspection in abattoirs be used elsewhere, or in a different manner, to maximize the efforts invested in reducing the impact of microbial contamination associated with the processing of animals into meat products?

#### **OBJECTIVE AND SCOPE OF THE HACCP PROGRAM FOR ABATTOIRS, STATISTICAL PROCESS CONTROL, AND RISK ANALYSIS IN ABATTOIRS**

As noted earlier, AAFC encourages approved abattoirs and processing plants to use systems based

on HACCP, Statistical Process Control, and Risk Analysis. The HACCP program is designed, essentially, to reduce the hazards associated with the processing of animals into meat products. This is AAFC's proposed strategy in response to consumer concerns regarding the safety of meat products.

Statistical Process Control and Risk Analysis with respect to the pathologies or conditions encountered in abattoirs relate to a single element of this processing operation, the postmortem inspection. This is AAFC's proposed strategy for more effective and economical use of its human and financial resources.

#### **HACCP program in Canadian abattoirs**

The HACCP program is the international approach recommended as the most effective in ensuring food safety (7). The FSEP (Food Safety Enhancement Program) is AAFC's effort to promote the use of HACCP principles in AAFC-approved agri-food establishments and egg grading stations, including abattoirs. As indicated earlier, HACCP permits the transfer of the inspection effort from final examination of the meat product to the inspection of controls involved in manufacturing the product. The sources of microbial, physical, or chemical hazards on the processing line, over which effective controls can be established, are known as critical control points (CCP). Monitoring of these points, combined with immediate corrective action to remedy any deviations from pre-established critical limits, ensures that the meat products, thus manufactured, are not only more wholesome, but more consistently wholesome. HACCP is a dynamic and preventive system designed to ensure consumers of the most wholesome food products possible.

AAFC's role in an establishment's HACCP program is to conduct periodic audits to ensure

that the system is operational. AAFC has been an international leader in developing HACCP programs and generic models (3). The role of the establishment's operator is to develop and implement HACCP plans based on these generic models, document them, train employees, ensure that the prerequisite programs required for implementing the HACCP plans are in place (suitable premises, equipment maintenance and calibration programs, clean water controls, sanitation, vermin control, transportation and storage control, personnel training, and recall of defective products), monitor the CCPs, follow, as required, the predetermined corrective measures, verify the effectiveness of the HACCP plans, and keep the necessary records.

Generic HACCP models have been developed specifically for the slaughtering of cattle, hogs, and poultry. These models identify biological, chemical, and physical hazards, determine CCPs, and, for each CCP, specify the critical limits beyond which corrective measures must be taken, the procedures for monitoring, correction, and verification, and the records to be kept.

The following is an example of a ten-point HACCP approach, based on a generic model, for an abattoir (3):

1. Formation of the establishment's HACCP team and appointment of the HACCP coordinator.
2. Evaluation and implementation of the prerequisite programs.
3. Description of the product and process, description of the product's use, preparation of a flow chart showing plant operations, and on-site verification of the accuracy of the information.
4. Identification of the biological, chemical, and physical hazards associated with incoming animals and with the stages of production at which these hazards appear. The producer may

use the generic HACCP model to assist in developing a specific HACCP plan for his operations.

5. Determination of the critical control points, that is, the stages of production at which action can be taken to control the identified hazard.
6. Definition, of the critical limits, for each of the critical points, the procedures for monitoring, correction, and verification, and the nature of the records to be kept.
7. Review of the HACCP plan by AAFC.
8. Employee training.
9. Implementation of the system, break-in period, and verification of the effectiveness of the HACCP plan.
10. Regular audits by AAFC.

The use of HACCP in federally registered abattoirs is not mandatory in Canada. The major incentive to implement such a system is primarily commercial, particularly in the beef industry, where some restaurant chains require their suppliers to establish HACCP systems. International pressures will also have a great deal of impact on the degree to which HACCP-based systems are adopted. In fact, many countries, including some of our most important trading partners, plan to regulate HACCP systems. In addition, HACCP is recommended by a number of international groups, such as the *Codex Alimentarius Commission* (CAC) and the International Commission on Microbiological Specifications for Food. It should also be noted that the *Codex Alimentarius* will be used as an international reference by the World Trade Organization (WTO) to assess national health measures in the event of trade disputes.

In 1995, the U. S. Department of Agriculture (USDA) proposed to regulate the HACCP approach for red meat and poultry products. This proposal will require the implemen-

tation of HACCP systems and will inevitably affect Canadian exporters. The final regulation was published on July 25, 1996, making HACCP systems mandatory in meat and poultry establishments by the year 1998 to 2000 (depending on the size of the plant). This regulation requires implementing HACCP systems not only in the U. S. but also in any foreign establishments exporting meat or poultry to the U. S. The U. S. Food and Drug Agency (FDA) will require the use of HACCP in seafood plants in 1997.

The European Union has issued a number of directives based on HACCP principles. Final coordination of national regulations is currently in progress. We can expect HACCP to be mandatory for exports to Europe and Japan in the near future.

The HACCP approach, proposed in the context of the Food Safety Enhancement Program (FSEP), is consistent with that recommended by the *Codex Alimentarius Commission*. This approach is internationally accepted and should lead to greater recognition of the HACCP plans developed in Canada, and, thus facilitate international trade in Canadian agri-food products.

#### **Statistical process control in federally registered Canadian abattoirs**

Statistical Process Control (SPC) was initially developed to meet the military demand for supplies of acceptable quality in sufficient quantity. Because of their efficiency, these control methods were immediately adopted by the manufacturing industry. Commercial pressures have virtually forced manufacturers to use these methods, either independently or as one component of a quality assurance system. These methods are extremely promising in agri-food inspection. Essentially, Statistical Process Control involves a standardized set of sampling designs and

procedures on which to base the acceptance or rejection of a lot and, thus, permits control of the various aspects of the production process. In other words, by sampling a representative proportion of a population of objects (foods) produced by a given manufacturing process and taking the measures required to correct the process when the sampling shows deviations not attributable to the sampling variation, the process can be controlled. As a result, the foods produced are consistently of acceptable quality. Since no process is perfect, every production lot, inevitably, will include some defects. The sampling designs and strategies are, thus, adjusted to reflect the desired level of quality. If the process in question involves continuous batch production, the desired quality index is known as the AQL (Acceptable Quality Level). By using these designs and procedures for rejection or acceptance and maintaining control over the process, the manufacturer can have a given degree of certainty that production will not be unnecessarily rejected (false positive). An example of standardized SPC with sampling designs and procedures for acceptance or rejection for continuous batch production is ISO 2859-1 sampling procedures for inspection by attributes (9).

To obtain efficiency at the lowest possible cost, AAFC has decided to apply SPC to inspection procedures in poultry processing plants. It is important to remember that, in Canada, carcasses must be inspected individually. The inspection can be broken down into three phases: inspection of the cavity, inspection of the viscera, and inspection of the carcass exterior. An agreement has been reached with the Canadian poultry industry transferring the responsibility for inspection of the cavities of chicken carcasses from the AAFC inspector to an employee of the abattoir. To ensure that these inspections are properly carried out, primary product inspectors

(PPIs) employed by AAFC perform statistical controls of the inspection process. This SPC uses the ISO 2859-1 sampling designs and acceptance and rejection procedures mentioned above.

The configuration of the inspection system can be summarized as follows: a presenter-inspector (plant employee) inspects the cavities, and PPIs (AAFC employees) inspect the viscera and carcass exteriors. Each hour, a PPI samples the number of chicken carcasses indicated in the ISO 2859-1 tables and ensures that the internal cavity inspection process is under control. The defects monitored are pathologies associated exclusively with inspection of the cavities of chicken carcasses: airsacculitis, pericloacal cellulitis, salpingitis, and fecal contamination.

SPC in poultry processing plants relieves PPIs of the responsibility for hands-on inspection of individual carcasses and assigns them to supervisory tasks instead. AAFC is able to make much more efficient use of its employees by freeing them from repetitive tasks, thus, making better use of their expertise and minimizing the injuries associated with repetitive movements. The use of SPC also places the responsibility for inspection where it belongs, on the operator of the processing plant, in accordance with the principle that an agency which creates a risk by producing a given good and derives a profit from doing so should bear the cost associated with controlling this risk (5). The responsibility for inspecting the internal cavities of the carcasses could have been transferred without the introduction of SPC. However, to demonstrate to Canadian consumers and our trading partners that the transfer of responsibility will have no adverse impact on the safety of the food thus processed, AAFC has opted to use SPC.

### **Risk analysis in abattoirs**

As mentioned previously, consumers of meat products are

exposed to two types of food-poisoning hazards, those associated with the processing of animals into meat products and those associated with pathological conditions in the animals delivered to the abattoir. It is generally accepted that the hazards associated with animal pathologies have minimal impact on human health and that they are well controlled by organoleptic inspection (with a few exceptions, including *Trichinella spiralis* in hogs, which must be controlled by freezing, cooking, or curing pork products). Risk Analysis of the conditions associated with the processing of animals, such as contamination by *Salmonella* or *Campylobacter* spp., is justified primarily as an approach, rather than an end in itself. A risk assessment approach produces an estimate of the number of cases of disease and death associated with a given condition, together with the associated costs. In the case of the contamination of carcasses by *Salmonella* or *Campylobacter* spp., this information, while somewhat controversial, is already available (6). The development of a Risk Analysis model for these conditions serves no purpose except in terms of the approach involved. Risk assessment can be broken down into hazard recognition, hazard characterization, evaluation of exposure, and risk characterization. This approach makes it possible to clarify various aspects of the behavior of a microbial agent and, thus, coordinates well with a HACCP approach focusing on the critical stages at which effective intervention can reduce or eliminate the risks associated with a process.

In terms of meat inspection at the abattoir, particularly postmortem inspection, the results of Risk Analysis are important in evaluating the extent of the inspection effort to be devoted to an emerging condition or in reviewing the effort devoted to a recognized condition. Two examples may be useful here. We know that a substantial propor-

tion of market hogs are infested by the parasite *Toxoplasma gondii* (8). We also know the consequences of infestation in human beings, particularly pregnant women and individuals with compromised immune systems (1). Only Risk Analysis allows us to answer the following questions: What is the impact of pork consumption on human health? If pork consumption is a major factor, how much effort should be devoted to inspection? What are the critical points on which the inspection effort should focus? How extensive should this inspection effort be?

A second example of the use of the principles of Risk Analysis in the abattoir, to determine whether existing inspection efforts should be maintained, involves poultry carcasses with bluish skin and meat. In Canada, these poultry carcasses are condemned. The condition involves a single defect of a turkey or chicken carcass, cyanosis of the skin and muscles of the breast. The condition is believed to be associated with lack of oxygen during transportation to the abattoir. As indicated earlier, inspectors watch for these dark-colored carcasses on the evisceration lines and condemn those showing marked discoloration. This is one of the major grounds for condemning chickens and turkeys in Canada. Because of the presumed cause of this condition, which is noninfectious, and the significant losses incurred by the Canadian industry as a result of the condemnation of these carcasses, the justification for condemning carcasses of this kind for an aesthetic flaw has been questioned. Under the existing regulations and by national or international standards, condemning these carcasses is justified. In response to the concerns expressed by the Canadian industry and as Canada's contribution to the efforts by New Zealand, Australia, the U. S., and Canada to develop the principles of Risk Analysis for application to postmortem inspections of animals, AAFC has undertaken a Risk Analysis of this condition.



This Risk Analysis is intended to determine whether this condition represents a risk for consumers and, if not, whether a product of this kind is acceptable for marketing. The approach adopted by AAFC includes all aspects of Risk Analysis and will serve as a model for similar approaches in the future. The first step in this Risk Analysis is to assess the probability that a condition of this nature will cause food-related illness in consumers and, if so, the severity of the condition. This study is being conducted by the Animal and Plant Health Risk Assessment Network of AAFC. In addition, an evaluation of the biochemical quality of meat of this kind is being performed, to be followed, if applicable (assuming the product proves to be wholesome), by organoleptic evaluation. If it is determined that meat of this kind poses no threat to consumers, the second step will be to bring together all the members of the food chain affected by the possible marketing of such a product, including processors, retailers, restaurant owners, and consumers. The goal of this approach will be to determine the feasibility and desirability of using meat of this kind and how it can be used (in processed or unprocessed form, over the counter) in a manner acceptable to all parties. Our trade partners must also be informed of any change.

In conclusion, HACCP is one available tool for developing systems promoting the production of wholesome foods. It will soon be mandatory for exports to our major

trading partners. The HACCP approach, proposed as part of the Food Safety Enhancement Program (FSEP), is consistent with that recommended by the *Codex Alimentarius Commission*. Extensive changes are anticipated in the postmortem inspection of carcasses to incorporate the principles of Risk Analysis and Statistical Process Control, which are also recognized internationally. In this way, AAFC hopes to place its inspection programs on a solid scientific footing and, at the same time, to reassure the public that it is making optimal use of the human and financial resources assigned to meat inspection.

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# HACCP/ISO 9000: Commonalities and Distinctions

Debby Newslow

## SUMMARY

The purpose of this text is to discuss the commonalities and distinctions between HACCP and ISO 9000. Food industries should not try to choose between one or the other. Individually they are both excellent programs. *Integration of the two can bring the best of both plus much more.*

## INTRODUCTION

HACCP (Hazard Analysis Critical Control Point) is very important to the food industry. There are very few food industry professionals who have not, at the very least, thought about HACCP relative to their product. For some industries, it is only a matter of time before a HACCP program is required. At this time it doesn't appear that ISO will become a regulatory requirement in this country, but the fact that it brings structure and discipline to a management system makes good business sense.

*Quality system, quality management, and critical control point* are important terms that will be referred to several times throughout this text. *Quality system* is "the organizational structure, procedures, processes, and resources needed to implement

quality management" (4). *Quality management* refers to "all activities of the overall management function that determine the quality policy, objectives and responsibilities and implement them by means such as quality planning, quality control, quality assurance and quality improvement within the quality system" (4). A *critical control point* (CCP) is defined as "any point or procedure in a specific food system where loss of control may result in an unacceptable health risk" (5).

ISO 9000 refers to a group of international standards containing a specific group of clauses directed at the quality management process of an organization. The standard is generic and can be applied to any industry. ISO does not mandate redesign of a process but provides the foundation and the discipline necessary to create an effective

quality management system. In fact, one of the biggest mistakes that can be made is to redesign a process to match ISO requirements. *Integrating* the ISO structure into the system is the key to a successful program.

*HACCP*, as defined by Dr. Ron Schmidt of the University of Florida in Gainesville, is a "logical system designed to identify hazards and/or critical situations and to produce a structured plan to control these situations" (7). HACCP is an activity developed to identify and control potential hazards critical to consumer safety. This is accomplished by identifying *critical control points* and defining procedures and/or activities to ensure their control. The *focus* of *HACCP* is on *product* safety.

According to Blakistone and Bernard of the National Food Processors Association (NFPA) in "Introduction to Hazard Analysis Critical Control Point System," HACCP can be defined as "a preventative system for assuring the safe production of a food product" (2).

Jon Porter of Porter and Associates, a renowned consultant in the food industry, goes one step further and defines HACCP as "a management tool directed to control risk and provide safe, quality products while generating profit" (6).

The *ISO 9000* standards make up a management process providing the foundation and structure through documentation and objective evidence for the maintenance of a quality system. The *focus* of *ISO* is on the *system*. Certification does not certify the product; it merely states that the company has a quality system that *meets the scope* of the stated standard.

Both *HACCP* and *ISO* are fundamental to a process and focus on preventing rather than detecting or correcting a problem. Their main objective is to prevent problems rather than discover them during final inspection.

When comparing the *ISO 9000* standards with *HACCP*, it is very important to keep in mind that *ISO relates to the system, not the product*. As a registrar, we are very careful that in no way do certified companies imply that the product is *ISO* certified. Although *HACCP* is oriented to product safety, in most cases, the critical control points are inevitably *process* oriented.

The *ISO* standards look at the existence, implementation, and effectiveness of the quality system. *ISO* means *equal* in Greek. Consistency is inherent in its name. Documentation is the focus: Write down what you do, do what you say you do, document what you have done, and audit to confirm compliance. Any deviations are addressed in the corrective and preventive action systems. The *ISO* standards are very specific about identifying and assigning responsibilities for *quality* related activities. This concept is also inherent in a *HACCP* system.

The *ISO 9000* standard consists of five standards which include conformance standards (*ISO 9001*, *9002*, and *9003*) and guidance standards (*ISO 9000-1* and *ISO 9004-1*).

The conformance standards are "used for external quality assurance...to provide confidence to the customer that the company's quality system will provide a

satisfactory product or service" (4). The emphasis is that *the system will provide, not the product is*.

The guidance standards are "descriptive documents, not prescriptive requirements" (4). These are used for guidance and understanding for integrating the *ISO* conformance requirements into a process. Because the conformance standards are generic in nature, many times, the challenge is understanding how the requirement applies to a specific industry or process.

The *ISO 9000* series is a quality system standard compatible with other industry standards, such as *HACCP*. Product and safety concerns are addressed, either directly or indirectly, and/or implied in several of the clauses as will be described later in this text.

## OUTLINES

### ISO

Following is a brief description of the three conformance standards:

*ISO 9001*: Quality Systems-Model for Quality Assurance in Design, Development, Production, Installation, Servicing.

*ISO 9002*: Quality Systems-Model for Quality Assurance in Production, Installation, and Servicing.

*ISO 9003*: Quality Systems-Model for Quality Assurance in Final Inspection and Test.

*ISO 9001* is the most comprehensive standard with twenty elements including the *design* function and applies when the system includes the *design* of a *product* or *process*. An example of a *design* system in the food industry would be an operation that includes research and development or engineering. Many times these activities are controlled at either a corporate or centralized location.

*ISO 9002* has identical requirements except for the absence of the *design* clause. This standard is frequently applied to manufacturing operations in the food industry.

*ISO 9003* basically deals with warehousing or distribution operations.

Other supporting *ISO* documents, such as *ISO 8402*, provide a definition of terms, and the *ISO 10011* series provides guidelines for auditing quality systems.

### HACCP

Following are the seven principles of *HACCP* including a brief explanation and a listing of the *ISO* clauses as they may apply to the principles. A specific *ISO* clause may relate to several principles.

**"Principle 1. Assess hazards associated with growing, harvesting, raw materials and ingredients, processing, manufacturing, distribution, marketing, preparation and consumption of the food" (5).**

- Management Responsibility (4.1)
- Quality Planning (4.2)
- Quality Systems (4.2)
- Design Control (4.4)
- Purchasing (4.6)
- Process Control (4.9)

**"Principle 2. Determine the Critical Control Points required to control the identified hazards" (5).**

- Contract Review (4.3)
- Design Control (4.4)
- Document and Data Control (4.5)
- Purchasing (4.6)
- Customer Controlled Product (4.7)
- Process Control (4.9)

**Principle 3. Establish the critical limits which must be met at each identified CCP" (5).**

- Quality System (4.2)
- Contract Review (4.3)
- Design Control (4.4)
- Document and Data Control (4.5)
- Inspection and Testing (4.10)

**"Principle 4. Establish procedures to monitor critical limits" (5).**

- Quality Planning (4.2)
- Quality System (4.2)
- Product Identification and Traceability (4.8)

Inspection and Testing (4.10)  
Control of Inspection, Measuring, and Test Equipment (4.11)  
Inspection and Test Status (4.12)

**"Principle 5. Establish corrective action to be taken when there is a deviation identified by monitoring of a CCP" (5).**

Management Responsibility (4.1)  
Control of Nonconforming Product (4.13)  
Corrective and Preventative Action (4.14)

**"Principle 6. Establish effective record-keeping systems that document the HACCP plan" (5).**

Inspection and Test Status (4.12)  
Internal Quality Audits (4.17)

**"Principle 7. Establish procedures for verification that the HACCP system is working" (5).**

Document and Data Control (4.5)  
Quality Records (4.16)  
Management Review (4.1), Internal Quality Audits (4.17), and Training (4.18) are umbrella-type activities which can be applied to the HACCP program in totality.

## QUALITY SYSTEM REQUIREMENTS (ISO) AND HACCP PRINCIPLES

For the purpose of understanding and further clarifying ISO and HACCP, the following text will briefly outline a portion of the requirements from each of the twenty ISO 9001 clauses including how HACCP principles may be related. Each clause is titled and numbered as it relates to the ISO 9001: 1994 standard.

### ISO 4.1 Management responsibility

Documented quality policy, clearly defining goals/objectives related to *customer expectations*

*and needs*, is created and endorsed regularly by senior management. The quality policy should relate to the company's own needs, the market it works within, and the requirements (needs and expectations) of its customers. Objective evidence should confirm that the policy statement has been implemented, communicated, and understood by all levels within the organization.

Responsibilities and authorities within the system need to be clearly defined. A management representative must be given specific authority relative to the ISO system. It is emphasized that executive management should demonstrate commitment visibly, actively, and continually.

The standard requires that "management with executive responsibility...review the quality system at defined intervals sufficient to ensure its continuing suitability and effectiveness" during management review meetings, held at defined intervals (1).

**HACCP.** A specific review of the HACCP plan, activities, and noncompliances related to identifying and monitoring CCPs can be included in the management review meeting. This is an excellent avenue for emphasizing top management's commitment to the program. In addition, the HACCP coordinator may have responsibilities similar to the ISO management representative. In my experience with ISO certified companies which have developed a HACCP program, this person is often one and the same.

### ISO 4.2 Quality system

The quality system must provide the documentation to support organizational activities that could impact product quality. A policy manual (known as the quality manual) must be prepared, defining the structure of the quality system and addressing the organization's policies as related to the ISO standard requirements. The quality manual should provide the basic roadmap for the quality system.

Quality planning (how quality requirements will be met) may be developed for each process and may include such things as flow charts, HACCP requirements, and product specifications.

**HACCP.** Procedures for creating, identifying, and monitoring activities related to the HACCP plan and CCP's may be incorporated as part of the quality plan and the quality system documentation. According to Porter, "Standard operating procedures (SOP) are beyond all tools, for without the SOP there is a void" (6).

### ISO 4.3 Contract review

**Contract** is defined as "agreed requirements between supplier and customer transmitted by any means" (1). Examples of a **contract** may include requirements for product, service, software, or processed material. This applies to all agreements, such as order processing and product specifications between the customer and the supplying organization. This requires clearly defined customer requirements and confirmation that this organization has the capability to meet these requirements.

**HACCP.** Identification of potential HACCP concerns and confirmation that the organization can meet any HACCP requirements should be determined prior to accepting the contract. For example, if a customer requires a CCP, such as a metal detector placed in a specific point in the process, then this must be agreed upon with the organization prior to accepting a contract to produce the product.

### ISO 4.4 Design control

This is a **product development** activity that focuses on the assurance that activities during the development stage meet the customer's needs. It requires a developed plan identifying activities, suitably qualified and equipped resources, and interfaces between

other groups. These interfaces must also be defined, documented, communicated, and reviewed.

**Design input** requirements, such as shelf life and regulatory compliance, must be defined and appropriately addressed. **Design output** requirements, such as assurance that the desired product has been designed, must be clearly defined and should consider such areas as food safety, Good Manufacturing Practice requirements, shelf life, and spoilage.

**HACCP.** Procedures should exist for incorporating HACCP, as necessary, for new processes and products developed. Such procedures should include review, verification, validation, and incorporation into the new process. All of this is required by this ISO clause.

#### **ISO 4.5 Document and data control**

The documented system includes **internal documents**, such as the quality (policy) manual, procedures, work instructions, HACCP plan, specifications, and drawings, and **external documents**, such as regulatory requirements (GMP, standard of identities), equipment manuals, and corporate supplied documents. These documents need to be **controlled** so that multiple versions and obsolete documents are not available.

**HACCP.** HACCP procedures can be incorporated in the document control procedure to ensure that only current controlled documents are available for use.

#### **ISO 4.6 Purchasing**

A system is required for the approval of suppliers of those items that **affect quality**. This relates to the company's own needs and is based on quality history, dependability, and capability. This also includes the supply of **quality critical** services, such as pest control, calibration services, carriers, and laboratory services.

Quality records must be available to confirm compliance.

Specific information communicating specific requirements, such as specification number (including the revision number), delivery date, and GMP requirements to these suppliers must be included on purchasing documents.

This clause requires effective working relationships and feedback systems between the company and all its suppliers of **quality** critical items.

**HACCP.** This clause relates closely because a major aspect of most HACCP plans is the assurance that suppliers are providing evidence that they meet the company's defined HACCP requirements or prerequisites.

#### **ISO 4.7 Control of customer-supplied product (CSP)**

This includes **quality critical** materials, ingredients, and services provided by the customer to be used in manufacturing a specific product. A system is needed for the identification and control of these items to prevent misuse or mishandling and for communicating any problems back to the customer. This does not relieve the company of the responsibility to ensure that CSP is suitable and meets a defined quality level.

**HACCP.** Any HACCP requirement or prerequisite related to customer-supplied products and services can be documented and addressed in compliance with this clause.

#### **ISO 4.8 Product identification and traceability**

Having a product recall (lot or batch traceability) system is common in the food industry and applies to this clause. In most instances, this requires traceability beginning with the raw ingredients through the manufacture of the finished product and includes unique identification numbers and a well-established method to trace records, should a problem arise.

**HACCP.** Product traceability and recall procedures, depending on the risk factor of the product (**safety** and **human** consumption issues), may be part of a HACCP plan.

#### **ISO 4.9 Process control**

This clause requires that the organization identify and plan the process to assure that all steps are performed under controlled conditions. Procedures where absence of such would affect quality must be available. This may require that a risk assessment of the process from raw materials through finished product be performed and evaluated.

Special processes, defined as those processes "whose results cannot be fully verified by subsequent inspection and testing of the product and where processing deficiencies may become apparent only after the product is in use," (sensory, texture, and appearance) must be addressed. An example of this may exist in the bakery industry.

**HACCP.** Identification, implementation, and monitoring of HACCP critical control points that may affect product safety is at the heart of process control.

#### **ISO 4.10 Inspection and testing**

Criteria and requirements must be defined for testing raw materials, in-process materials (product in production), and finished products before release from one stage to the next. Objective evidence is required to confirm completion of all required testing.

Incoming products cannot be released prior to acceptance verification. Should urgent release be an option, then documented procedures including a recall and replacement function, should a test result be unacceptable, must be available.

All tests on finished product must be completed and acceptable

prior to release. Procedures to allow for release under special circumstances must assure that this product can be retrieved prior to use.

**HACCP.** Depending on the HACCP plan and the product being produced, the actual performance of a test and confirmation of a positive result may be identified as a CCP.

#### **ISO 4.11 Controls of inspection, measuring, and test equipment**

Procedures required for calibration need to address a calibration schedule, acceptable measurement criteria, a method for checking equipment, traceability to a national standard, and what is to be done if equipment is found out of calibration (risk assessment for product tested). The calibration status of a specific piece of equipment must be clearly evident to the person using the equipment.

Objective evidence (records) must be available for all related activities including confirmation certificates for national standards and an "as found" status of equipment at the time of calibration.

**HACCP.** As mentioned for the previous clause, depending on the product (risk assessment) identified in the HACCP plan, the calibration of a specific piece of equipment may be identified as a critical control point.

#### **ISO 4.12 Inspection and test status**

This clause addresses the identification of items in various stages of process as to the product **status**. Clear identification of inspection and test status is required to prevent inadvertent use of a product not approved for the next production stage.

**HACCP.** If verification of a test status including confirmation of activity by a qualified inspector is identified as a critical control point in the HACCP plan, then it would fall within this clause.

#### **ISO 4.13 Control of nonconforming product**

Nonconforming product may be sourced from many different areas including customer complaints, inspection, process problems, and equipment failures. Nonconforming product must be identified and appropriately stored to prevent unintended use.

Disposition activities, such as rework, reinspection, customer concession, or regrading including responsibility and authority for disposition, must be defined in procedures.

**HACCP.** Identification of problem products at critical control points, their segregation, and disposition may be addressed relative to this clause.

#### **ISO 4.14 Corrective and preventive action**

The corrective action system provides records of "things gone wrong" (4) for identification of risk factors and for evaluation, correction, and history to avoid future recurrences. The identification of a corrective action may include any system abnormalities or nonconformances, such as late shipment, machine malfunction, out-of-specification product, customer complaints, internal audit findings, and pest control.

To evaluate and improve the system, information from corrective action may be used for trend and root cause analysis. It is also required that the processes be monitored for any potential problems which are incorporated in preventive actions to avoid future problems. ISO requirements stress proactive rather than reactive measures. Prevent rather than correct.

**HACCP.** Having an effective corrective and preventive action system, which includes monitoring trends and root cause analysis, is an essential part of a HACCP plan. As mentioned many times in this text, the prevention of a problem is as

important to a HACCP plan as it is to the ISO quality management system.

#### **ISO 4.15 Handling, storage, packaging, preservation and delivery**

A system must exist to ensure that materials and product are packed, handled, stored, preserved, and delivered to maintain the specified quality. Examples of this are shelf life dating, storage temperatures, and storage practices (first in/ first out), risk factors, GMPs, and pest control.

Procedures also focus on preventing loss through misstorage and regularly reviewing stored items to ensure preservation of quality. It is important that identification, control, and responsibility for quality through the shipping and delivery steps be defined.

**HACCP.** Depending on the characteristics of the product, it is possible that a critical control point related to areas addressed in this clause may be relevant.

#### **ISO 4.16 Control of quality records**

Quality records provide objective evidence for effective management of the system. Some of those required by the standard include management review meeting minutes, internal audit reports, corrective actions including follow-up for effectiveness, test data, inspection reports, calibration data, training, approved supplier data, design review and verification, contract review activities, and identification of product for traceability. It is the responsibility of the organization to identify those additional quality records which are necessary objective evidence to demonstrate conformance to specified requirements and confirm the effective management of the system.

**HACCP.** Records created and essential to the HACCP plan should be included as part of this clause.

### ISO 4.17 Internal quality audits

Internal audits are scheduled, planned, and carried out to ensure that all system activities are audited at a predetermined frequency dependent on risk and the importance of the activity. Auditors are to be trained by defined criteria and must be independent of the area being audited. Summaries of audit findings are reviewed during the management review meeting.

**HACCP.** Internal audits must be designed to include the monitoring of the critical control points, and any unique aspects of the HACCP plan. Auditors may need additional training to understand HACCP. This can be integrated into the total auditor training program. The internal audit report, already required as part of the quality record system, can serve as part of the objective evidence documenting HACCP compliance.

### ISO 4.18 Training

Training criteria and records of actual training completed, such as in-house and external sessions and on-the-job training, should be available for all associates who perform activities which *may affect quality*. Training needs must be identified at predefined intervals and confirmed by objective evidence.

**HACCP.** Employee training in HACCP concepts and requirements is a necessary part of the HACCP plan and can be included in the ISO training system.

### ISO 4.19 Servicing

Servicing relates to after-sales or warranty type activities. Procedures need to be in place and activities confirmed by objective evidence as servicing relates to the organization's activities. Servicing type activities may be rare in food related processes. However, some

examples may include maintenance of refrigeration equipment, vending machines, and juice dispensers, particularly in food service activities.

**HACCP.** If any aspect of this activity is identified as a critical control point, then it can be controlled and monitored relative to the requirements of this clause. An example of a critical control point that would fall under this clause could be temperature control on the refrigeration unit used for storage of fresh meat or fish.

### ISO 4.20 Statistical techniques

If these activities are defined as required to the process, then procedures should exist for implementing and applying identified statistical controls related to the organization's activities. Statistical methods, such as statistical process control (SPC), are used in many food companies to evaluate process capabilities, on-line sampling, and quality control analysis.

**HACCP.** Statistical methods may be used to monitor the critical control points although limits will need to be well defined so that they do not cross the critical product safety limits.

No matter what system the organization is focused on, that system will be required to have top management support, identification of critical concerns, procedures for monitoring and controlling the concerns, and training of associates. Top and middle management will need the knowledge to show visible support of the program. HACCP focuses on product safety which should be incorporated into all management systems. Compliance with ISO requirements focuses on the entire operation with special emphasis on meeting customer *needs and expectations*. What

better team focus could there be than *product safety and meeting customer needs and expectations*. Porter summed it up by saying that "ISO is the envelope and everything else fits inside" (6).

### Inside the envelope

Food processing is an interesting industry. People will always need to eat, but there are many choices. Consumers will return to the products which they enjoy and consistently meet their needs and expectations. The incorporation of HACCP along with an effective, efficient quality management system, such as ISO 9000, will certainly go a long way toward providing safe and consistent products.

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## Death of Jesse Stanley Beecher, World-Renowned Chemical Engineer

It is with deep regret that Ashland Chemical Company's Drew Industrial Division announces the death of Jesse Stanley Beecher after a long illness. Beecher represented the technical leadership of Drew Industrial for nearly five decades. The division's annual employee award for technical excellence is named in his honor.

Beecher graduated from the University of Pittsburgh in 1938 with a bachelor's degree in chemical engineering. He was a registered chemical engineer in the states of Ohio, Pennsylvania, and New Jersey. Beecher began his career with Drew Industrial in 1949. During his tenure, he served as sales representative, marketing manager, technical director, and in various consulting positions until his retirement in 1985. Since retiring, he had been retained by Drew Industrial as a consultant.

Beecher was cochairman of the ASME subcommittee which prepared a detailed document on a lay-up of boiler turbines and peripheral equipment and was a past chairman and program chairman of the International Water Conference. Beecher received numerous awards from the IWC, ASME, and NACE for outstanding performance. He was the author of numerous papers on industrial water treatment in addition to coauthoring *Drew Principles of Industrial Water Treatment*.

## DFISA Postpones Martin's Retirement

John R. Sherrill, Jr. president of M.G. Newell Corporation and chairman of Dairy & Food Indus-

tries Supply Association, (DFISA) has announced that DFISA's board of directors has asked DFISA president and CEO John M. Martin to stay beyond his planned retirement date of May 1997 to guide the association through the conclusion of Worldwide Food Expo '97 this fall.

Martin's 12-year legacy with DFISA includes the purchase of a new headquarters building in McLean, VA, the success of four Food & Dairy EXPOS, the Food MegaShow in 1995, and bringing the industry together at this fall's Worldwide Food Expo with IDFA, NFPA and the AML. He has also established the DFISA Foundation's role in the industry as a major resource of financial support for research and education.

Martin is a 39-year veteran in association management, 33 years as chief executive officer. Before joining DFISA in 1985, he was CEO of the National Lumber & Building Material Dealers Association, represented the housing industry, the U.S. Chamber of Commerce and served as president of the National Peanut Council during the Carter Administration.

## Southeast Account Manager Appointed by Captive Plastics

Captive Plastics, Inc., a manufacturer of plastic packaging for the personal care, pharmaceutical, food and chemical industries, recently appointed Scott Fleming as account manager to service customers in the Southeast region.

Mr. Fleming brings with him a variety of experience gained from several positions in the plastic packaging industry. He previously was employed by Summit Plastics.

Prior to that, Mr. Fleming held positions with Empire Bottle and All-Pak.

Mr. Fleming earned his B.S. degree from Villanova University and an M.B.A. from SUNY and is currently a resident of Amherst, MA. He will be relocating to the PA/NJ area.

## J&W Co-founder Walt Jennings to Receive the 1997 Keene P. Dimick Award at Pittcon '97 for Achievement in Gas Chromatography

Professor Walt Jennings, co-founder of J&W Scientific, Inc., has been selected by the Society for Analytical Chemists of Pittsburgh (SACP) to receive the 1997 Keene P. Dimick Award in Chromatography. The award recognizes notable achievement in gas chromatography and consists of an honorarium and a plaque that was presented at the Pittcon award symposium.

Dr. Jennings was a professor and chemist at the University of California, Davis in 1973, working with graduate students in the field of gas chromatography for 20 years. In 1974, he cofounded J&W in a modest Sacramento garage, and by 1986, the company's annual sales were nearly \$8 million. J&W Scientific, Inc. has grown to become the worldwide leader in the capillary gas chromatography market.

Dr. Walt Jennings, now fully retired from the University, maintains his close ties to J&W, and continues to serve as a keynote speaker, presiding at both national and international meetings. He also continues to give seminars, lectures, and courses worldwide on the subject of gas chromatography.

## Flavorite Laboratories, Inc. Promotes Allen Helms to Director of Technical Services

Flavorite Laboratories, Inc. announces the promotion of Allen Helms to director of technical services.

Since joining Flavorite Laboratories, Inc. in July of 1977, Helms has demonstrated high levels of commitment and service to both the company and the customers as he held the positions of director of quality and controller.

Continuing in areas where he has already demonstrated success, Helms will be fully responsible for total quality management, quality assurance and project management between sales and R&D.

## PRISM Names Woods and Ho Ken as Vice Presidents of Operations

PRISM™ Integrated Sanitation Management has named Jay B. Woods and Hector R. Ho Ken as vice presidents of operations, according to Paulo S. Bello, company president. Woods heads PRISM's eastern U.S. division. Ho Ken heads the company's western U.S. division, as well as the western region of PCO Services, Inc., the company's Toronto-based Canadian operation.

Woods is a 19-year veteran of PRISM and "Bugs" Burger Bug Killers, the company that introduced guaranteed pest elimination in the 1980s. S.C. Johnson Wax formed PRISM in 1986, after acquiring "Bugs" Burger. Woods most recently served as director of quality assurance for PRISM after rising through company ranks from service technician to supervisor,

district manager, regional manager and business manager. A veteran of the U.S. Air Force, Woods holds a degree in accounting from the University of South Florida. He was a restaurant manager for three years before joining "Bugs" Burger. Woods and his family reside in Ft. Lauderdale, FL.

Ho Ken served as the vice president of operations for PRISM for the past three years, and earlier as a vice president of PCO Services. Previously, Ho Ken worked in the food industry and the petroleum industry in Jamaica. He holds a degree in chemical engineering from the University of the West Indies. Ho Ken and his family reside in the Pacific Northwest.

## AFFI Chairman Smittcamp Appoints 549 Members to AFFI's 1997 Committees

American Frozen Food Institute (AFFI) Chairman William S. Smittcamp, president of Wawona Frozen Foods, appointed 549 representatives from AFFI's member companies to the Institute's 1997 committees, councils and task forces.

In making the appointments, Smittcamp said, "AFFI's committee structure allows member company representatives an opportunity to experience hands-on involvement in the issues that shape the success and future of the frozen food industry."

AFFI's 37 committees, councils and task forces guide membership activities in a variety of areas, including legislative, regulatory, distribution and logistics, statistical analyses, technical services, public relations, trade relations, international trade and more.

To nominate individuals to an AFFI committee, members should contact AFFI President Steven C. Anderson at (703) 821-0770.

## Kevin Burkum Named Industry Marketing Communications Director

Kevin L. Burkum has joined Dairy Management Inc. (DMI) as director of industry marketing communications. He had been director of communications for IGA Inc. in Chicago. Burkum fills an existing post that was repositioned.

At DMI, Burkum will serve as the communications liaison between the organization and the dairy trade marketing channel, including processors, retailers and foodservice operators, as well as their respective trade and consumer media outlets.

At IGA for the past four years, Burkum was responsible for all public relations, marketing communications and community relations for the multinational supermarket chain. He also has held key marketing communications positions with Oscar Mayer Foods Corporation and Ruder Finn Public Relations.

Burkum was born and raised on a dairy farm near Gays Mills, WI. He earned a bachelor of arts degree in journalism from Marquette University in 1989. He currently lives in Chicago.

Dairy Management, Inc. is the nonprofit organization formed by the National Dairy Board and the United Dairy Industry Association that conducts programs in integrated marketing communications, promotion and research for U.S.-produced dairy products on behalf of America's dairy farmers.

## Kids Can Prevent Foodborne Illness by Practicing Food Safety

**K**ids today have more independence than ever in fixing snacks for themselves or helping to prepare family meals. Knowing how to handle food safely can help youth avoid foodborne illnesses, according to Bill Schafer, food technologist with the University of Minnesota's Extension Service.

Kids often experience flu-like symptoms, such as vomiting or diarrhea. However, food safety professionals know these symptoms do not necessarily come from the flu. They could sometimes come from bacteria or viruses in the food they eat.

Kids should know that there are both good and bad kinds of bacteria in food. Good bacteria are desirable because they produce flavors and sensory qualities in such foods as cheese and pickles. They also help prevent bad bacteria from setting up shop by producing acids and other compounds which may inhibit illness-causing pathogens.

Kids need to know many foodborne illnesses occur due to eating food which has been contaminated by human hands or from other contaminated foods. Children need to know it is especially important to avoid contamination from raw foods, which are a potential source of bacteria and viruses, to food they are about to eat.

As food safety professionals also know, washing food, hands, and utensils that touch it is an important element of food safety. Educate children to wash their hands thoroughly after they go to the bathroom or handle pets and before they make snacks.

Kids must learn how to restrict the growth of harmful bacteria. Teach children to keep hot food hot and cold food cold. Raw meats, poultry, milk, and fresh fruit and vegetables that have been cut or sliced are most susceptible to pathogen growth or survival.



# NEWS

Youth need to be particularly aware of safe food-handling practices because they are considered a high-risk group. "The effects of foodborne illness can be more life threatening for kids than for adults," says Schafer.

## FDA Proposes Precautionary Ban against Ruminant-to-Ruminant Feeding

**T**he Food and Drug Administration proposed to prohibit using tissues from ruminants — animals such as cows, sheep and goats — in the manufacture of ruminant feeds. Mink tissue would also be prohibited from such feeds.

The proposed regulation is the latest in a series of preventive measures — including a voluntary industry moratorium that FDA, other federal agencies, and industry have already taken to protect animals from transmissible degenerative neurological diseases, and to minimize any potential risk that such diseases could be transmitted from animals to humans.

These animal diseases are known as transmissible spongiform encephalopathies (TSEs). Bovine spongiform encephalopathy (BSE) is among the more commonly

known of these diseases. TSEs are characterized by a long incubation period, a relatively short clinical course of neurological signs, and 100 percent mortality. Because of concerns that BSE could in the future be identified scientifically as the cause of a new TSE in humans, FDA and USDA officials said the protection of public health depends on the development of a strategy to control possible routes of TSE expansion in food animals.

FDA's proposed regulation would prohibit the use of nearly all potential sources of ruminant and mink protein in feed intended for ruminants. The only exceptions would be bovine blood, ruminant-derived milk and gelatin, since FDA has no information suggesting that milk proteins, gelatin or bovine blood proteins are potentially infective for TSEs.

"This is a precautionary measure, — there have been no reported cases of BSE in this county," said Donna E. Shalala, Secretary of Health and Human Services. "It will add another level of safeguards to protect the U.S. against the potential risk from these diseases."

"If for some reason a case of BSE were to occur in the U.S., and it is important to emphasize that not even one case of BSE has ever been found here, the steps we are taking today would confine it to the individual animal and greatly decrease the potential risk to humans," said FDA Commissioner David A. Kessler, M.D. "In essence, this proposal would build a protective barrier against the spread of BSE."

In addition to prohibiting tissues with the potential to spread TSEs, the proposed rule also requires process and control systems to ensure that ruminant feed does not contain the prohibited tissues.

The first case of BSE was reported in the United Kingdom in 1986. Epidemiological evidence gathered in the U.K. suggests an association between the outbreak of BSE there and the feeding to cattle of protein derived from sheep infected with scrapie, another TSE.

Recently, scientists have postulated an association between BSE and a variant form of Creutzfeldt-Jakob Disease (v-CJD) reported in the U.K. Creutzfeldt-Jakob Disease is a degenerative neurological disorder that affects humans.

The British government on March 20, 1996 announced a possible link between BSE and 10 cases of v-CJD. Nine days later, U.S. national livestock organizations and professional health groups announced a voluntary moratorium on the use of ruminant protein in feeds of ruminants. At the same time, FDA committed to expediting regulations addressing issues related to feeding ruminant protein, and on May 14, 1996 the FDA published an Advance Notice of Proposed Rulemaking to solicit scientific and economic information and other public comments.

This proposed regulation is the product of FDA's evaluation of this information to date. FDA will continue to evaluate additional data and comments related to this proposal.

### **Gelman Sciences Membrane Technology Center Receives International Quality Certification**

**G**elman Sciences Membrane Technology Center achieved certification to the internationally recognized ISO 9001 and EN 46001 quality systems standards after passing a five-day audit in mid-September.

ISO 9001 represents the most comprehensive and rigorous standard in the ISO 9000 series, which is a set of standards for quality management and quality assurance developed by the Interna-

tional Organization for Standardization. The scope of the ISO 9001 series registration spans from product development and design to production, distribution, and customer service.

European Standard EN 46001 specifies the quality system requirements for the design/development, production, and where relevant, installation and servicing of medical devices. The standard embraces all the principles of good manufacturing practice (GMP) widely used in the manufacture of medical devices.

The Membrane Technology Center, which opened in 1991 in Pensacola, FL, is a full-service manufacturing facility with departments devoted to research and development, sales and marketing, technical service, and production.

### **FOODCERT-NL, the First to be Accredited for HACCP Certification**

**H**azard Analysis Critical Control Point (HACCP) is a method for determining risks related to food safety, aimed at prevention of marketing unsafe foodstuffs. Since 1996, all companies that may influence the safety of foodstuffs the U.S. have been obliged to carry out regular HACCP analysis of their company activities in accordance with the U.S. food and drug act.

So far, the Netherlands is the only country in the world to have adopted voluntary HACCP certification in its structure of testing and certification.

In a meeting of the HACCP Association, the Council for Accreditation has accredited FOODCERT-NL as the first certification institute that will be allowed to carry out certification of HACCP programs.

### **Osmonics to Acquire AquaMatic, Inc.**

**O**smonics, Inc. (NYSE/OSM) announced the execution of an agreement in principle to acquire AquaMatic, Inc. of Rockford, IL, for cash. AquaMatic is a leading supplier of specialty valves and controllers for the water treatment equipment market. The product line is complementary to the Autotrol product line. Terms of the acquisition were not disclosed.

AquaMatic has been a supplier to the water purification industry for over 60 years. AquaMatic pioneered automatic water softener controls and has a unique non-metallic diaphragm valve. AquaMatic will continue to operate out of Rockford and will be closely aligned with the Milwaukee business unit which manufactures the Autotrol product line.

### **Merger of Two Scientific Testing Laboratories**

**C**hemex Labs (Alberta) Inc. of Calgary and NOVAMANN International Inc. of Mississauga have concluded a merger with a resulting incorporation. The combined company, headquartered in Mississauga, includes all of the wholly owned or controlled subsidiaries, without divestiture.

Close to 500 people are employed at the company, with 8 Canadian offices in Alberta, Ontario and Québec, as well as in Mexico City, in Bratislava, Slovakia, and in Thailand. Each partner company had been operating for over 20 years. The new company will now offer testing services that include pharmaceutical, environmental,



food safety, industrial, and occupational health, both nationally and internationally.

Gerry Johnston in Montréal is chairman of the board, and will direct international market development. John Stanley is appointed president, situated in Calgary. Howard McLean, also in Calgary, will lead corporate special projects.

## **APV Fluid Handling America Acquires Sanitary Fittings and Valve Lines of Alloy Products Corp.**

**A**PV Fluid Handling America, a division of APV North America, Inc., announces the acquisition of the Sanitary Valve and Fittings product lines of Alloy Products Corp. of Waukesha, WI, U.S.A. The acquired product lines have been transferred to APV's manufacturing facility in Lake Mills, WI.

Effective February 1, 1997, all former APC sanitary valve and fitting product lines will be sold and distributed through the APV sales and distribution network. APV engineers and manufactures equipment and systems for the process industries worldwide.

## **Decrease Dairy Herd Exposure to Infectious Diseases**

**D**ecreasing the exposure of a dairy herd to infectious diseases is one of the keys to keeping the herd productive. Jerry Olson, veterinarian with the University of Minnesota's Extension Service, has the following recommendations for decreasing dairy herd exposure to infectious diseases:

- Isolate sick and diseased cattle with unusual clinical signs, or cattle that do not respond to customary treatments.
- Have a veterinarian necropsy (autopsy) any animal that dies from undetermined causes. Dispose of dead animals promptly.
- Utilize individual calf hutches for newborn calves. Thoroughly disinfect between uses.
- When selling cull cows and bull calves, use a location outside the barn for buyers to pick up these animals without entering the barn.
- Reduce manure contamination of water sources, bunks, feeds and feeding equipment.
- Require hoof trimmers to sanitize their chutes, tables, knives and other equipment before coming to the farm.
- Limit access to the dairy facilities from outside visitors.

- Lock the doors to the barn.
- Post a warning sign asking visitors to keep out. Leave a phone number to call.

- Provide clean coveralls and boots for all visitors.

- Maintain a logbook of all visitors, recording date, time and origin.

- Employ rodent and other pest control measures.

## **CINVEN Acquires Unilever's Microbiology Business**

**O**xoid Limited and its affiliated companies, including the American business, is trading as an independent company. They are now backed by CINVEN, one of Europe's independent business investors and are therefore no longer a member of the Unilever Group.

The manufacture of Oxoid products will continue to take place at the existing headquarters in Basingstoke, with American operations remaining in Ogdensburg, New York. The management and workforce team which have been responsible for the success of the Oxoid brand over many years will remain unchanged. Oxoid is fully committed to strengthening their relationship with their highly valued customers in the years to come.

# IndustryProducts



Ecolab, Inc.

## Ecolab Announces EcoPro

Ecolab Pest Elimination announces its new *EcoPro* program for the food and beverage processing industry. Since the inception of its pest elimination division 11 years ago, Ecolab has been prominent in pest services for the hospitality, food processing, and agriculture industries.

The Ecolab *EcoPro* is an integrated pest elimination (IPE) program, which combines environmentally sensitive IPM techniques with a goal of zero pest tolerance.

*EcoPro* uses a proactive "industry best practices approach." We provide solutions which fit your needs. While it follows national standards, each *EcoPro* program is customized to fit the needs of the individual facility.

Ecolab Inc., St. Paul, MN

Reader Service No. 342

## Dilu-Lok™ Dilution Bottles

Dilu-Lok™ Dilution Bottles from Hardy Diagnostics help to eliminate time consuming dilution preparation procedures in the laboratory.

Dilu-Lok™ Dilution Bottles are fully prepared diluents available in 90ml and 99ml fill volumes for preparation of 1:10 and 1:100 test dilutions. Dilu-Lok™ Dilution Bottles are prefilled with Butterfield's Buffer, Peptone Water, or Phosphate Buffer and are ready for immediate use. Simply open the hinged lid, add the sample, close and mix.

Dilu-Lok™ Dilution Bottles are made of polypropylene material and hold a total volume of 120ml. They have a 44mm opening for easy access of large samples and a hinged lid for easy closure. Vials containing 90ml of buffer are labeled in red. Vials containing 99ml of buffer are labeled in black.

Hardy Diagnostics, Santa Maria, CA

Reader Service No. 343

## Sanitizer Test Kits

All QA Products sanitizer test kits are designed for testing chemical concentrations of Chlorine, Iodophor and Quaternary Ammonium compounds. Each sanitizer your facility uses should be backed up with a test procedure to insure proper sanitizer concentration. Solutions that are too weak or strong can compromise food safety.

These handy kits offer fast, accurate and reliable results. Each kit offers economy that is hard to beat, both in low cost per test and no training for your personnel. Test papers are easy enough for unskilled personnel to use.

Our free catalog is dedicated to food safety, with a broad array of items that make your job easier and safer. We offer HACCP training materials, recording devices, sanitizer and pH testing kits, reference books and more.

All QA Products, Gainesville, FL

Reader Service No. 344

## LIGHTNING™—New Services Help Meet HACCP Requirements

When used in conjunction with written SSOPs, the *LIGHTNING* cleaning validation system from IDEXX is an easy, convenient answer to testing for and documenting proper sanitation. *LIGHTNING* uses ATP bioluminescence to detect food residue, yeast and mold, and bacteria on production surfaces. It provides instant feedback to validate and document cleaning effectiveness, which helps prevent food contamination.

The *LIGHTNING* luminometer has the ability to record up to 5000 test results. *LIGHTNING TRAX™* customized software then enables users to store, analyze, and graph results on a personal computer and use this information for SSOP documentation. IDEXX also offers its *LIGHTNING* customers free membership to the *LIGHTNING INDEX™* Proficiency Program, an innovative benchmarking tool which gives members feedback on their test data as well as a compari-

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son of their performance against the average of other companies in their industry. It's the only industry-wide, interactive database of its kind.

IDEXX Laboratories, Inc.,  
Westbrook, ME

Reader Service No. 345

## Germ, Stains Frustrated by Formica® Surell

For specifiers, designers and consumers seeking an innovative and beautiful surface that will give years of outstanding nonporous performance, there is Surell® solid surfacing material from Formica Corporation.

Surell is a homogeneous, nonporous material designed to accommodate a broad range of interior applications with high durability and ease in maintenance. Surell is available in 33 colors from the solid, mists, granite and Revolution® collections in three sheet thicknesses (suitable for vertical and horizontal applications), sinks, lavatory bowls, vanities with integral bowls and backsplashes, bathtubs, shower bases and surrounds, edge strips, windowsills, flooring tiles and planks, laboratory and utility/bath sinks.

Germ-free surfaces are needed in many areas of commercial applications; not just in the kitchen. Designers are increasingly seeking solutions that blend utility, convenience, elegance and beauty. Surell countertops provide an unbroken nonporous barrier on kitchen and bathroom work surfaces, flowing from backsplash to counter to sink to drain with no rims or seams to accumulate dirt or provide a place for germs to hide and grow.

Kitchens and bathrooms are also notorious places for spills, and where there are spills, stains or other permanent damage often follow. Surell resists most common stainmakers. Heat resistance is also a strength of Surell.

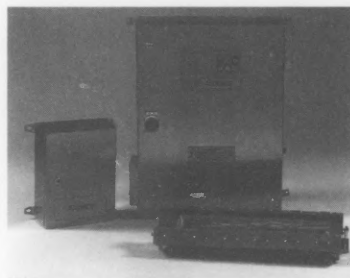
Nine different multi-directional single and double bowl sinks, two with integral drainboards, give flexibility in designing kitchens to meet individuals' wants while guaranteeing superior performance. Fourteen sizes in one-piece vanity tops make fabrication simple.

Surell can be renewed and repaired, so even deep scratches will not provide a permanent place for germs to hide or for moisture to penetrate, meaning that Surell keeps its newly-installed beauty.

Surell, in shapes and sheets, complies with many standard test methods for fire resistance, resistance to fungal and bacterial growth, chemical resistance, use in food service areas and various ANSI/ASTM/NEMA performance tests.

Formica Corporation, Cincinnati, OH

Reader Service No. 346



Aquionics

## UV Surface Disinfection Systems Reduce Product Contamination

Now available from Aquionics, ultraviolet surface disinfection systems increase product quality and shelf life by reducing contamination without the use of heat or chemicals.

UV units disinfect containers, packaging materials, and certain product surfaces while maintaining a clean filling environment. Surface units are also used for conveyor lines to prevent reintroduction of

spoilage microorganisms by destroying microbes on belt surfaces.

UV surface disinfection systems are ideal for use with extended shelf-life filling machines, plastic containers, caps, crowns and closures, metal cans, and foils and films.

Aquionics' units are CIP compatible, can be easily retrofitted to existing machines and meet ISO 9001 standards. Maintenance requirements are minimal.

Aquionics, Erlanger, KY

Reader Service No. 347

## Hannay's Durable SS3000 Stainless Steel Reels Ideal for Sensitive and Harsh Environments

Hannay Reels SS3000 Series stainless steel reels are built to last and provide superior protection against corrosion. With no paint to chip or potential for rust, these rugged hose reels are ideal for the food and beverage industry, chemical transfer, harsh environments, off-shore use, and cosmetics applications.

Like all Hannay stainless steel reels, the SS3000 Series is constructed of fine grade 304 or 316 stainless frames, discs and drums. It handles single hose with 3/4" or 1" I.D., operates at pressures to 1,000 psi, and features either a disc rewind or direct crank rewind. The crank attaches to the reel axle and is removable.

Hannay Reels, Westerlo, NY

Reader Service No. 348

## CleanTech® Automated Hand and Glove Washing System

Meritech's CleanTech® automated hand and glove washing systems are now in use in over 1,300 food handling operations in the U.S.A. CleanTech® use standard-

izes an uncontrolled, highly variable procedure. It verifies, for management, that an effective handwash has taken place, and is the perfect SOP for employee hygiene.

The 2000S model, with an automated self clean cycle helps kill *Listeria* that can be a problem in drains. The 2000S model is also being used by many as a footbath conducted simultaneously to the handwash. The CHG (E-2) solution is the best broad spectrum antimicrobial available to the food industry. On skin, it provides residual kill for several hours. To wash gloves only, CleanTech® systems should be used with a less expensive quaternary solution, since the CHG will not bond to the gloves.

Meritech, Englewood, CO

Reader Service No. 349

## Real-Time Bacteria Testing that Correlates to Culture

New Horizons Diagnostics Corporation (NHD) announces the release of the PROFILE™-1 System, Model 3550i, a general screen for the presence of bacteria via the detection of ATP (adenosine triphosphate) with bioluminescence. The PROFILE™ System has been validated by the U.S. Department of Agriculture (USDA) for detection of bacteria on beef, pork, and poultry.

The PROFILE™ System is able to perform total ATP counts and bacterial ATP counts, detecting as few as 10 microorganisms. Somatic/mammalian cells that could potentially cause false positive results are easily removed from the sample. Potential false negatives are eliminated by the removal of interfering or quenching substances, such as

salts or heavy metals. Independent studies have confirmed that NHD's PROFILE does correlate to culture and is linear and reproducible.

New Horizons Diagnostics, Columbia, MD

Reader Service No. 350

## Labconco Protector® Plus™ Laboratory Hood Features Higher Sash Opening, Easy-to-Reach Controls

Labconco Corporation, Kansas City, Missouri, offers the Protector® Plus™ Laboratory Hood, with design options that include increased visibility, easier accessibility, and improved energy savings. The customer selects from a menu of features to create a customized hood which meets specific needs.

A higher sash opening provides 20% more visibility than standard laboratory hoods. The sash may be fully opened for easy loading of tall apparatus. The customer may also select a two-piece telescoping sash. This option precludes the sash from extending beyond the top of the hood permitting installation in laboratories with lower ceiling heights.

Switches and service fixtures are mounted low so that the user can easily reach hood controls, even while he or she is seated. This enhancement meets the requirements of the Americans with Disabilities Act.

An adjustable bypass system allows total air exhaust volume to be reduced up to fifty percent, thus saving energy. At the same time, a sash stop prevents sash operation beyond a safe height so adequate face velocity is assured. This exhaust volume control is beneficial for installations with HVAC restrictions.

The Protector Plus Hood is available with a corrosion-resistant, one-piece fiberglass liner or with a solid composite panel liner. Hood widths range from 4 feet to 8 feet. The customer also has a choice of a variety of service fixtures and electrical receptacles.

Labconco Corp., Kansas City, MO

Reader Service No. 351



Binax, Inc.

## NOW™ EH *E. coli*

NOW™ a rapid immunochromatographic assay for detection of *E. coli* O157 and *E. coli* O157:H7 in meat products from Binax, Inc. is easy to read and provides a permanent visual record, thereby eliminating the need for repeat testing.

After overnight enrichment in standard modified EC broth (no special media required), this simple 3-step assay yields results in 5 minutes or less, while exceeding the USDA criteria for detection.

Designed for reliability, simplicity, and compliance with tougher environmental standards, the test system is presented in a self-contained cardboard housing, and can be stored at room temperature for up to one year.

Binax, Inc., Portland, ME

Reader Service No. 352

# BusinessExchange

## Services/Products

### COMPLETE LABORATORY SERVICES

Ingman Labs, Inc.  
2945 - 34th Avenue South  
Minneapolis, MN 55405  
612-724-0121

Reader Service No. 153



### Michelson Laboratories, Inc.

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# IAMFES Lending Library

## DAIRY

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- ❑ **The Bulk Milk Hauler: Protocol & Procedures**—(8 minute videotape). Teaches bulk milk haulers how they contribute to quality milk production. Special emphasis is given to the hauler's role in proper milk sampling, sample care procedures, and understanding test results. (Iowa State University Extension-1990)
- ❑ **Causes of Milkfat Test Variations and Depressions**—(30 minute-140 slides-tape-script). This set illustrates the many factors involved in causing milkfat test variations or depressions in your herd, including feeding, management, stage of lactation, age of samples, handling of samples, and testing procedures. The script was reviewed by field staff, nutritionists, laboratory personnel and county extension staff. It is directed to farmers, youth and allied industry. (Penn State-1982)
- ❑ **Cold Hard Facts**—This video is recommended for training personnel associated with processing, transporting, warehousing, wholesaling and retailing frozen foods. It contains pertinent information related to good management practices necessary to ensure high quality frozen foods. (National Frozen Food Association-1993)
- ❑ **Ether Extraction Method for Determination of Raw Milk**—(26 minute videotape). Describes the ether extraction procedure to measure milkfat in dairy products. Included is an explanation of the chemical reagents used in each step of the process. (CA-1988)
- ❑ **The Farm Bulk Milk Hauler**—(30 minute-135 slides-tape-script). This set covers the complete procedure for sampling and collecting milk from farms. Each step is shown as it starts with the hauler entering the farm lane and ends when he leaves the milk house. Emphasis is on universal sampling and automated testing. Funds to develop this set were provided by The Federal Order #36 Milk Market Administrator. (Penn State-1982)
- ❑ **Frozen Dairy Products**—(27 minute videotape). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients; emphasis is on what to look for in a plant inspection. Everything from receiving, through processing and cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA-1987)
- ❑ **The Gerber Butterfat Test**—(7 minute videotape). Describes the Gerber milkfat test procedure for dairy products and compares it to the Babcock test procedure. (CA-1990)
- ❑ **High-Temperature, Short-Time Pasteurizer**—(59 minute videotape). Provided by the Dairy Division of Borden, Inc. It was developed to train pasteurizer operators and is well done. There are seven sections with the first covering the twelve components of a pasteurizer and the purpose and operation of each. The tape provides the opportunity for discussion after each section or continuous running of the videotape. Flow diagrams, processing and cleaning are covered. (Borden, Inc.-1986)
- ❑ **The How and Why of Dairy Farm Inspections**—(15 minute-110 slides-tape-script). This was developed at the request of seven northeast dairy cooperatives and with their financial support. Emphasis is on clean cows, facilities and equipment and following proper procedures. Regulatory agencies cooperated in reviewing the script and taking pictures. This was developed for farmers, youth and allied industry. (Penn State-1984)
- ❑ **Mastitis Prevention and Control**—(2-45 minute videotapes). This video is ideal for one-on-one or small group presentations. Section titles include: Mastitis Pathogens, Host Defense, Monitoring Mastitis, Mastitis Therapy, Recommended Milking Procedures, Postmilking Teat Dip Protocols, Milk Quality, Milking Systems. (Nasco-1993)
- ❑ **Milk Plant Sanitation: Chemical Solution**—(13 minute videotape). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titrations are reviewed... alkaline wash, presence of chlorine and iodophor, and caustic wash and an acid wash in a HTST system. Emphasis is also placed on record keeping and employee safety. (1989)
- ❑ **Milk Processing Plant Inspection Procedures**—(15 minute videotape). Developed by the California Department of Food and Agriculture. It covers pre- and post-inspection meeting with management, but emphasis is on inspection of all manual and cleaned in place equipment in the receiving, processing and filling rooms. CIP systems are checked along with recording charts and employee locker and restrooms. Recommended for showing to plant workers and supervisors. (CA-1986)
- ❑ **Pasteurizer: Design and Regulation**—(16 minute videotape). This tape provides a summary of the public health reasons for pasteurization and a nonlegal definition of pasteurization. The components of an HTST pasteurizer, elements of design, flow-through diagram and legal controls are discussed. (Kraft General Foods-1990)
- ❑ **Pasteurizer Operation**—(11 minute videotape). This tape provides a summary of the operation of an HTST pasteurizer from start-up with hot water sanitization to product pasteurization and shut-down. There is an

emphasis on the legal documentation required. (Kraft General Foods-1990)

- **Processing Fluid Milk**—(30 minute-140 slides-script-tape). It was developed to train processing plant personnel on preventing food poisoning and spoilage bacteria in fluid dairy products. Emphasis is on processing procedures to meet federal regulations and standards. Processing procedures, pasteurization times and temperatures, purposes of equipment, composition standards, and cleaning and sanitizing are covered. Primary emphasis is on facilities such as drains and floors, and filling equipment to prevent post-pasteurization contamination with spoilage or food poisoning bacteria. It was reviewed by many industry plant operators and regulatory agents and is directed to plant workers and management. (Penn State-1987)
- **Safe Milk Hauling-You're the Key**—(34 minute videotape). Recommended for anyone who samples, measures and collects milk from dairy farms. The purpose of this tape is to acquaint milk handlers with the proper procedures for sampling and picking up milk at the farm and delivering it safely to the handling plant. This tape provides an excellent review for experienced milk haulers and shows step-by-step procedures for novice milk haulers. (Cornell University)
- **3-A Symbol Council**—(8 minute videotape). A video which was developed to make people in the dairy and food industries aware of the 3-A program and its objectives.
- **10 Points to Dairy Quality**—(10 minute videotape). Provides in-depth explanation of a critical control point in the residue prevention protocol. Illustrated with on-farm, packing plant, and milk-receiving plant scenes as well as interviews of producers, practicing veterinarians, regulatory officials and others. (Dairy Quality Assurance-1992)

## FOOD

- **Close Encounters of the Bird Kind**—(18 minute videotape). A humorous but in-depth look at *Salmonella* bacteria, their sources, and their role in foodborne disease. A modern poultry processing plant is visited, and the primary processing steps and equipment are examined. Potential sources of *Salmonella* contamination are identified at the different stages of production along with the control techniques that are employed to insure safe poultry products. (Topek Products, Inc.)
- **Food Irradiation**—(30 minute videotape). Introduces viewers to food irradiation as a new preservation technique. Illustrates how food irradiation can be used to prevent spoilage by microorganisms, destruction by insects, overripening, and to reduce the need for chemical food additives. The food irradiation process is explained and benefits of the process are highlighted. (Turnelle Productions, Inc.)
- **Food Safe—Food Smart—HACCP and Its Application to the Food Industry**—(2-16 minute videotapes). (1)—Introduces the seven principles of HACCP and their application to the food industry. Viewers will learn about the HACCP system and how it is used in the food industry to provide a safe food supply. (2)—Provides guidance on how to design and implement a HACCP system. It is intended for individuals with the responsibility of setting up a HACCP system. (Alberta Agriculture, Food and Rural Development)
- **Food Safe—Series I**—(4-10 minute videotapes). (1) "Receiving & Storing Food Safely," details for food-service workers the procedures for performing sight inspections for the general conditions of food, including a discussion of food labeling and government approval stamps. (2) "Food-service Facilities and Equipment," outlines the requirements for the proper cleaning and sanitizing of equipment used in food preparation areas. Describes the type of materials, design, and proper maintenance of this equipment. (3) "Microbiology for Food-service Workers," provides a basic understanding of the microorganisms which cause food spoilage and foodborne illness. This program describes bacteria, viruses, protozoa, and parasites and the conditions which support their growth. (4) "Food-service House-keeping and Pest Control," emphasizes cleanliness as the basis for all pest control. Viewers learn the habits and life cycles of flies, cockroaches, rats, and mice. (Perennial Education-1991)
- **Food Safe—Series II**—(4-10 minute videotapes). Presents case histories of foodborne disease involving (1) *Staphylococcus aureus*, (sauces) (2) *Salmonella*, (eggs) (3) *Campylobacter*, and (4) *Clostridium botulinum*. Each tape demonstrates errors in preparation, holding or serving food; describes the consequences of those actions; reviews the procedures to reveal the cause of the illness; and illustrates the correct practices in a step-by-step demonstration. These are excellent tapes to use in conjunction with hazard analysis critical control point training programs. (Perennial Education-1991)
- **Food Safe—Series III**—(4-10 minute videotapes). More case histories of foodborne disease. This set includes (1) Hepatitis "A", (2) *Staphylococcus aureus* (meats), (3) *Bacillus cereus*, and (4) *Salmonella* (meat). Viewers will learn typical errors in the preparation, holding and serving of food. Also included are examples of correct procedures which will reduce the risk of food contamination. (Perennial Education-1991)
- **Food Safety is No Mystery**—(34 minute videotape). This is an excellent training visual for food-service workers. It shows the proper ways to prepare, handle, serve and store food in actual restaurant, school and hospital situations. A policeman sick from food poisoning, a health department sanitarian, and a food-service worker with all the bad habits are featured. The latest recommendations on personal hygiene, temperatures, cross-contamination, and storage of foods are included. (USDA-1987). Also available in Spanish.
- **Food Safety: For Goodness Sake, Keep Food Safe**—(15 minute videotape). Teaches foodhandlers the fundamentals of safe food handling. The tape features the key elements of cleanliness and sanitation, including: good

personal hygiene, maintaining proper food product temperature, preventing time abuse, and potential sources of food contamination. (Iowa State University Extension-1990)

- **Food Safety: You Make the Difference**—(28 minute videotape). Through five food workers from differing backgrounds, this engaging and inspirational documentary style video illustrates the four basic food safety concepts: handwashing, preventing cross-contamination, moving foods quickly through the danger zone, and hot/cold holding (Seattle-King County Health Department-1995)
- **GMP: Personal Hygiene and Practices in Food Manufacturing**—(14 minute videotape). This video focuses on the personal hygiene of food-manufacturing workers, and explores how poor hygiene habits can be responsible for the contamination of food in the manufacturing process. This is an instructional tool for new food-manufacturing line employees and supervisors. It was produced with "real" people in actual plant situations, with only one line of text included in the videotape. (Penn State-1993)—(Available in Spanish and Vietnamese)
- **GMP: Sources and Control of Contamination During Processing**—(20 minute videotape). This program, designed as an instructional tool for new employees and for refresher training for current or reassigned workers, focuses on the sources and control of contamination in the food-manufacturing process. It was produced in actual food plant situations. A concise description of microbial contamination and growth and cross-contamination, a demonstration of food storage, and a review of aerosol contaminants are also included. (Penn State-1995)
- **HACCP: Safe Food Handling Techniques**—(22 minute videotape). The video highlights the primary causes of food poisoning and emphasizes the importance of self-inspection. An explanation of potentially hazardous foods, cross-contamination, and temperature control is provided. The main focus is a detailed description of how to implement a Hazard Analysis Critical Control Point (HACCP) program in a food-service operation. A leader's guide is provided as an adjunct to the tape. (The Canadian Restaurant & Foodservices Association-1990)
- **Is What You Order What You Get? Seafood Integrity**—(18 minute videotape). Teaches seafood department employees about seafood safety and how they can help insure the integrity of seafood sold by retail food markets. Key points of interest are cross-contamination control, methods and criteria for receiving seafood and determining product quality, and knowing how to identify fish and seafood when unapproved substitutions have been made. (The Food Marketing Institute)
- **Northern Delight—From Canada to the World**—(13 minute videotape). A promotional video that explores the wide variety of foods and beverages produced by the Canadian food industry. General in nature, this tape presents an overview of Canada's food industry and its contribution to the world's food supply. (Ternelle Production, Ltd.)
- **Proper Handling of Peracetic Acid**—(15 minute videotape). Introduces peracetic acid as a chemical sanitizer and features the various precautions needed to use the product safely in the food industry.
- **Purely Coincidental**—(20 minute videotape). A parody that shows how foodborne illness can adversely affect the lives of families that are involved. The movie compares improper handling of dog food in a manufacturing plant that causes the death of a family pet with improper handling of human food in a manufacturing plant that causes a child to become ill. Both cases illustrate how handling errors in food production can produce devastating outcomes. (The Quaker Oats Company-1993.) Also available in Spanish.
- **On the Front Line**—(18 minute videotape). A training video pertaining to sanitation fundamentals for vending service personnel. Standard cleaning and serving procedures for cold food, hot beverage and cup drink vending machines are presented. The video emphasizes specific cleaning and serving practices which are important to food and beverage vending operations. (National Automatic Merchandising Association-1993)
- **On the Line**—(30 minute videotape). This was developed by the Food Processors Institute for training food processing plant employees. It creates an awareness of quality control and regulations. Emphasis is on personal hygiene, equipment cleanliness and good housekeeping in a food plant. It is recommended for showing to both new and experienced workers. (Available in Spanish)
- **100 Degrees of Doom... The Time and Temperature Caper**—(14 minute videotape). Video portraying a private eye tracking down the cause of a *Salmonella* poisoning. Temperature control is emphasized as a key factor in preventing foodborne illness. (Educational Communications, Inc.-1987)
- **Pest Control in Seafood Processing Plants**—(26 minute videotape). Videotape which covers procedures to control flies, roaches, mice, rats and other common pests associated with food processing operations. The tape will familiarize plant personnel with the basic characteristics of these pests and the potential hazards associated with their presence in food operations.
- **Principles of Warehouse Sanitation**—(33 minute videotape). This videotape gives a clear, concise and complete illustration of the principles set down in the Food, Drug and Cosmetic Act and in the Good Manufacturing Practices, as well as supporting legislation by individual states. (American Institute of Baking-1993)
- **Product Safety and Shelf Life**—(40 minute videotape). Developed by Borden Inc., this videotape was done in three sections with opportunity for review. Emphasis is on providing consumers with good products. One section covers off-flavors, another product



problems caused by plant conditions, and a third the need to keep products cold and fresh. Procedures to assure this are outlined, as shown in a plant. Well done and directed to plant workers and supervisors. (Borden-1987)

- **Safe Food: You Can Make a Difference**—(25 minute videotape). A training video for food-service workers which covers the fundamentals of food safety. An explanation of proper food temperature, food storage, cross-contamination control, cleaning and sanitizing, and handwashing as methods of foodborne illness control is provided. The video provides an orientation to food safety for professional foodhandlers. (Tacoma-Pierce County Health Department-1990)
- **Safe Handwashing**—(15 minute videotape). Twenty-five percent of all foodborne illnesses are traced to improper handwashing. The problem is not just that handwashing is not done, the problem is that it's not done properly. This training video demonstrates the "double wash" technique developed by Dr. O. Peter Snyder of the Hospitality Institute for Technology and Management. Dr. Snyder demonstrates the procedure while reinforcing the microbiological reasons for keeping hands clean. (Hospitality Institute for Technology and Management-1991)
- **Sanitation for Seafood Processing Personnel**—(20 minute videotape). A training video suited for professional foodhandlers working in any type of food manufacturing plant. The film highlights Good Manufacturing Practices and their role in assuring food safety. The professional foodhandler is introduced to a variety of sanitation topics including: 1) foodhandlers as a source of food contamination, 2) personal hygiene as a means of preventing food contamination, 3) approved food storage techniques including safe storage temperatures, 4) sources of cross-contamination, 5) contamination of food by insects and rodents, 6) garbage handling and pest control, and 7) design and location of equipment and physical facilities to facilitate cleaning.
- **Sanitizing for Safety**—(17 minute videotape). Provides an introduction to basic food safety for professional foodhandlers. A training pamphlet and quiz accompany the tape. Although produced by a chemical supplier, the tape contains minimal commercialism and may be a valuable tool for training new employees in the food industry. (Indiana-1990)
- **Seafood Q & A**—(20 minute videotape). Anyone who handles seafood, from processor to distributor to retail and food service, must be prepared to answer questions posed by customers. This tape features a renowned nutritionist and experts from the Food & Drug Administration, the National Marine Fisheries Service, and the National Fisheries Institute who answer a full range of questions about seafood safety. Excellent to educate and train employees about seafood safety & nutrition. (National Fisheries Institute)
- **SERVSAFE® Serving Safe Food**—(4-20 minute videotapes). This video series illustrates and reinforces important food safety practices in an informative and entertaining manner. The material is presented in an easy to understand format, making it simpler for employees to learn and remember this essential information. Each video includes a leader's guide that provides all the information managers need to direct a productive training session. (Educational Foundation of the National Restaurant Association-1993)
- **SERVSAFE® Serving Safe Food Second Edition**—(6-10 minute videotapes). The program still covers all the major areas of food safety training, but there is an added emphasis on training employees to follow HACCP procedures. The second edition program includes an Employee Guide, Leader's Guide and six instructional videos. (Educational Foundation of the National Restaurant Association-1993)
- **Supermarket Sanitation Program—"Cleaning and Sanitizing"**—(13 minute videotape). Contains a full range of cleaning and sanitizing information with minimal emphasis on product. Designed as a basic training program for supermarket managers and employees. (1989)
- **Supermarket Sanitation Program—"Food Safety"**—(11 minute videotape). Contains a full range of basic sanitation information with minimal emphasis on product. Filmed in a supermarket, the video is designed as a basic program for manager training and a program to be used by managers to train employees. (1989)
- **Take Aim at Sanitation**—(8 minute videotape). This video features tips on food safety and proper disposal of single service items. Also presented is an emphasis on food contact surfaces as well as the manufacture, storage and proper handling of these items. (Foodservice and Packaging Institute, Inc.-1995)
- **Wide World of Food-Service Brushes**—(18 minute videotape). Discusses the importance of cleaning and sanitizing as a means to prevent and control foodborne illness. Special emphasis is given to proper cleaning and sanitizing procedures and the importance of having properly designed and constructed equipment (brushes) for food preparation and equipment cleaning operations. (1989)
- **Your Health in Our Hands—Our Health in Yours**—(8 minute videotape). For professional foodhandlers, the tape covers the do's and don'ts of foodhandling as they relate to personal hygiene, temperature control, safe storage and proper sanitation. (Jupiter Video Production-1993)

## ENVIRONMENTAL

- **The ABC's of Clean—A Handwashing & Cleanliness Program for Early Childhood Programs**—For early childhood program employees. This tape illustrates how proper handwashing and clean hands can contrib-

ute to the infection control program in daycare centers and other early childhood programs. (The Soap & Detergent Association-1991)

- **Acceptable Risks?**—(16 minute videotape). Accidents, deliberate misinformation, and the rapid proliferation of nuclear power plants have created increased fears of improper nuclear waste disposal, accidents during the transportation of waste, and the release of radioactive effluents from plants. The program shows the occurrence of statistically anomalous leukemia clusters; governmental testing of marine organisms and how they absorb radiation; charts the kinds and amounts of natural and man-made radiation to which man is subject; and suggests there is no easy solution to balancing our fears to nuclear power and our need for it. (Films for the Humanities & Sciences, Inc.-1993)
- **Air Pollution: Indoor**—(26 minute videotape). Indoor air pollution is in many ways a self-induced problem... which makes it no easier to solve. Painting and other home improvements have introduced pollutants, thermal insulation and other energy-saving and water-proofing devices have trapped the pollutants inside. The result is that air pollution inside a modern home can be worse than inside a chemical plant. (Films for the Humanities & Sciences, Inc.)
- **Asbestos Awareness**—(20 minute videotape). This videotape discusses the major types of asbestos and their current and past uses. Emphasis is given to the health risks associated with asbestos exposure and approved asbestos removal abatement techniques. (Industrial Training, Inc.-1988)
- **Down in the Dumps**—(26 minute videotape). Garbage is no laughing matter. The fact is that we are running out of space to dump the vast amounts of waste we create each day. Since many of the former methods of disposal are environmentally unacceptable, what are we to do? The program examines the technological approaches to the garbage dilemma, including composting, resource recovery, and high-tech incinerators, and public reaction to the creation of new waste treatment facilities. (Films for the Humanities & Sciences, Inc.)
- **EPA Test Methods for Freshwater Effluent Toxicity Tests (using Ceriodaphnia)**—(22 minute videotape). Demonstrates the Ceriodaphnia 7-Day Survival and Reproduction Toxicity Test and how it is used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. The tape covers the general procedures for the test including how it is set up, started, monitored, renewed and terminated. (1989)
- **EPA Test Methods for Freshwater Effluent Toxicity Tests (using Fathead Minnow Larva)**—(15 minute videotape). A training tape that teaches environmental professionals about the Fathead Minnow Larval Survival and Growth Toxicity Test. The method described is found in an EPA document entitled, "Short Term Methods for Estimating the Chronic Toxicity of Effluents & Receiving Waters to Freshwater Organisms." The tape demonstrates how fathead minnow toxicity tests can be used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. (1989)
- **Fit to Drink**—(20 minute videotape). This program traces the water cycle, beginning with the collection of rain-water in rivers and lakes, in great detail through a water treatment plant, to some of the places where water is used, and finally back into the atmosphere. Treatment of the water begins with the use of chlorine to destroy organisms; the water is then filtered through various sedimentation tanks to remove solid matter. Other treatments employ ozone, which oxidizes contaminants and makes them easier to remove; hydrated lime, which reduces the acidity of the water; sulfur dioxide, which removes any excess chlorine; and flocculation, a process in which aluminum sulfate causes small particles to clump together and precipitate out. Throughout various stages of purification, the water is continuously tested for smell, taste, titration, and by fish. The treatment plant also monitors less common contaminants with the use of up-to-date techniques like flame spectrometers and gas liquefaction. (Films for the Humanities & Sciences, Inc.-1987)
- **Food-Service Disposables: Should I Feel Guilty?**—(12 minute videotape). The video, produced by the Food-service & Packaging Institute, Inc., national trade association of manufacturers and suppliers of single service articles for food service and packaging, examines such issues as litter, solid waste, recycling, composting and protection of the earth's ozone layer, makes for an excellent discussion opener on the theme of conservation of natural resources (trees, fresh water and energy) and the environmental trade-offs (convenience, sanitation and family health) that source reduction necessarily entails. (Foodservice & Packaging Institute, Inc.-1991)
- **Garbage: The Movie**—(25 minute videotape). A fascinating look at the solid waste problem and its impact on the environment. Viewers are introduced to landfills, incinerators, recycling plants and composting operations as solid waste management solutions. Problems associated with modern landfills are identified and low-impact alternatives such as recycling, reuse, and source reduction are examined. (Churchill Films)
- **Global Warming: Hot Times Ahead?**—(23 minute videotape). An informative video tape program that explores the global warming phenomenon and some of the devastating changes it may cause. This program identifies greenhouse gases and how they are produced by human activities. Considered are: energy use in transportation, industry and home; effects of deforestation, planting of trees and recycling as means of slowing the build-up of greenhouse gases. (Churchill Films-1995)
- **Kentucky Public Swimming Pool and Bathing Facilities**—(38 minute videotape). Developed by the Lincoln Trail District Health Department in Kentucky and includes all of their state regulations which may be different from other states, provinces and countries.

This tape can be used to train those responsible for operating pools and waterfront bath facilities. All aspects are included of which we are aware, including checking water conditions and filtration methods. (1987)

- ❑ **Putting Aside Pesticides**—(26 minute videotape). This program probes the long-term effects of pesticides and explores alternative pest-control efforts; biological pesticides, genetically-engineered microbes that kill objectionable insects, the use of natural insect predators, and the cross-breeding and genetic engineering of new plant strains that produce their own anti-pest toxins. (Films for the Humanities & Sciences, Inc.)
- ❑ **Radon**—(26 minute videotape). This program looks at the possible health implications of radon pollution, methods homeowners can use to detect radon gas in their homes, and what can be done to minimize hazards once they are found.
- ❑ **RCRA—Hazardous Waste**—(19 minute videotape). This videotape explains the dangers associated with hazardous chemical handling and discusses the major hazardous waste handling requirements presented in the Resource Conservation and Recovery Act. (Industrial Training, Inc.)
- ❑ **The New Superfund: What It is & How It Works**—A six-hour national video conference sponsored by the EPA. Target audiences include the general public, private industry, emergency responders and public interest groups. The series features six videotapes that review and highlight the following issues:
  - ❑ **Tape 1—Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements**—(62 minute videotape). A general overview of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and the challenge of its implementation. The remedy process—long-term and permanent clean-up—is illustrated step-by-step, with emphasis on the new mandatory clean-up schedules, preliminary site assessment, petition procedures and the hazard ranking system/National Priority List revisions. The major role of state and local government involvement and responsibility is stressed.
  - ❑ **Tape 2—Changes in the Removal Process: Removal and Additional Program Requirements**—(48 minute videotape). The removal process is a short-term action and usually an immediate response to accidents, fires and illegally dumped hazardous substances. This program explains the changes that expand removal authority and require procedures consistent with the goals of remedial action.
  - ❑ **Tape 3—Enforcement and Federal Facilities**—(52 minute videotape). Who is responsible for SARA clean-up costs? Principles of responsible party liability; the difference between strict, joint and several liability; and the issue of the innocent landowner are discussed. Superfund enforcement

tools-mixed funding, De Minimis settlements and the new nonbinding preliminary allocations of responsibility (NBARS) are explained.

- ❑ **Tape 4—Emergency Preparedness and Community Right-to-Know**—(48 minute videotape). A major part of SARA is a free-standing act known as Title III: The Emergency Planning and Community Right-to-Know Act of 1986, requiring federal, state, and local governments and industry to work together in developing local emergency preparedness/response plans. This program discusses local emergency planning committee requirements, emergency notification procedures, and specifications on community right-to-know reporting requirements, such as using OSHA Material Safety Data Sheets, the emergency & hazardous chemical inventory and the toxic chemical release inventory.
- ❑ **Tape 5—Underground Storage Tank Trust Fund and Response Program**—(21 minute videotape). Another addition to SARA is the Leaking Underground Storage Tank (LUST) Trust Fund. One half of the U.S. population depends on ground water for drinking—and EPA estimates that as many as 200,000 underground storage tanks are corroding and leaking into our ground water. This program discusses how the LUST Trust Fund will be used by EPA and the states in responding quickly to contain and clean-up LUST releases. Also covered is state enforcement and action requirements, and owner/operator responsibility.
- ❑ **Tape 6—Research and Development/Closing Remarks**—(33 minute videotape). An important new mandate of the new Superfund is the technical provisions for research and development to create more permanent methods in handling and disposing of hazardous wastes and managing hazardous substances. This segment discusses the SITE (Superfund Innovative Technology Evaluation) program, the University Hazardous Substance Research Centers, hazardous substance health research and the DOD research, development and demonstration management of DOD wastes.
- ❑ **Sink A Germ**—(10 minute videotape). A presentation on the rationale and techniques for effective handwashing in health care institutions. Uses strong imagery to educate hospital personnel that handwashing is the single most important means of preventing the spread of infection. (The Brevis Corp.—1986)
- ❑ **Waste Not: Reducing Hazardous Waste**—(35 minute videotape). This tape looks at the progress and promise of efforts to reduce the generation of hazardous waste at the source. In a series of company profiles, it shows activities and programs within industry to minimize hazardous waste in the production process. Waste Not also looks at the obstacles to waste reduction, both within and outside of industry, and considers how soci-

ety might further encourage the adoption of pollution prevention, rather than pollution control, as the primary approach to the problems posed by hazardous waste. (Umbrella films)

## OTHER

- Diet, Nutrition and Cancer**—(20 minute videotape). Investigates the relationship between a person's diet and the risk of developing cancer. The film describes the cancer development process and identifies various types of food believed to promote and/or inhibit cancer. The film also provides recommended dietary guidelines to prevent or greatly reduce the risk of certain types of cancer.
- Eating Defensively: Food Safety Advice for Persons with Aids**—(15 minute videotape). While HIV infection and AIDS are not acquired by eating foods or drinking liquids, persons infected with the AIDS virus need to be concerned about what they eat. Foods can transmit bacteria and viruses capable of causing life-threatening illness to persons infected with AIDS. This video provides information for persons with AIDS on what foods to avoid and how to better handle and prepare foods. (FDA/CDC-1989)
- Ice: The Forgotten Food**—(14 minute videotape). This training video describes how ice is made and where the critical control points are in its manufacture, both in ice plants and in on-premises locations (convenience stores, etc.); it documents the potential for illness from contaminated ice and calls on government to enforce good manufacturing practices, especially in on-premises operations where sanitation deficiencies are common. (Packaged Ice Association-1993)
- Legal Aspects of the Tampering Case**—(25 minute videotape). This was presented by Mr. James T. O'Reilly, University of Cincinnati School of Law at the fall 1986 Central States Association of Food and Drug Officials Conference. He emphasizes three factors from his police and legal experience—know your case, nail your case on the perpetrator, and spread the word. He outlines specifics under each factor. This should be of the greatest interest to regulatory sanitarians, in federal, state and local agencies. (1987)
- Personal Hygiene & Sanitation for Food Processing Employees**—(15 minute videotape). Illustrates and describes the importance of good personal hygiene and sanitary practices for people working in a food processing plant. (Iowa State-1993)
- Psychiatric Aspects of Product Tampering**—(25 minute videotape). This was presented by Emanuel Tanay, M.D. from Detroit, at the fall 1986 conference of CSAFDA. He reviewed a few cases and then indicated that abnormal behavior is like a contagious disease. Media stories lead to up to 1,000 similar alleged cases, nearly all of which are false. Tamper-proof packaging and recalls are essential. Tampering and poisoning are characterized by variable motivation, fraud and greed. Law enforcement agencies have the final responsibilities. Tamper proof containers are not the ultimate answer. (1987)
- Tampering: The Issue Examined**—(37 minute videotape). Developed by Culbro Machine Systems, this videotape is well done. It is directed to food processors and not regulatory sanitarians or consumers. A number of industry and regulatory agency management explain why food and drug containers should be made tamper evident. (Culbro-1987)

If you are interested in checking out any of our audio-visuals, please fill out this form with the box or boxes checked as to which presentations you wish to view. Mail to: IAMFES, Lending Library, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863. (Material from the Lending Library can be checked out for two weeks only so that others can benefit from its use.)

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# Preview

## of the 84<sup>th</sup> Annual Meeting Orlando, FL

### Monday Morning—July 7, 1997

#### Opening Doors to New Dairy Markets

- New Product Opportunities, What are Consumers Seeking?
- Moo Cooler—Breaking New Ground
- Square Pegs in Round Holes
- How do IDF, Codex and Trade Agreements Impact the Dairy Farmer?
- Some Implications of the Dairy Portions of the Farm Bill

#### Technical Session—Foodborne Pathogens

- Effects of Culture Temperature, Inoculum Concentration, and Contact Time on Attachment of *E. coli* O157:H7 and *L. monocytogenes* to Chicken Skin
- Factors Affecting Inhibitory Activity of Lactates Against *E. coli* O157:H7 at 10°C
- A Sensitive 24-h Vero Cell Tissue Culture Assay for Cytotoxins of EHEC O157:H7 Strains
- Stimulation of Growth and Survival of *E. coli* O157:H7 at Suboptimal Temperatures by Sodium Lactate
- A Small Outbreak of Listeriosis Linked to the Consumption of Imitation Crab Meat
- Thermal Destruction of *L. innocua* in Ground Beef Patties with 5, 25 or 50% Fat
- Accelerated Recovery on Injured *Salmonella* through Media Modification
- *Salmonella* Control in Poultry
- Factors Affecting Growth and Toxin Production by *Clostridium botulinum* in Peanut Spread
- Response to Acid Challenge by *Yersinia enterocolitica* Depends on Physiological State and Strain
- A Quantitative Risk Assessment of *Vibrio vulnificus* in Gulf of Mexico Oysters Consumed in Canada

#### Quantitative Microbial Risk Assessment: From Start to Finish

- Risk Assessment: The Link between HACCP and Public Health
- Modeling the Prevalence of Contamination
- Growth, Survival and Thermal Death Models to be Used in the Process of Risk Assessment
- Dose Response Modeling
- Simulation Modeling—Monte Carlo Techniques
- Risk Management and Economic Analyses

#### Special Poster Session—Washing Makes a Difference (Posters—without authors will be displayed until Tuesday at noon)

- Update of Washing and Sanitizing of Milk Haulers and Dairy Plant Equipment
- An Assessment of the Cleaning and Disinfection of Poultry Transport Containers and Truck Beds
- Efficacy of Holding Pen Washing to Reduce Bacterial Levels
- New Methods for Sanitization of Egg Shells
- Biofilms in Aquatic Food Processing
- Washing Fresh Fruits and Vegetables

#### Safety of Refrigerated Foods—An Update

- Refrigerated Food Safety: Regulatory Perspective
- Refrigerated Food Safety: Industry Perspective
- Packaging Refrigerated Foods
- Antimicrobial Strategies for Refrigerated Foods
- Intervention Strategies of Minimally Processed Refrigerated Foods
- Use of Predictive Modeling in Formulating for Food Safety

#### Poster Session—Methodology

- A New Rapid Automated Method for the Detection of *Listeria* spp. from Environmental Swabs
- Development of a New Medium to Assess Injury in Heat & Sanitizer Injury for *Listeria*

- Suitability of Selective Media for Recovery and Enumeration of Sublethally Heat- and Acid-Injured *L. monocytogenes*
- Identification and Enumeration of *Salmonella* on Sample Slides of Poultry Carcass Wash Water Using Image Analysis
- Evaluation of an Automated Enzyme-Linked Fluorescence Immunoassay (ELFA) for the Detection of *Salmonella*
- Antibody-Direct Epifluorescent Filter Technique (Ab-DEFT) for Rapid, Specific Enumeration of *Listeria* in Food
- Quantitative Screening of Reactivity of *Bacillus* and *Clostridium* Spores in a Dot-Blot Immunoassay
- Detection of *Staphylococcus aureus* Using an Enhanced Chemiluminescent Biosensor
- Multiplex PCR for the Detection of Human Enteroviruses, Hepatitis A Virus, and Norwalk Virus
- Modification of the Sample Preparation Protocol in the BAX™ System for Screening *Salmonella* to Permit Detection of Food Matrices with Inhibitory PCR Effects
- Rapid Molecular Method for the Detection of *Salmonella* spp. Using PCR and LCR
- Rapid Detection of *Salmonella* in Feces from Dairy Cows Using a Fluorescent PCR-Based Assay
- Results of Testing a Variety of Foods for *Salmonella* Using a Fluorogenic PCR-Based Assay
- Evaluation of an Enzyme-Linked Immunosorbent Assay, Direct Immunofluorescent Filter Technique and Multiplex PCR for Detection of *E. coli* O157:H7 in Beef Carcass Wash
- Development of PCR-Based Homogeneous Confirmative Assays for *L. monocytogenes* and *E. coli* O157:H7
- Development and Evaluation of a PCR-Based Assay for the Detection of *L. monocytogenes* in Foods
- Concentration of Pathogenic Microorganisms from Dairy Products for Detection of PCR
- Rapid Methods for Identification of Lactic Acid Bacteria
- Genetic Characterization of *Shewanella putrefaciens* and *Pseudomonas* spp. Isolated from Fish Processing and Spoilage Using Automated Ribotyping
- Comparison of Excision Versus Swabbing Techniques for Assessing the Bacteriological Quality of Pig Carcass Surfaces
- A Novel Technique for *E. coli* Testing of Beef and Pork Carcasses
- A 24 h Test for Enumeration of Total Coliforms and *E. coli* in Food
- The Occurrence of Non-Coliform Bacteria on VRBA
- Evaluation of a Novel Method for the Detection of *Staphylococcus aureus* in Dairy Samples
- The Evaluation of an Automated Rapid Microbial Detection System for Sterility Testing of an Aseptically Processed Tomato-Based Vegetable Beverage

- SimPlate™ for Yeast and Mold: A New Method for Rapid Fungi Enumeration in Food

#### Monday Afternoon—July 7, 1997

#### Fresh-Cut Fruits—Pitfalls and Challenges for the Future

- An Introduction to Fresh-Cut Fruits Market Potential in Both the Foodservice and Retail Arenas
- The Effect of Farm Management Practices on the Quality of Fresh-Cut Fruits
- Factors Affecting the Suitability of Commodity Fruits Headed for the Fresh-Cut Processor
- Processing and Quality Factors Affecting the Quality and Storage Life of Fresh-Cut Processor
- Fruit Spoilage
- Microbiological Safety and Control of Fresh-Cut Fruits

#### Technical Session—Methodology and Education

- Comparison of *Staphylococcus aureus* Detection by Conventional and New Petrifilm™ Methods
- A Single Test Unit for Quantitating Coliforms, *E. coli* and *Salmonella* in Waters and Foods
- Ensuring the Microbiological Quality of a Low Proof Beverage
- Assessing Surface Cleanliness—An Integrated Approach Using ATP Bioluminescence and Microbiological Analysis
- The Use of Bioluminescence for Evaluating Plant Cleanliness in a Baking Facility
- Rapid Molecular Method for Detection of Human Enteric Viruses in Prepared Hamburgers and Leaf Lettuce
- Immunomagnetic Separation and Flow Cytometry for Rapid Detection of *E. coli* O157:H7
- Hazard Analysis Critical Control Point (HACCP) Implementation of Food-service Directors
- Handwashing vs. Gloving for Food Protection
- Foodborne Disease in the Home
- Statewide Training for Environmental Health Specialist
- Recipe HACCP

#### USDA “Mega-Reg” Microbiological Requirements

- Microbiological Sampling and Testing Aspects of the “Mega-Reg”
- *E. coli* Testing and Process Control
- *E. coli* and *Salmonella* Levels on Beef Carcasses—Survey Results Compared to Mega-Reg Requirements
- Consumer Perspective of the “Mega-Reg”
- International Perspective of the “Mega-Reg” Microbiological Testing Requirement
- Microbiological Performance Standards and HACCP

### **Food Allergies and Intolerances**

- Medical Aspects of Food Allergies and Intolerances
- Food Allergy: Scope, Risk and Severity Issues
- Assessing the Potential Allergenicity of New Food Pathogens
- The Consumer Perspective on Food Allergy
- Food Allergy: Food Industry Risk Management
- Food Allergy: The Regulatory Perspective

### **Poster Session—General Food Microbiology**

- Biological Properties of a Bacteriocin-Like Inhibitory Substance Produced by a Newly Isolated *Bacillus subtilis*
- Use of HPLC to Demonstrate Aflatoxin B<sub>1</sub> Degradation by *Flavobacterium aurantiacum* in Corn
- Occurrence of Molds and Levels of Aflatoxins and Fumonisin in Venezuelan Corn
- Enumeration and Characterization of *Aeromonas* sp. in Vegetable Products from Venezuela
- Inhibition of Microbial Growth and Toxin Production in Honey
- Effect of Diet on the Indicative and Pathogenic Microbiological Quality of Aquacultured Pacu (*Piaractus mesopotamicus*)
- Antibiotic Resistant Bacteria in Aquacultured Catfish Fillets
- Effect of Production System on the Indicative and Pathogenic Microbiological Quality of Aquacultured Finfish
- Effects of Vitamin E Supplementation and High vs. Low Initial Microbial Loads on Retail Display Life of Beef Muscle
- Rapid Catalytic Activity Method for Measurement of End-Point Temperature in Cooked Beef and Sausage
- Shelf-Life of Ground Beef Patties Treated by Gamma Irradiation
- Sensory Changes of Irradiated Ground Beef through Six Weeks of Storage
- The Effect of Growth Medium and Heating Menstruum on Heat Resistance of *Pedilococcus* sp.
- Evaluation of Changes in Microbial Populations on Beef Carcasses Resulting from Steam Pasteurization
- Comparison of Methods for Beef Carcass Decontamination
- Efficacy of Trisodium Phosphate for Destruction of *Salmonella* on Cantaloupe
- Growth and Adherence on Stainless Steel by *Enterococcus faecium*
- Evaluation of Surface Topography of Food Grade Polyethylene, Polypropylene, Acetate and Stainless Steel by Scanning Electron Microscopy
- Scanning Electron Microscopy of High Density Polyethylene Conveyor Surfaces during Normal Processing in Meat Plant Operations
- Delamination in Polyethylene Structures and the Influence of Multilayered Upper Surfaces on Deterioration Processes

- Microbial Spoilage of Chub-Packed Ground Beef from Four Processing Plants in the United States
- Simulation of *Bacillus* Spoilage in a Model Food System
- Development of an Experimental Model for Microbial Cross-Contamination and Evaluation of the Efficiency of an Antibacterial Kitchen Disinfectant
- Efficacy of Three Sanitizers Against Food Spoilage Bacteria
- Bacterial Populations of Different Sample Types from Poultry
- Microbial Ecology of South African Retail
- Microbiological Quality of Cream-Fillings from Doughnuts Sold at Bulawayo, a Zimbabwean City
- Microbial Quality of Koshari, One of the Most Famous Flokys Meals Common in Egypt

### **Tuesday Morning—July 8, 1997**

#### **Ensuring Proper Equipment Design**

- World Issues and Organizations Involved in Equipment Design and Standards Harmonization
- The Meaning of the 3-A Symbol
- Regulatory and Inspection Bodies Involved—A Panel Discussion
- Interested Parties: Is the System Working? A Panel Discussion
- Interested Parties: Is the System Working? A Panel Discussion (3-A Standards Practical Application)

#### **Technical Session—General Food Microbiology**

- A Risk Assessment for *Salmonella enteritidis* in Eggs in Canada
- Verification of a Quantitative Risk Assessment for *E. coli* O157:H7 in Hamburgers
- Rapid Desiccation with Heat in Combination with Water Washing for Reducing Bacteria on Beef Carcass Surfaces
- A Purge Sampling Method to Detect Total Aerobic Bacteria and *E. coli* O157:H7 in Raw Beef Combos
- Evaluation of the USDA Sponge Sampling Technique for Beef Carcasses for Enumeration of *E. coli*
- Reductions in Microbial Populations at Five Anatomical Locations on Steam Pasteurized Beef Carcasses
- Characterization of Lactic Acid Bacteria from a Sow, a Healthy Piglet and an Ill Piglet
- Thermotolerance of *Enterobacter sakazakii* in an HTST Pasteurizer
- Reducing Conditions and Seryl and Sulphydryl Inhibitors on Aflatoxin B<sub>1</sub> Degradation by *F. aurantiacum*
- Effect of Prebiotics on *Bifidobacterium*

#### **Safety of Genetically Modified Foods**

- An Overview of Technology and Products
- Consumers' Perceptions



- National and International Regulatory Perspectives
- Recent Trends in Biotechnology
- Risks, Public Opinion and Risk Communication

#### International Trends in Microbiological Methods

- Laboratory Accreditation: Is It Needed and Can It be Standardized?
- International Efforts to Standardize Microbiological Methods
- Tolerance Limits and Methodology: Effect on International Trade
- How to Design a Comprehensive Validation Program: Association of Official Analytical Chemists (AOAC)
- How to Design a Comprehensive Validation Program: MicroVal

#### Cyclospora—The Parasite that Raspberries Made Famous

- Epidemiology of the Outbreak
- Tracebacks—Untangling the Maze
- Microbiology and Testing of Cyclospora
- Ontario Experience and Response to Cyclospora Ontario Infection, 1996
- Cyclospora—FDA Regulatory Aspects
- Environmental Assessment in Guatemala

#### Poster Session—Foodborne Pathogens

- Survival of *L. monocytogenes* in Refrigerator Dill Pickles
- Fate of Gamma Irradiated *L. monocytogenes* on Raw or Cooked Turkey Breast Meat during Refrigerated Storage
- Effectiveness of Two Cooking Systems in Destroying *E. coli* O157:H7 and *L. monocytogenes* in Ground Beef Patties
- Fate of *E. coli* O157:H7, *L. monocytogenes*, and *Salmonella* spp. in Reduced Sodium Beef Jerky
- The Impact of Cold Shocking on the Minimum Growth Temperature for *E. coli* O157:H7
- Influence of Package Atmosphere on Growth and Survival of Uninjured and Sublethally Heat-Injured *E. coli* O157:H7
- Fate of Selected Pathogens in Vacuum-Packaged Dry-Cured (Country-Style) Ham Slices at 2°C and 25°C
- Fate of *L. monocytogenes* on Smoked Fish Coated with Sorbate-Containing Cellulose-Based Edible Films
- Effect of Acidulant Identity on the Acid Tolerance Response of Enterohemorrhagic *E. coli*
- Effect of pH and Acid Tolerance on Radiation Resistance of Enterohemorrhagic *E. coli*
- Acid Tolerance and Acid Shock Responses of *E. coli* O157:H7 and Non-O157:H7 Strains in the Presence of Arginine, Lysine and Methionine

- Characterization of Acid Shock and Acid Tolerance Response in *L. monocytogenes* Strains V7, V37, and CA
- Comparison of Chlorine and a Produce Rinse for Killing Pathogens on Fresh Produce
- Inhibition of *Listeria innocua* in Manchego Cheese by Bacteriocin-Producing *Enterococcus faecalis*
- Inhibition of *L. monocytogenes* on Fresh Pork Loin Using a Nisin-Based Treatment
- Control of *L. monocytogenes* by Use of Lysozyme, Lactoferricin- $\beta$  and EDTA
- Antimicrobial Activities of Lysozyme and Lactoferricin- $\beta$  Against *Salmonella*
- Incidence of *Salmonella* on Beef Carcasses at Various Stages of the Slaughtering Process
- Probabilities of Passing *E. coli* Performance Criteria in Seven Beef Slaughtering Plants
- Incidence of *Edwardsiella*, *Salmonella* and *Shigella* on Fresh Catfish Fillets
- Incidence of *Giardia lamblia* in Finished Potable Water Samples in Hermosillo, Sonora, México
- Occurrence of *Vibrio* spp. in Guacuco Clams (*Tivela mactroides*) and Chipi-chipi Clams (*Donas denticulatus* and *Donas striatus*) from Venezuela
- Revised Model for Aerobic Growth of *Shigella flexneri* to Extend the Validity of Predictions at Low Temperatures
- Lag Phase Durations of *L. monocytogenes* Cells in Different Physiological States to Changes in the Environment
- Updated Models for the Effects of Temperature, pH, NaCl, and NaNO<sub>2</sub> on the Aerobic and Anaerobic Growth of *L. monocytogenes*
- A Computer Model Describing the Competitive Growth of *L. monocytogenes* and *Lactococcus lactis* in Cucumber Juice
- Modulation of Lag Phase at 5°C of *L. monocytogenes* Scott A by Osmolytes

#### Tuesday Afternoon—July 8, 1997

#### General Session—Food Safety Issues for Special Populations

- Populations at Increased Risk for Foodborne Disease
- Special Pathogens: Foodborne Agents Posing Special Risk Concerns
- The Impact of an Aging Population on the Special Consumer Risk Concern
- The Value of Society of Protection Population Subgroups at Special Risk
- Food Safety and the Special Consumer
- Communicating Risk: Where should Special Consumers Get Their Food Safety Information?

#### IAMFES Business Meeting

### Wednesday Morning—July 9, 1997

#### HACCP Implementation in the Seafood Industry: Are You Prepared?

- Benefits and Pitfalls of HACCP for the Seafood Industry
- Experiences in Implementation of HACCP in Seafood Processing Plant
- Experiences in Implementation of HACCP in Seafood Processing Industry
- Experiences in Implementation of HACCP in Seafood Foodservice Industry
- FDA's Expectation for Seafood Industry Compliance
- Global Perspective on HACCP in Seafood Industry

#### Future Trends and Considerations in Sanitation

- Mega Regs—As It Applies to Sanitation
- Contracting Sanitation Services, An Evaluation
- Sanitizers, What Can be Done to Reduce the Problem of New and Old Pathogens
- Pest Control without Pesticides, 2000 and Beyond
- Foreign Material Control
- Rapid Hygiene Monitoring, A New Light

#### Ensuring a Safe Global Food Supply—Part Two

- The Birth of an Emerging Foodborne Pathogen and a Strategy for the Future
- Highlight of the March 1997 "Conference on Emerging Foodborne Pathogens: Implications and Control"
- Lessons Learned from the 1996 Outbreak of Enterohemorrhagic *Escherichia coli* Infection in Japan
- Panel Discussion—Integrated Science-Based Approaches to Food Safety Regulation

### Wednesday Afternoon—July 9, 1997

#### Viral Foodborne Disease: Emerging Agents, Emerging Methods

- Overview of the Viral Foodborne Disease Issue: New York State Perspective
- Presumed Viral
- Hepatitis A Virus: Molecular Methods of Detection
- Update on SRSV's (Norwalk-like) Viruses
- Detection of Human Enteric Viruses
- Inactivated Hepatitis A Virus Detection by Antigen Capture-PCR

- Application of the 5' Nuclease Assay for the Detection of Bacterial and Viral Foodborne Pathogens

#### Food Safety and Quality Concerns Associated with Juice Products

- Microbiological Concerns Associated with Juice Products
- Spoilage of Juice Products by Sporeforming Microorganisms
- Fungi in Packaging Material: How does It Effect Juice Quality and Shelf-life?
- Processing Alternatives to Pasteurization
- Impact of Foodborne Disease from a Regulatory Perspective
- Impact of Foodborne Disease from an Industry Perspective

#### Epidemiological Typing of Foodborne Organisms

- Molecular Methods for Epidemiological Typing of Foodborne Pathogens
- PCR-RFLP for Epidemiological Typing
- RAPD and Fatty Acid Profiling for Typing of Foodborne Microorganisms
- Ribotyping
- PFGE for Typing of Foodborne Pathogens

#### The Impact of the WTO and Codex Alimentarius on International and Domestic Food Standards

- *Codex Alimentarius* Initiatives to Meet International Trade Agreement Responsibilities: Overview
- Science/Risk Based Requirements of International Trade: Agreements and Responsibilities of Countries
- *Codex Alimentarius* Initiatives to Meet International Trade Agreement Responsibilities: Microbiological Risk Assessment: Principles, Relationship to HACCP and Microbiological Criteria, Future Needs
- *Codex Alimentarius* Initiatives to Meet International Trade Agreement Responsibilities: Microbiological Risk Assessment: Chemical Risk Assessment: Procedures for Food Additives and Pesticides, Harmonization Activities, Initiatives for Food Additives
- Risk Assessment/Risk Management: Clarifying the Relationships
- U. S. Codex Strategic and Action Plans for Sound Science and Transparency

# 84<sup>th</sup> IAMFES Annual Meeting

## *Tours and Special Events*

**Sunday, July 6, 1997 - 8:30 a.m. - 4:30 p.m.**  
**Kennedy Space Center**  
**Registration: \$42 (Late \$50) Lunch included**

Enter the world of outer space with a guided tour of Kennedy Space Center. Hear the history behind the Mercury, Gemini, and Apollo rockets during a tour of the Rocket Garden! Walk through a full-size replica of the space shuttle. Then board the NASA bus and see the launching pads and the enormous Saturn V Rocket. Experience the spectacular IMAX film "The Dream is Alive," filmed by astronauts in outer space. Simply out of this world!

**Sunday, July 6, 1997-8:30 a.m.-Shotgun Start**  
**IAMFES Golf Tournament**  
**Registration: \$95 (Late \$110)**

Before dealing with issues of food protection, let's get together for some fun and a great round of golf. A best-ball tournament for all skill levels is scheduled at the Grand Cypress Golf Club designed by Jack Nicklaus. To request a golf registration form, call IAMFES at (800) 369-6337 or (515) 276-3344.

**Opening Session**  
**Ivan Parkin Lecture**  
**Sunday, July 6, 1997 - 7:00 p.m.**

*Lecture:* Martha Rhodes Roberts, Ph.D., Florida Department of Agriculture and Consumer Services.

**Cheese and Wine Reception**  
**Held in the Exhibit Hall**  
**Sunday, July 6, 1997 - 8:00 p.m. - 10:00 p.m.**

Join friends and colleagues for complimentary refreshments while viewing over 80 educational exhibits.

### **Exhibit Hall Hours**

Monday, July 7, 1997 - 9:30 a.m. - 4:00 p.m.  
Tuesday, July 8, 1997 - 9:30 a.m. - 4:00 p.m.

**Monday, July 7, 1997 - 6:00 p.m. - 10:30 p.m.**  
**Sail Away... A Key West Evening**  
**Registration: \$55 (Late \$60)**

Put on your best Florida shirt and join us poolside at the Hyatt Regency Grand Cypress as we transform you to the relaxing, casual atmosphere like the Florida Keys. Start your evening enjoying a tropical fruit drink with old and new friends. Then move on to a luscious and tantalizing dinner; don't forget the Key Lime pie for dessert!

Spend the rest of the evening enjoying the sounds of the Keys - Jimmy Buffet style. While enjoying the entertainment, you could try your hand at a friendly game of sand volleyball or horseshoe pitching. If that's not your style you can sit comfortably poolside and watch the waterfalls or stroll along the lake. It's sure to be a relaxing night to sail away.

**Monday, July 7, 1997 - 9:00 a.m. - 4:00 p.m.**  
**All Around Orlando**  
**Registration: \$30 (Late \$35) Lunch on own**

During this tour you will see Orlando in all its glory. The fun begins with a narrated tour through downtown Orlando. See the historic Church Street District and beautiful Lake Eola. You will drive through and see one of the most exclusive areas of Orlando, Winter Park. Our tour will also stop at the home of the Orlando Magic, the O-rena. Throughout the day there will be opportunities for some unique shopping experiences.

**Tuesday, July 8, 1997 - 8:30 a.m. - 4:00 p.m.**  
**Cypress Gardens**  
**Registration: \$49 (Late \$55) Lunch on own**

Travel across the rolling hills of central Florida, through orange groves to Cypress Gardens; a 223-acre family attraction that is home of the first, and still the finest, water-ski show. The botanical garden, created out of a swamp, was first opened to the public in 1936. Walk through exquisite gardens and see huge banyan trees, along with central Florida's flora and fauna. Meet graceful Southern Belles and shop the antebellum village, Southern Crossroads. There are a variety of shows, animal exhibits and rides for kids of all ages. Be sure to visit the all-new "Wings of Wonder" Butterfly Conservatory with more than 1,000 free-flying butterflies.

**Wednesday, July 9, 1997**  
**IAMFES Annual Awards Banquet**  
**Reception: 6:00 p.m. - 7:00 p.m.**  
**Banquet: 7:00 p.m.**  
**Registration: \$35 (Late \$40)**

**Wednesday, July 9, 1997**  
**IAMFES Children's Banquet**  
**Time: 6:30 p.m. - 9:30 p.m.**  
**Registration: \$15 (Late \$20)**

### **Child Care**

Child care can be arranged through the Hyatt Child Care or Camp Hyatt. Please contact the Hyatt Grand Cypress at (404) 293-1234 ext. 4440 for further details. Pre-registration is advised.

# 84th IAMFES Annual Meeting Registration Form

Hyatt Regency Grand Cypress — Orlando, FL — July 6 - July 9, 1997  
(Use photocopies for extra registrations)

FOR OFFICE USE  
Date Rec'd. \_\_\_\_\_  
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Last name \_\_\_\_\_

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Title Employer

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Mailing Address (Please specify: Home or Work)

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**\*REGISTER BY MAY 30, 1997 TO AVOID LATE REGISTRATION FEES**

REGISTRATION:	MEMBERS	NON-MEMBERS	AMOUNT
Registration (Banquet included)	\$220 (\$270 late)*	\$305 (\$355 late)*	_____
Student Member	\$ 35 (\$ 45 late)*	Not Available	_____
One Day Registration (Circle: Mon/Tues/Wed)	\$110 (\$135 late)*	\$145 (\$165 late)*	_____
Spouse/Companion (Name): _____	\$ 35 (\$ 35 late)*	\$ 35 (\$ 35 late)*	_____
Children (14 & Under, Names): _____	FREE	FREE	_____

**NEW MEMBERSHIP FEES:**

Membership with Dairy, Food & Environmental Sanitation	\$ 75.00	_____
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**Student Membership <input type="checkbox"/> Dairy, Food & Env. San. or <input type="checkbox"/> Journal of Food Protection	\$ 37.50	_____
**Student Membership with Dairy, Food & Env. San. & Journal of Food Protection	\$ 60.00	_____

*\*\*Full-time student verification required.*

<b>SHIPPING CHARGES: OUTSIDE THE U.S. - SURFACE RATE</b>	\$ 22.50 per journal	_____
<b>AIRMAIL</b>	\$ 95.00 per journal	_____

**OTHER FEES:**

	PER PERSON	# OF TICKETS	AMOUNT
Cheese and Wine Reception (Sun., 7/6)	FREE	_____	_____
IAMFES Golf Tournament (Sun., 7/6)	\$ 95 (\$ 110 late)	_____	_____
Sail Away... A Key West Evening (Mon., 7/7)	\$ 55 (\$ 60 late)	_____	_____
IAMFES Awards Banquet (Wed., 7/9)	\$ 35 (\$ 40 late)	_____	_____
Children's Banquet (Wed., 7/9)	\$ 15 (\$ 20 late)	_____	_____

**SPOUSE/COMPANION EVENTS:**

	PER PERSON	# OF TICKETS	AMOUNT
Kennedy Space Center (Sun., 7/6)	\$ 42 (\$ 50 late)	_____	_____
All Around Orlando (Mon., 7/7)	\$ 30 (\$ 35 late)	_____	_____
Cypress Gardens (Tues., 7/8)	\$ 49 (\$ 55 late)	_____	_____

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**Registration Information**

Send payment with registration to IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863. Make checks payable to IAMFES. Registration must be post-marked by May 31, 1997. Registration post-marked after May 31, 1997 will be charged the late registration fee. For additional information contact Julie Cattanach at (800) 369-6337.

**Refund/Cancellation Policy**

The IAMFES policy on refunds and/or cancellations is as follows: Registration fees, minus a \$50 processing fee, will be refunded for written cancellations post-marked by June 20, 1997. No refunds will be made for cancellations post-marked after June 20, 1997, however, the registration may be transferred to a colleague with written notification to IAMFES.

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July 6 - July 9, 1997  
Hyatt Regency Grand Cypress  
Orlando, FL

- Please check accommodation requested:
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Special Requests \_\_\_\_\_

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All Reservations must be held with one (1) night's deposit payable by credit card (or check received within fourteen (14) days). Reservations canceled less than seventy-two (72) hours prior to arrival will forfeit the deposit. After June 4, 1997, reservations will be accepted on a space and rate available basis.

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# IAMFES

# 84<sup>TH</sup>

## Annual Meeting

### Orlando, Florida

### July 6 - July 9

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# Coming Events

## APRIL

• **2-4, Missouri Milk, Food and Environmental Health Association (MMFEHA) and Annual Educational Conference**, Columbia, MO. For further information, contact Dianna Pasley at (314) 789-3372.

• **7-8, American Institute of Baking Food Plant Pest Control Seminar**, in Manhattan, KS. The seminar is designed to increase awareness of pest control strategies and alternatives to the use of chemicals as the main control strategy for pests in the food industry. For additional information, contact AIB, 1213 Bakers Way, Manhattan, KS 66502 or call (913) 537-4750; fax (913) 537-1493.

• **8-9, Oregon Dairy Industries Annual Conference**, Eugene Hilton. For additional information, contact Lilly Smith, Oregon Dairy Industries, Food Science Dept., 100 Wiegand Hall, OSU, Corvallis, OR 97331-6602; phone (503) 745-5545; fax (503) 745-1018.

• **8-10, Pasta and Noodles: Raw Materials and Processing**, Fargo, ND. For more information, contact the AACC Short Course Department, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; phone (612) 454-7250; fax (612) 454-0766; e-mail: aacc@scisoc.org.

• **9-11, Food Science Course: Applied Sensory Evaluation**, Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; (908) 932-9271.

• **14-17, Better Process Control School**. For information, contact The World Wide Web at <http://www.foodsci.purdue.edu/> or Gwen Shoemaker, Food Science Department, 1160 Smith Hall, Purdue University, West Lafayette, IN 47907; phone (317) 494-8270; e-mail: shoemake@foodsci.purdue.edu.

• **14-18, Recombinant DNA: Techniques and Applications**, sponsored by The American Type Culture Collection. For further information, contact ATCC, Workshop Coordinator, 12301 Parklawn Dr., Rockville, MD, 20852; telephone (800) 359-7370; (301) 231-5566; fax (301) 816-4364.

• **15-17, FPI-HACCP (Food Science Course)**, Rutgers University, New Brunswick, NJ. For additional information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231, or call (908) 932-9271.

• **16-18, Biological Contamination of Indoor Environments**, Holiday Inn O'Hare International, Chicago, IL. A three-day symposium by US EPA, Region 5 and National Association of County and Health Officials. For further information, contact MidAtlantic Environmental Hygiene Resource Center, 3624 Market St., First Floor East, Philadelphia, PA 19104; telephone (215) 387-2255; fax (215) 387-6321.

• **20-22, American Dairy Products Institute 1997 Annual Meeting and Dairy Products Marketing Conference**, at The Fairmont Hotel, at Grant Park, in Chicago, IL. All evaporated and dry milk processors, whey products manufacturers, cheese and allied industry representatives interested in the processing, marketing, and utilization of these products, government and university representatives, and end-product users, are invited to attend. For further information, contact Dr. Warren S. Clark, Jr., 130 N. Franklin St., Chicago, IL 60606; phone (312) 782-4888; (312) 782-5455; fax (312) 782-5299.

• **20-23, 48th Meeting of the Pacific Fisheries Technologists**, Astoria, OR. Topics will cover areas related to seafood processing, quality and safety. For more information, contact Michael Morrissey, fax (503) 325-2753; e-mail: moormic@ccmailorst.edu.

• **21, Who's Who in HACCP Workshop**, at the DoubleTree Hotel in Arlington, VA. This one-day workshop will provide details on HACCP programs for general food processors, meat/poultry processors, seafood, and dairy processors. For more information contact Carol Mouchka, IAMFES at (800) 369-6337; (515) 276-3344; Fax (515) 276-8655 or e-mail: cmouchka@iamfes.org.

• **21-24, Bacteriological Concepts and Methods for the Poultry and Other Food Industries**. An objective of the workshop is to educate poultry professionals concerning the importance of pathogenic bacteria such as *Salmonella*, *Campylobacter*, *Listeria*, and *Staphylococcus* on fresh poultry, other foods, and environmental surfaces. For further information, contact Margaret Caufield, The Georgia Center for Continuing Education, Family, Consumer and Other Life Sciences Program Unit, telephone (706) 542-1585.

• **21-24, Polymerase Chain Reaction (PCR) Applications/Cycle DNA Sequencing**, sponsored by The American Type Culture Collection. For further information, contact ATCC, Workshop Coordinator, 12301 Parklawn Dr., Rockville, MD, 20852; telephone (800) 359-7370; (301) 231-5566; fax (301) 816-4364.

• **28, ASI Food Safety Consultants, Inc. 30th Annual Food Protection Seminar**, St. Louis, MO. The focus of this year's three-day seminar will be cleaning and sanitation for food processors. For more information, call Vicki Bodrow or Christine VerPlank at (314) 725-2555 or (800) 477-0778.

• **28-30, Food Protection Workshop for Processors**, at the Holiday Inn Downtown/Convention Center, St. Louis, MO. This comprehensive 2 1/2 day seminar covers GMP, HACCP and SSOP programs. For further information, contact Vicki Bodrow, ASI Food Safety Consultants, Inc., 7625 Page

Blvd., St. Louis, MO 63133; or phone (800) 477-0778.

• **29-May 1, Hazard Analysis and Developing Your HACCP Program**, Guelph. Hazard Analysis Critical Control Point is an internationally recognized process-oriented approach to food safety involving the entire food chain. While reference is made to the Food Safety Enhancement Program guidelines and forms, this program will be of benefit to all food companies interested in the economical and food safety benefits of adopting a HACCP system. For further information, contact the Office of Open Learning, Room 159, Johnston Hall, University of Guelph, Guelph, Ontario N1G 2W1 or call (519) 767-5000; fax (519) 767-1114.

## MAY

• **3-8, The 26th National Conference on Interstate Milk Shipments**, at the Hyatt Regency, San Francisco Airport. For further information, contact Leon Townsend, NCIMS Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601. Telephone and/or fax (502) 695-0253.

• **5, Functional Foods & Wellness: A Research Update**, Guelph Food Technology Centre, Guelph, Ontario. In this unique networking opportunity, you'll share the results of leading scientists as they unlock the "wellness" secrets of ingredients and nutraceuticals for the functional foods of the future. For further information, phone (519) 767-5036; fax (519) 836-1281; e-mail: gftc@uoguelph.ca.

• **5-6, Symposium on Texture of Fermented Milk Products and Dairy Desserts**, in Vicenza, Italy. The objective of the seminar is the presentation and discussion of new information about the different factors affecting the texture of fermented milk and dairy desserts. Besides the key factors influencing the texture of products, an up-to-date will be given on the instrumental and sensory evaluation of texture. For further information, contact Symposium Secretariat, Istituto Sperimentale Lattiero-Caseario,

Dr. Roberto Giangiacomo, Via A. Lombardo, 11, 20075 LODI-ITALY; phone +39-371-430990; fax +39-371-35579.

• **5-7, Introduction to Food Chemistry**, Chicago, IL. For more information, contact the AACC Short Course Department, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; Telephone (612) 454-7250; fax (612) 454-0766.

• **6-7, Sanitation and HACCP Workshop**, San Jose, CA. During this workshop the latest issues facing the food industry will be examined, including: management systems for product safety, principles of HACCP, and the need to maintain customer relations by establishing essential programs intended to meet their expectations. For additional information, or to enroll, please contact AIB, 1213 Bakers Way, Manhattan, KS 66502; or phone (913) 537-4750; fax (913) 537-1493.

• **12-14, Premier International Conference on Food Preservation**, in Washington. A major emphasis will be placed on new technologies, global market trends and forecasts from both industrial and the consumer viewpoints. Participants will gain a comprehensive assessment of how the world's communities must proceed to ensure the safe trade and consumption of food. For more information, please contact Jennifer Winch at Intertech Conferences, 411 U.S. Route One, Portland, MA 04105; phone (207) 781-9800; fax (207) 781-2150; or e-mail: info@intertechusa.com.

• **12-16, Pharmaceutical Quality Assurance and Control**, Cincinnati, OH. This course provides an understanding of the principles and practice of pharmaceutical quality assurance and control and of specific topics which have become important because of regulatory interest or recent technological achievements. For further information, contact Registrar, The Center for Professional Advancement, P.O. Box 1052, East Brunswick, NJ 08816; phone (908) 613-4500; fax (908) 238-9113.

• **13-14, Fourth Annual Cultured Dairy Products Symposium**, at the Wyndham Milwaukee Center Hotel in Milwaukee. Guest speakers

from around the world will address topics on the manufacture and development of yogurt products, frozen yogurt, nonfat cultured products, cottage cheese, and new probiotic cultures. For additional information, contact Lisa Lecher or Dr. Bill Watrous at Chr. Hansen, Inc., by phone at (800) 247-8321; fax (414) 476-2313.

• **19-22, Food Polymer Science**, Minneapolis, MN. For more information, contact the AACC Short Course Department, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; Telephone (612) 454-7250; fax (612) 454-0766.

## JUNE

• **4-5, Advanced HACCP Application: Training and Implementation**, Chong Yuet Ming Amenities Centre, University of Hong Kong. For more information, contact Miss Monisha Bhattacharya, Dept. of Botany, University of Hong Kong, Pokfulam Road, Hong Kong; telephone + 852 28578522; fax + 852 28583477.

• **12-13, National Conference on Food Safety Education**. The conference title, "Changing Strategies—Changing Behavior: What Food Safety Communicators Need to Know" conveys the future direction of food safety education. Persons interested in attending the conference can obtain a registration brochure by faxing requests to USDA Graduate School at (202) 401-7304.

• **23-25, Food Extrusion**, St. Etienne, France. For more information, contact AACC Europe (Branch Office), Broekstraat 47, 3001 Heverlee, Belgium. Telephone +1 32 16.20.40.35; Fax +1 32 16 20.25.35; e-mail: aacc.europe@pophost.eunet.be.

## JULY

• **6-9, IAMFES Annual Meeting**, in Orlando, FL at the Hyatt Regency Grand Cypress Hotel. Advancing food protection worldwide with over 200 presentations and posters on the latest issues and research on food safety. Registration materials available in this issue of *DFES* on page 190, or call (800) 369-6337; (515) 276-3344; fax (515) 276-8655.



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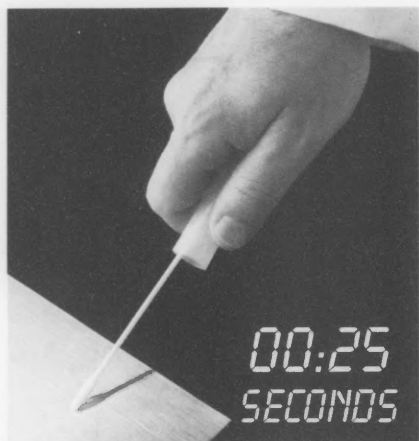
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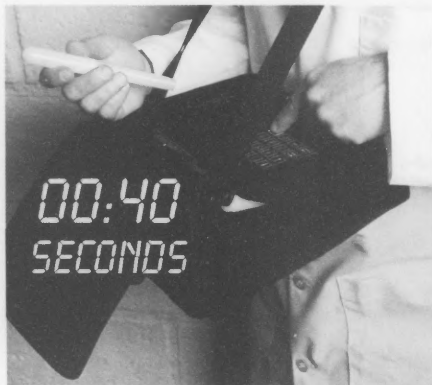
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