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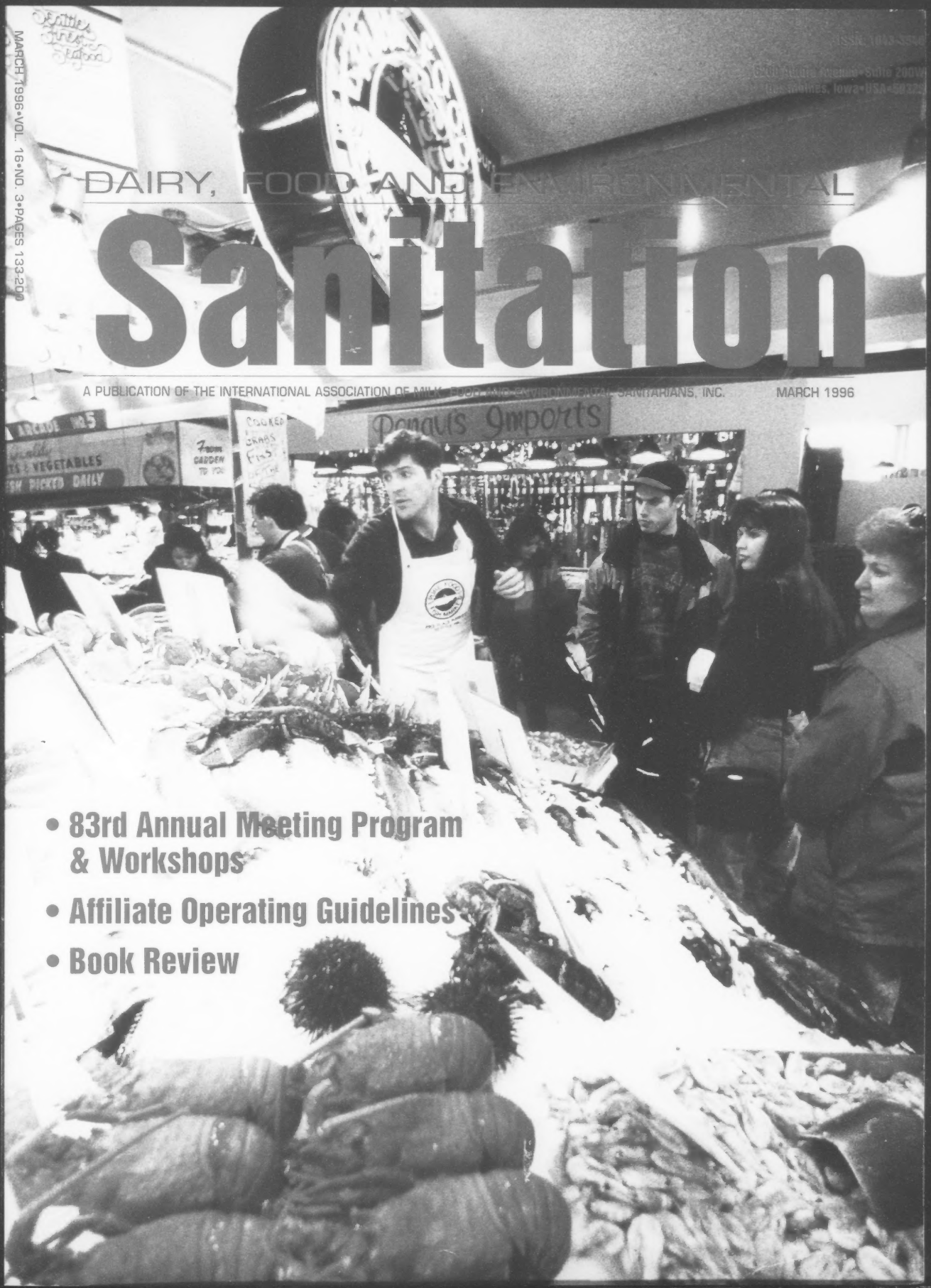
A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. MARCH 1996



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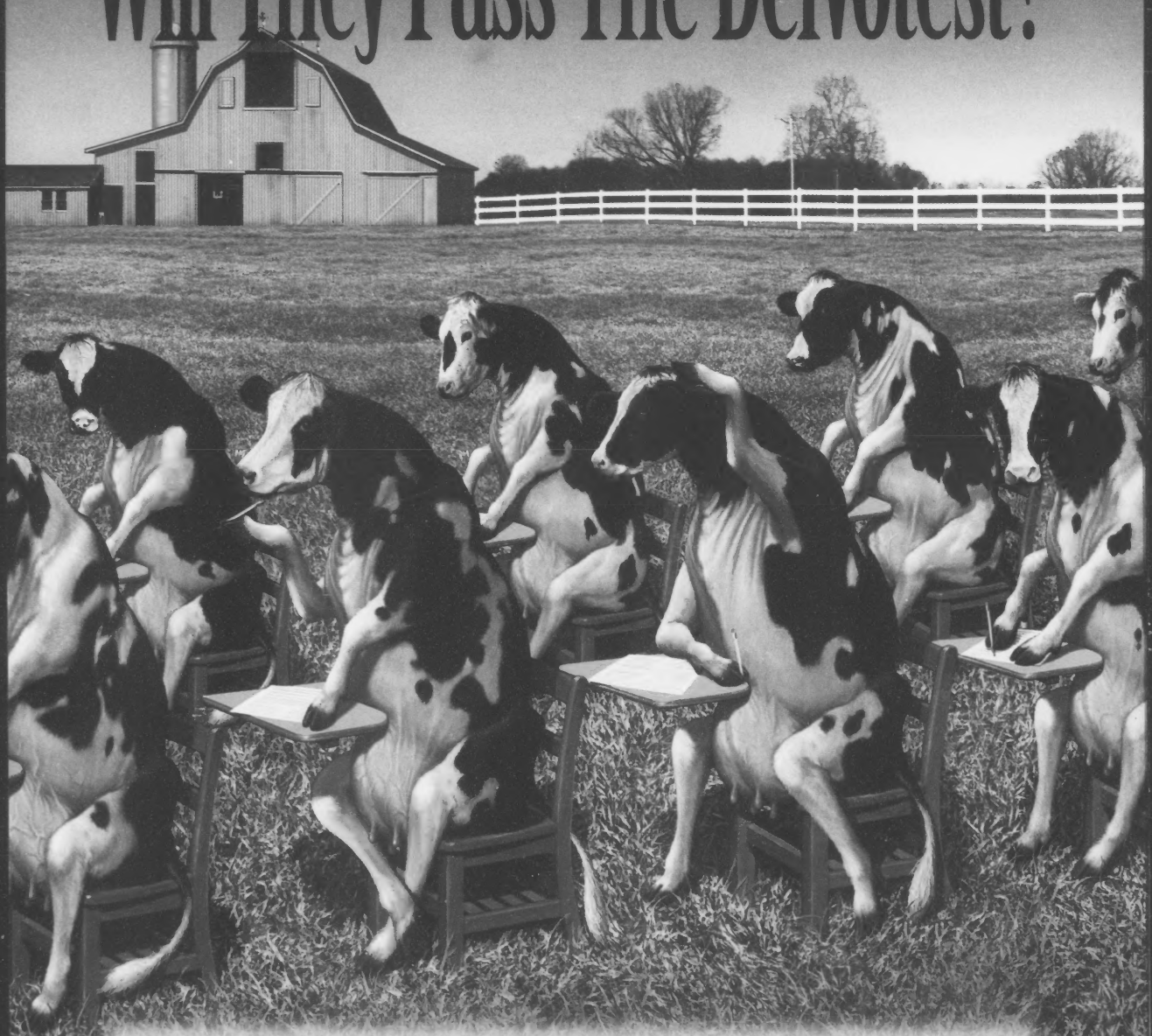

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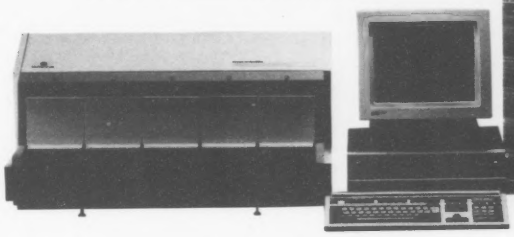

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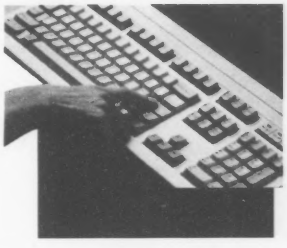

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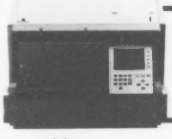

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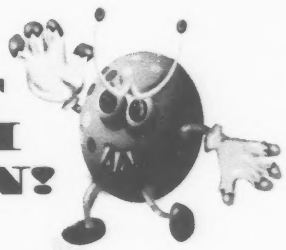

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THOUGHTS

FROM THE PRESIDENT

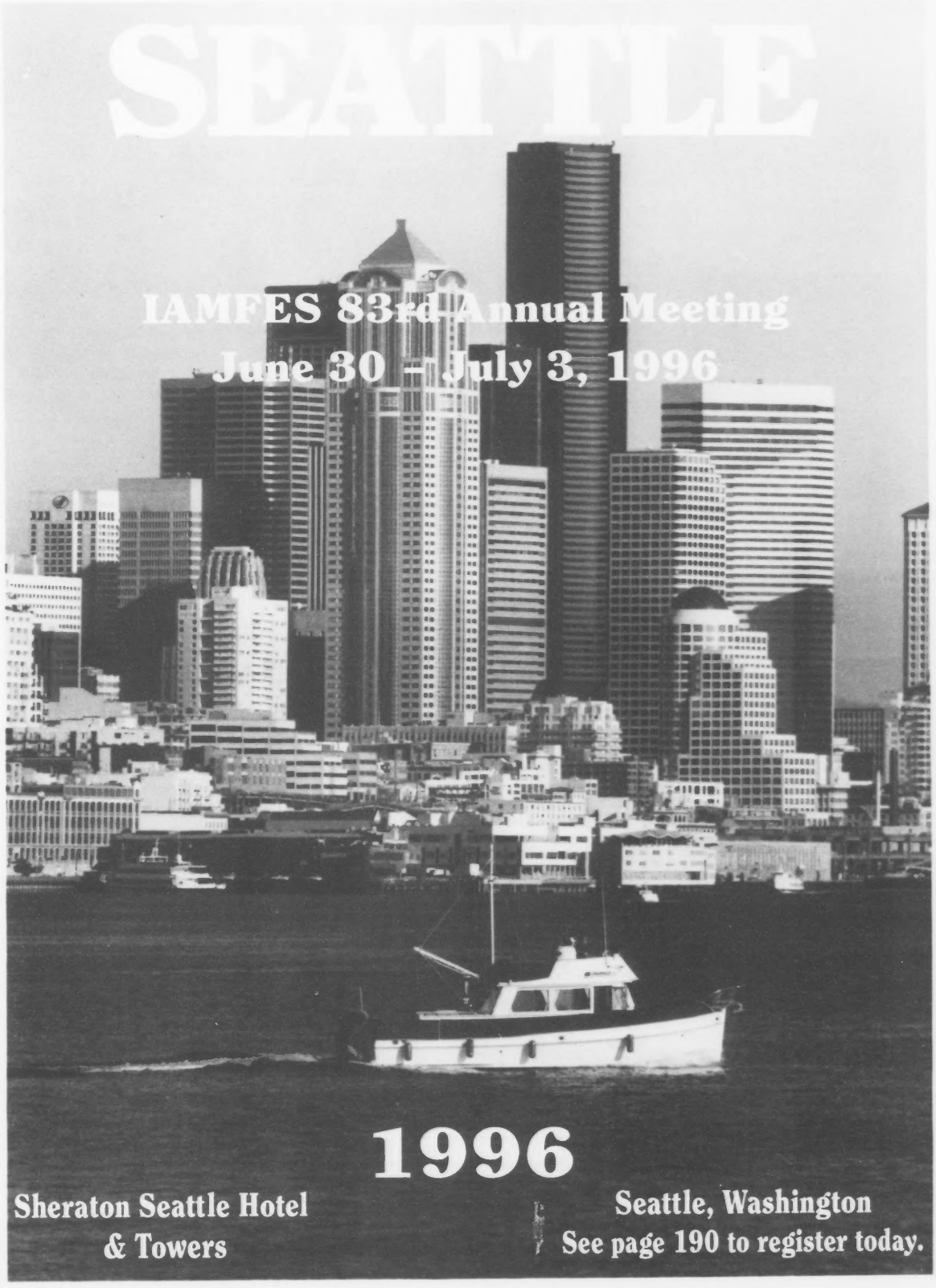
By F. ANN DRAUGHON,
IAMFES President

"If we fail to plan—we plan to fail"

In preparation for the Executive Board Meeting, I have been reviewing the activities of IAMFES over the last few months and years and thinking about the future. In February of 1993, Lawrence-Leiter and Company provided a report to the Executive Board on their research which was the basis for a Strategic Plan which was subsequently developed. In November of 1993, the Executive Board approved and implemented a long-range Strategic Plan for IAMFES. The four major objectives of that strategic plan are: (1) A Major Effort to Expand the Membership, (2) A Major Education Program Development Effort, (3) A Major Review of Our Products and Our Membership Services Leading to a Product Enhancement Program for Members and (4) Develop a Formal and More Sophisticated Financial Plan. Have we accomplished all these objectives? Not by a long shot! Have we made progress? Yes, although not at the rate which we had hoped!

The objectives in which we have made the greatest progress are in the development of educational programs (specifically through the PDG's and PAC), the handling of our finances (primarily David Tharp, Director of Finance), and review of our journal handling procedures and upgrades to *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection* (through the efforts of many professional members, our managing editor, and other staff). The areas where I think we need the greatest improvement at this time are in expanding membership, identifying critical needs of our members and marketing our association. Under educational programming, we still do not have our "Speaker's Bureau Resource/Directory" off the ground or our tracking system for information requests which come through the IAMFES office. However, we have become more involved in co-sponsoring of regional meetings and in the generation of "White Papers," through our PDG's. If you would like a more detailed copy of the IAMFES Strategic Plan, please give me a call or write and I will be happy to send it.

A Strategic Plan needs to be dynamic. Unfortunately, we frequently get involved in "putting out fires" and forget to plan. We've done a lot of that in the past and yet tremendous progress has been made. I look forward to sitting down with our new Executive Director and the other Board Members to revisit our Strategic Plan and discuss where we are headed next. One of the greatest benefits of having a Board which changes slightly each year as officers rotate on and off is the generation of new thoughts and ideas without loss of continuity of action. My objective as President of IAMFES is to have both long-term and short-term goals for IAMFES which will allow us to meet our mission and to be THE LEADER in providing Food Protection and Sanitation information for the remainder of this decade and as we move into the 21st century. I will keep you posted on our progress.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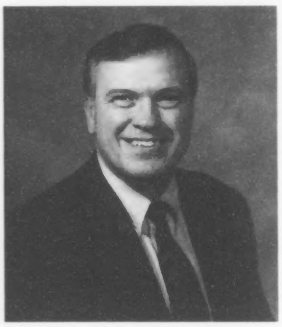
From the Executive Director



By DAVID M. MERRIFIELD,
IAMFES Executive Director

"For every member we gain, we take a step forward"

Let's talk about membership. Let's talk about why people want to be members of any association and then specifically why people want to be members of IAMFES.

Before we talk membership, it's important to understand that an association is usually formed by concerned and committed people who want to make a difference in their profession, job, or area of interest. They find they are more effective as a group, than individuals; in terms of direction, influence, and resources. It's the application of the principle; the whole is stronger than the parts. Like the easily broken, a strand of wire can lift a locomotive when hundreds are woven into one cord.

There are thousands of every imaginable type of associations, all formed either for a single purpose or with a professional binding as a common denominator. While most have a clearly defined and attainable mission, for others it can be ambiguous. For IAMFES, its mission of providing food safety professionals worldwide with a forum to exchange information on protecting the food supply, is on the "clearly defined and attainable" side. This is illustrated by the publication of two superior, mission-oriented journals, *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection*.

There are probably as many reasons people join associations as there are associations. Draw a horizontal line and label one end active or "givers," and the other end passive or "receivers." Toward the "giver" end place members who join to attain a specific goal. Toward the "receiver" end place those who join mostly to get something from their membership. What you will end up with is a line that has most of its membership from the middle to the "receiving" end. This is what voluntary organizations call the 80/20 rule or, 80% do 20% of the work and 20% do 80% of the work. I call it "the nature of the beast." IAMFES generally fits the 80/20 rule but seems to fare better than most. Organizations with a preponderance of members at either end tend to be minimally effective because of too much or too little leadership.

Sizes of associations also vary from the small, usually localized, to the large and expansive. Scope will also vary accordingly. Take for example the American Medical Association (AMA), an organization large in both members, scope, and annual budget. The AMA covers all health issues, as well as a considerable number of distantly related and non-related issues. Smaller associations usually have a more limited sphere of influence relative to their membership, annual budget, and scope. This is where IAMFES deviates from the norm. Our membership is diverse (covering academic, industry, and regulatory), but limited in scope considering its international flavor. Using size and money as a yardstick, IAMFES is relatively small, but has strong influence in food safety because of the high degree of credibility among our members who operate in that arena.

Regardless of the size of the association, they all operate under an aim of increasing membership. Increased membership means more income and influence which means a wider range of accomplishments. For IAMFES, this means a greater realization of its mission to ultimately benefit people worldwide. Considering the influence IAMFES has today on food safety, just imagine what could be done if we doubled, tripled, or even quadrupled our membership in the next few years.

Look at it this way, for every new member we gain, we take a step forward in ensuring there will always be a safe food supply worldwide. What this boils down to is: If you are not an IAMFES member, join and help us realize our mission. If you are a member, use your influence to get someone who's not a member to join. Do this because you believe and you care!

Dairy, Food and Environmental Sanitation, Vol. 16, No. 3, Pages 146–149

A Review of the Microbiological Safety of Fresh Salads

By Alfred R. Fain, Ph.D.
Technical Director of Microbiology, Silliker Laboratories of Georgia, Inc.

INTRODUCTION

Freshly prepared salads are highly popular food items due to the health, fitness, and diet trends of today's consumers. Fresh fruits, lettuce, and other salad vegetables, particularly for commercial trade, are usually pre-prepared (washed, trimmed, and bagged near the growing source) by food processors to provide convenient products to consumers and to reduce shipping costs *(17)*. Thus, the processing of fresh salads is moved farther away from the ultimate consumer, increasing the time and distance between processing and consumption and also increasing the potential health risks to consumers. These factors have been shown to contribute to foodborne illnesses in the United States *(8)*. Ready-to-eat products may be prepared in a local supermarket delicatessen, centralized commissary, commercial salad-manufacturing plant, or in a local kitchen. The facilities, manufacturing procedures, process controls, and training of the workers may be as variable as the products themselves. This article will discuss microbiological issues surrounding fresh salads which do not contain preservatives (mayonnaise, vinegar, etc.).

Fresh Salads and Issues of Concern

Processors and consumers have generally considered fresh fruit or vegetable salads as safe to eat. Therefore, they may not have practiced the same food-handling precautions as they would with other products. The general public usually associated foodborne illness with meats, poultry, seafood, and dairy products. A 1973 to 1987 review of foodborne illness by the Centers for Disease Control (CDC), however, reveals that fruits and vegetables, as a category, do represent a risk similar to that of other products. During this time period, the CDC reported that 5% of foodborne outbreaks were attributed to fruits and vegetables (not necessarily fresh) *(2)*. This rate compares with rates for beef (9%), pork (7%), chicken (3%), and shellfish (6%).

Today, consumers are becoming cognizant of the health risks associated with the consumption of fresh vegetable and fruit salads and are aware that fresh produce may be a source of pathogenic organisms (Table 1) *(5, 7, 17)*. Three groups of these organisms, listerias, yersinias, and aeromonads, are psychrotrophic and capable of growing at the refrigeration temperatures which are widely relied upon by food processors to combat microbial growth and ensure quality retention. In addition, the high moisture content of fresh salads, the lack of a terminal treatment step, and the potential of temperature abuse by consumers further intensifies the risk of foodborne illness.

Table 1. Pathogenic organisms of concern in minimally processed produce

Listeria monocytogenes	*Escherichia coli* O157:H7
Clostridium botulinum	*Aeromonas hydrophila*
Shigella spp.	*Bacillus cereus*
Salmonella spp.	*Plesiomonas shigelloides*
	Yersinia enterocolitica

The potential sources of pathogenic bacteria in fresh salads include ingredients (particularly raw produce), plant workers, and the processing environment. In one study, approximately 1,000 samples covering 10 different types of fresh produce were examined for *Listeria monocytogenes (15)*. The organism was isolated from cabbage, cucumber, potatoes, and radishes. More

significant amounts of contamination were found on potatoes, and radishes than on other positive produce. Other *Listeria* species (*L. innocua*, *L. seeligeri*, and *L. welshimeri*) were also isolated from cabbage, cucumbers, lettuce, mushrooms, potatoes, and radishes. In a small sample of retail head lettuce purchased in Nebraska, 2 out of 43 samples (4.7%) were positive for *L. monocytogenes (24)*.

In England, 4 of 60 samples (6.7%) of prepackaged salads containing a mixture of salad vegetables were found to contain *L. monocytogenes (24)*. *L. monocytogenes* was detected in 3 of 64 (4.7%) raw salads in Switzerland *(24)*.

In a survey of 60 samples of 10 different prepackaged salads from two different supermarkets, 4 samples were found to be positive for *L. monocytogenes (26)*. Retesting after 4 days at 4°C (39.2°F) showed that the numbers had approximately doubled. *L. monocytogenes* is of special concern because it can grow at refrigeration temperatures, persists as an environmental contaminant in the processing environment, and has the potential to cause mortalities associated with outbreaks.

Several challenge studies have shown that *L. monocytogenes* will survive and grow in lettuce, asparagus, broccoli, cauliflower, and tomatoes *(4, 6, 27)*. *Shigella sonnei* will proliferate in shredded cabbage packaged and stored under vacuum, modified atmosphere, and aerobic conditions *(25)*. Increased microbiological monitoring of international airline foods in Australia and England uncovered a disturbingly high level of *Salmonella* spp. in various cold dishes (including fruit and vegetable salads) and in hot meals sampled before heating on aircrafts *(10)*. Another study found that the growth of *Salmonella* spp. was rapid on melons and that the final populations were higher for watermelons than cantaloupe and honeydew melons *(14)*. *Salmonella* spp. and *Shigella* spp. were also found to grow in jicama, papaya, and watermelons *(12)*. Results of another study showed that *Campylobacter jejuni* was able to survive in watermelon and papaya long enough to be a risk to the consumer *(9)*.

In a study of fresh mushrooms in retail packages, *Campylobacter jejuni* was isolated from 3 of 200 samples (1.5%), justifying concerns about this food as well *(17)*. A study of travelers' diarrhea in Mexico City revealed that enterotoxigenic *Escherichia coli* (not O157:H7) accounted for 45% of the cases. The illnesses were associated with the consumption of salads containing raw vegetables *(11)*.

Foodborne Illness-Associated Risks of Fresh Salads

Foodborne illnesses have been traced to fresh salad products and raw produce. An outbreak of listeriosis involving patients from eight Boston hospitals was associated with the consumption of raw vegetables, especially celery, tomatoes, and lettuce *(16)*. Two large outbreaks of gastroenteritis were recently caused by the consumption of fresh raw vegetables. Both were caused by the consumption of lettuce contaminated with *Shigella sonnei (20)*. In one outbreak, the contamination may have occurred in the growing field or in a warehouse, while the second outbreak was thought to be the result of a contaminated worker handling shredded lettuce (the lettuce was then incubated at elevated temperatures in a plastic bag). A 1990 salmonellosis outbreak in the Midwest, in which 100 people became ill, was attributed to the consumption of sliced raw tomatoes *(22)*.

It was suspected that an elderly patient in a London hospital acquired listeric septicemia after consuming contaminated lettuce *(24)*. *L. monocytogenes* was isolated from the patient and from washed lettuce prepared in the hospital's kitchen. This suggests that the consumption of washed raw vegetables may pose a potential health threat to high-risk hospital patients.

Two unusual foodborne outbreaks occurred in Rhode Island and New Hampshire in 1993. The causative organism in each outbreak was determined to be enterotoxigenic *E. coli*, a frequent cause of diarrhea in developing countries, but not in the U.S. *(3)*. In the first outbreak, 47 passengers on an airline became ill and the illnesses were strongly associated with eating garden salad made from iceberg, romaine, and endive lettuces, and shredded carrots. In New Hampshire, 78 lodge guests became ill after consuming tossed salad as part of a buffet dinner. The salad contained a number of fresh produce items including onions, carrots, zucchini, peppers, broccoli, mushrooms, and tomatoes.

Some of the largest foodborne illness outbreaks have been traced to melons, which are common items in fresh salads. Three outbreaks of salmonellosis in the 1950s were caused by contaminated watermelons *(20)*. In these cases, it was thought that the organisms were introduced from the rind into the fruit by the physical act of cutting the melons. Laboratory experiments have confirmed that introduced microbes will multiply if temperatures are suitable for growth. From 1989 to 1990, a large outbreak of salmonellosis in 30 states, affecting approximately 25,000 individuals, was attributed to *Salmonella chester* from imported cantaloupe *(20)*. Once again, it was speculated that the microbes on the unwashed rind came in contact with the interior after cutting. Another outbreak of salmonellosis in cantaloupe, caused by *Salmonella poona*, occurred in June 1991 *(20)*. This outbreak in 15 states (185 cases) and 2 Canadian provinces (56 cases) was associated with cantaloupe from salad bars.

Melons represent known risks if not handled properly. The Food and Drug Administration (FDA) issued instructions to food retailers in July 1991 on proper handling procedures for melons. In an effort to determine the incidence of contamination of melons in the same growing areas that were implicated in 1989–1990 outbreak, the FDA sampled 2,220 melons: only 24 (1.06%) were positive for *Salmonella* spp. *Salmonella*

chester was not isolated from any of the melons. Twelve different serotypes were found in the study, but there was not one dominate serotype *(20)*.

More recently, reported outbreaks of enterohemorrhagic *E. coli* O157:H7 in the Pacific Northwest have been associated with cantaloupe from salad bars *(1)*. It is thought that these outbreaks were probably due to cross-contamination of the cantaloupe with the *E. coli* O157:H7 cells from another product, such as beef. There have been a number of recalls recently of preprepared sandwiches which might have been contaminated by the natural microflora of the produce used on the sandwiches.

Control of Microbiological Foodborne Illness Hazards in Fresh Salads

A hazard analysis using the incidence and outbreak data provided herein would clearly establish that a fresh produce and salad facility represents a potential health risk. The concern over this risk is increased because of the following factors:

1. There is no terminal step (further cooking) in the process to eliminate any pathogens.
2. Several of the pathogens are psychrotrophic and can grow at the refrigeration temperatures used to store these products.
3. Preprepared produce and centralized processing increase the distance and time between initial preparation and the consumer, which increases the risk of growth of pathogens.
4. The wide variety of conditions to which produce is exposed during growth, harvest, distribution, and processing increases the potential for microbial contamination.

The primary sources of pathogens in a processing facility are contaminated raw materials received in the plant and the contamination of the product during processing by workers, equipment, packaging materials, and environment. It must be understood that once a pathogen is introduced into the product, there is no certain and effective way of eliminating it.

Faced with the above conditions, processors of fresh produce must center their control efforts on (i) keeping pathogens out of the facility, (ii) preventing contamination of the products, (iii) reducing the microbial load, and (iv) reducing the growth of the microbes. Keeping pathogens out of the plant means purchasing raw materials only from those vendors who are capable of supplying clean products. This can only be determined by microbial testing and experience.

Preventing contamination begins with a clean and sanitized facility that is monitored by a critical pre-op review each day and is verified by periodic microbial testing of the environment. The segregation of raw, unwashed produce from washed produce is absolutely necessary to control the potential for cross-contamination. Equipment, utensils, personnel, and traffic patterns for processed products must be totally segregated from operations involving raw, unwashed product.

Without a terminal step to eliminate pathogenic organisms from produce, actions must be directed at reducing the microbial load through procedures such as washes. Washing the raw produce with chlorinated water is effective in reducing the microbial load, as long as the proper amount of residual chlorine is maintained. But chlorine cannot be relied upon to eliminate all pathogens *(5, 17)*.

Controlling the growth of microbes centers around temperature and time. Many produce processors require that recording temperature devices be included with each load of produce they receive to ensure that the product has not been abused during shipping.

Since several of the pathogens of concern in fresh salads are psychrotrophic and can grow at refrigeration temperatures, processors need to place more emphasis on the time factor. Produce should move through the system from field to consumer as rapidly as possible to reduce the potential growth of contaminating pathogens. The ancillary benefit of this rapid movement is a fresher, higher quality product for consumers.

HACCP

A hazard analysis critical control point (HACCP) program is an internationally recognized systematic, preventive process control program to assure the production of safe food. A detailed description of the procedures necessary to implement a HACCP plan is beyond the scope of this article, but a number of excellent publications are available *(13, 18, 19, 21, 23)*.

CONCLUSIONS

Microbiological safety issues must be seriously considered by manufacturers, distributors, and consumers of refrigerated fresh salad products. Pathogenic microorganisms occur on the raw fruit and vegetables used in many salads and the process does not provide a means to completely eliminate them. Some pathogens, notably *L. monocytogenes*, are psychrotrophic. Therefore, refrigeration alone cannot be relied on to ensure prevention of growth. Strict adherence to good manufacturing practices (GMPs) and sanitation is essential to avoid and control contamination, while purchasing clean produce and using chlorinated water washes will reduce the level of contamination. Implementation of a proper HACCP plan will produce the safest products possible and reduce the risk of foodborne illness due to the consumption of refrigerated fresh salads.

References

1. Anonymous. 1993. Fourth northwest Sizzler outbreak sickens at least nine. Food Chem. News 35:45.
2. Bean, N. H., and P. M. Griffin. 1990. Foodborne disease outbreaks in the United States, 1973–1987: pathogens, vehicles, and trends. J. Food Prot. 53:804–817.
3. Benoit, V., P. Raiche, M. G. Smith, J. Guthrie, E. F. Donelly, E. M. Julian, R. Lee, S. DiMaio, M. Rittmann, and B. T. Matyas. 1994. Foodborne out-

breaks of enterotoxigenic *Escherichia coli*–Rhode Island and New Hampshire, 1993. Morbid. Mortal. Weekly Rep. 43:81, 88–89.
4. Berrang, M. E., R. E. Brackett, and L. R. Beuchat. 1989. Growth of *Listeria monocytogenes* on fresh vegetables stored under controlled atmopshere. J. Food Prot. 52 (10):702–705.
5. Beuchat, L. R. 1992. Surface disinfection of raw produce. Dairy Food Environ. Sanit. 12 (1):6–9.
6. Beuchat, L. R. and R. E. Brackett. 1991. Behavior of *Listeria monocytogenes* inoculated into raw tomatoes and processed tomato products. Appl. Environ. Microbiol. 57(5): 1367–1371.
7. Brackett, R. E. 1992. Shelf stability and safety of fresh produce as influenced by sanitation and disinfection. J. Food Prot. 55:808–814.
8. Bryan, F. L. 1988. Risks of practices, procedures and process that lead to outbreaks of foodborne diseases. J. Food Prot. 51(8):663–673.
9. Castillo, A. and E. F. Escartin. 1994. Survival of *Campylobacter jejuni* in sliced watermelon and papaya. J. Food Prot. 57(2):166–168.
10. D'Aoust, J. Y. 1989. *Salmonella*, p. 328–417. *In* M.P. Doyle (ed.), Foodborne bacterial pathogens. Marcel Dekker, Inc., New York.
11. Doyle, M. P., and V. V. Padhye. 1989. *Escherichia coli*, p. 235–281. *In* M. P. Doyle (ed.), Foodborne bacterial pathogens. Marcel Dekker, Inc., New York.
12. Escartin, E. F., A. C. Ayala, and J. S. Lozano. 1989. Survival of and growth of *Salmonella* and *Shigella* on sliced fresh fruit. J. Food Prot. 52(7):471–472.
13. FDA. 1993. Food Code. Recommendations of the U.S. Public Health Service, Food and Drug Administration. Report no. PB94–113941AS. U.S. Department of Commerce, National and Technical Information Service, Washington, D.C.
14. Golden, D. A., E. J. Rhodehamel, and D. A. Kautter. 1993. Growth of *Salmonella* spp. in cantaloupe, watermelon, and honeydew melons. J. Food Prot. 56 (3):194–196.
15. Heisick, J. E., D. E. Wagner, M. L. Nierman, and J. T. Peeler. 1989. *Listeria* spp. found on fresh market produce. Appl. Environ. Microbiol. 55:1925–1927.
16. Ho, J. L., K. N. Shands, G. Freidland, P. Eckind, and D. W. Fraser. 1986. An outbreak of type 4b *Listeria monocytogenes* infection involving patients from eight Boston hospitals. Arch. Intern. Med. 146:520–524.
17. Hurst, W. C. and G. A. Schuler. 1992. Fresh produce processing–an industry perspective. J. Food Prot. 55(10): 824–827.
18. IAMFES. 1991. Procedures to implement the hazard analysis critical control point system. Committee on Communicable Diseases Affecting Man; F. L. Bryan, chairman. International Association of Milk, Food and Environmental Sanitarians, Des Moines, IA.
19. ICMSF. 1988. The hazard analysis critical control point approach to control of food safety and quality, p. 22–28. *In* J. H. Silliker, A. C. Baird-Parker, F. L. Bryan, J. H. B. Christian, T. A. Roberts, and R. B. Tompkin (ed.), Microorganisms in foods, 4. Blackwell Scientific Publications, Oxford, England.
20. Madden, J. M. 1992. Microbial pathogens in fresh produce–the regulatory perspective. J. Food Prot. 55(10):821–823.
21. Mortimer, S., and C. Wallace. 1994. HACCP. A practical approach. Chapman & Hall. London.
22. National Association of Fresh Produce Processors. 1993. Handling guidelines for fresh-cut produce. NAFPP, Alexandria, VA.
23. Pierson, M. D. and D. A. Corlett, Jr. (ed.). 1992. HACCP: Principles and applications. Van Nostrand-Reinhold, New York.
24. Ryser, E. T. and E. H. Marth. 1991. *Listeria*, listeriosis, and food safety. Marcel Dekker, Inc., New York.
25. Satchell, F. B., P. Stephenson, W. H. Andrews, L. Estela, and G. Allen. 1990. The survival of *Shigella sonnei* in shredded cabbage. J. Food Prot. 53 (7):558–562, 624.
26. Sizmur, K. and C. W. Walker. 1988. *Listeria* in prepacked salads. Lancet i (8595):1167.
27. Steinbruegge, E. G., R. B. Maxcy, and M. B. Liewen. 1988. Fate of *Listeria monocytogenes* on ready-to-serve lettuce. J. Food Prot. 51(8):596–599.

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Temperature and Food Additives Affect Growth and Survival of *Escherichia coli* O157:H7 in Poultry Meat

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SUMMARY

Escherichia coli O157:H7 has recently emerged as a foodborne pathogen and has been isolated from a variety of retail meats including poultry. The growth and survival of several strains of *E. coli* O157:H7 in chicken meat with and without NaCl (6 or 8%), sodium lactate (3 or 4%), and polyphosphate (0.25 or 0.5%) at 37, 10, 4, and -20°C was determined. Populations reached >10^8 colony-forming units (CFU)/g at 37 and 10°C within 10 h and 12 days, respectively, but did not increase at 4°C in controls. At 37°C, NaCl and sodium lactate reduced growth, whereas polyphosphate had no effect. At 10°C, NaCl did not permit growth, and sodium lactate and polyphosphate produced the same trend as seen at 37°C. At 4°C populations of *E. coli* O157:H7 declined steadily during storage in controls and in polyphosphate and NaCl treatments. *E. coli* O157:H7 began to grow after 5 weeks at 4°C in the presence of sodium lactate. At 18 months of storage at -20°C, populations had decreased by only one log unit. Chicken meat provides a good substrate for the growth of *E. coli* O157:H7. Sodium lactate and NaCl can enhance its survival at refrigeration temperatures, and this pathogen can grow at 4°C with certain conditions and given sufficient time.

[1]Presented at the 11th European Symposium on the Quality of Poultry Meat held October 4–8, 1993 in Tours, France. Previously published in *Symposium Proceedings* (p. 485–493). Reprinted in appropriate format with authors' permission.

INTRODUCTION

Escherichia coli O157:H7 is a highly virulent bacterium whose transmission to humans has recently been epidemiologically associated with the consumption of contaminated foods *(7, 9, 11)*. This pathogen is an etiological agent of hemorrhagic colitis, hemolytic uremic syndrome, and thrombotic thrombocytopenic purpura in humans *(11)*. Although outbreaks of food-associated *E. coli* O157:H7 illness have been primarily associated with the consumption of ground beef, this bacterium has been isolated from refrigerated retail poultry *(8)*. At least two outbreaks have been linked to poultry *(3, 10)*. Furthermore, it is reported that *E. coli* O157:H7 readily colonizes the ceca of chickens, and is shed in the feces for several months following colonization *(1)*. These findings suggest that poultry may be a reservoir and vehicle for this pathogen, and potential fecal contamination and/or cross contamination of poultry during processing, handling, or distribution may contribute to the presence of *E. coli* O157:H7 in poultry products at the retail level. Because this bacterium has only recently

been identified as a foodborne pathogen, little is known concerning its growth pattern in foods. Therefore, there is a need for research concerning various aspects of foodborne *E. coli* O157:H7, including the behavior of the bacterium in various food environments. This research was undertaken to further elucidate the growth, survival, and death characteristics of this pathogen as affected by food additives and storage temperature.

MATERIALS AND METHODS

Media

Two basal media, ground chicken meat (obtained from Auburn University Poultry Research Unit) and Bacto tryptic soy broth (Difco Laboratories, Detroit, MI), were used. Lean breast meat (ca. 3% fat) was ground (Model KSM90 household mixer equipped with 4-mm die plate grinder attachment, Kitchen Aid, St. Joseph, MI), supplemented with the additives to be tested, mixed, placed (10g per bag) into individual Whirl Pak® polyethylene bags (Nasco Whirl Pak, Fort Atkinson, WI), frozen at -20°C and irradiated (10 kGy) to eliminate indigenous microflora. Samples were held at -20°C until used (<1 week). Bacto tryptic soy broth (TSB) was prepared in 100-ml amounts in 250-ml sealed Erlenmeyer flasks according to manufacturer's instructions, with the addition of the additives to be tested prior to autoclaving.

Faad additive and temperature treatments

Experimental treatments included media with no additional food additives (controls), sodium chloride (NaCl) at 6 and 8% (wt/wt), sodium lactate (60% syrup, Wilke International, Inc., Olathe, KS) at 3 and 4% (vol/wt), and polyphosphate (Brifisol® 414, BK Ladenberg Corp., Cresskill, NJ) at 0.25 and 0.50% (wt/wt). Meat-based treatments were stomached (Model 80, Tekmar, Inc., Cincinnati, OH) for 2 min to mix. Storage temperatures and times were 37°C for 24 h, 10°C for 30 days, 4°C for 12 weeks (TSB only), and -20°C for 18 months (chicken meat only). No agitation was used during storage (TSB medium).

Figure 1. Growth of *Escherichia coli* O157:H7 in ground chicken breast meat (■) and tryptic soy broth (+) at 10°C.

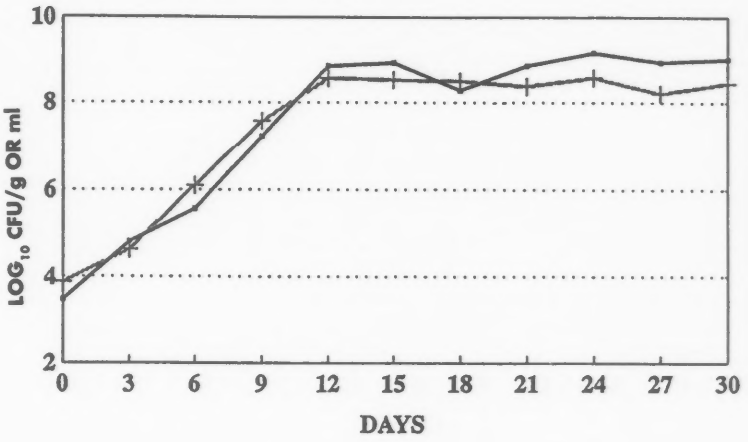
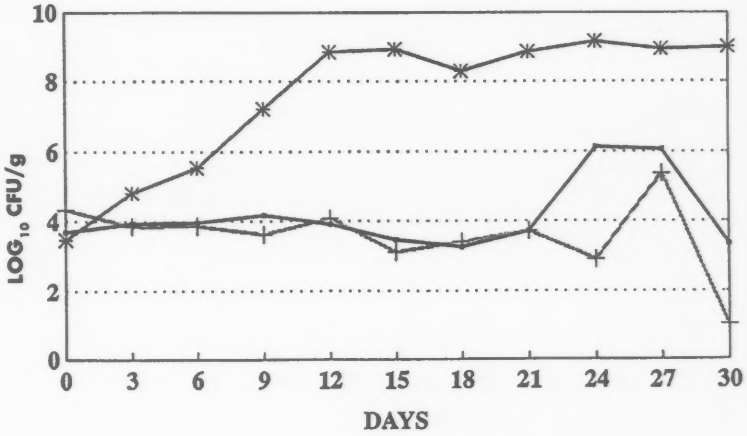


Figure 2. Growth and survival of *Escherichia coli* O157:H7 at 10°C in ground chicken breast meat containing 0 (*), 6 (■) or 8% (wt/wt) (+) NaCl.



Inoculum

At initiation of experimentation, treatment samples were tempered to the desired storage temperature and inoculated (0.1 ml) with a composite suspension of *Escherichia coli* O157:H7 to obtain a starting population of 10^3 to 10^4 colony-forming units (CFU)/g in those samples to be stored at 37, 10, or 4°C, and 10^6 CFU/g in those to be stored at -20°C. The composite suspension contained equal numbers of isolates 204P, 505B, and 301C, all obtained from M. P. Doyle (Univ. of Georgia, Griffin, GA). Inocula were mixed into the meat-based media by stomaching for 1 min, while broth-based media were swirled for 30 s.

Sampling and analysis

Samples were periodically taken to enumerate *E. coli* O157:H7. For chicken meat treatments, two bags (10 g each) were taken at each time, and the entire contents were diluted, inoculated onto Bacto tryptic soy agar (Difco) using a Spiral Plater (Spiral Biotech, Bethesda, MD) and incubated at 37°C for 24 h before counting colonies (Laser Colony Counter, Model 500, Spiral Biotech). For treat-

Figure 3. Growth of *Escherichia coli* O157:H7 at 10°C in ground chicken breast meat containing 0 (*), 3 (+) or 4% (vol/wt) (■) sodium lactate (60% syrup).

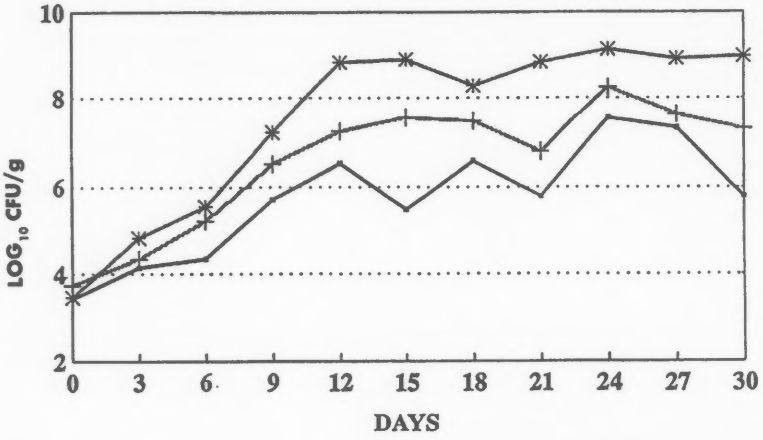
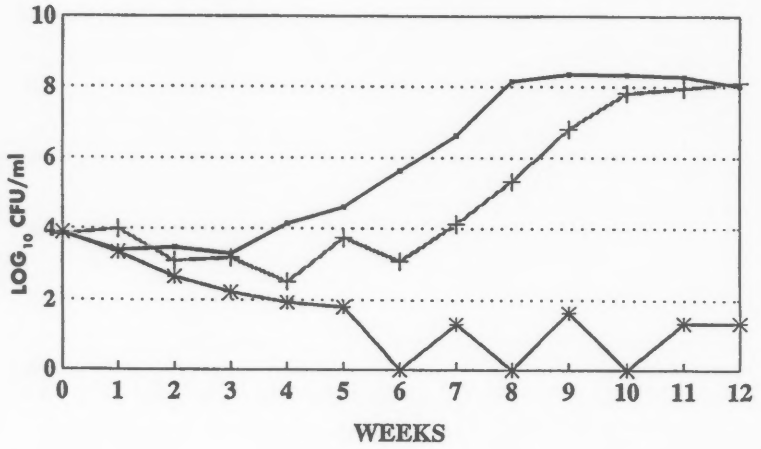


Figure 4. Growth and survival of *Escherichia coli* O157:H7 at 4°C in tryptic soy broth containing 0(*), 3(+) or 4% (vol/wt) (■) sodium lactate (60% syrup).



ments in TSB, duplicate samples (1 ml each) were taken at each sampling time to enumerate *E. coli* O157:H7 using the same procedures.

RESULTS AND DISCUSSION

The primary goal of this work was to better characterize the growth and survival of *E. coli* O157:H7 in raw poultry as affected by commonly used food additives and storage temperature. For comparison, studies were also done in laboratory medium (TSB). In general, similar results were obtained in the chicken meat and TSB. As growth substrates, both media supported excellent growth of *E. coli* O157:H7. Populations reached >10^8 CFU/g at 37°C (data not shown) and 10°C (Fig. 1) within 10 h and 12 days, respectively. No growth occurred at 4°C in media with no additives. Effects of additives and temperature on populations of *E. coli* O157:H7 are provided; however, only selected data sets are offered in figures due to space limitations.

At 37°C, NaCl had a pronounced effect on growth and survival in TSB. Addition of 6% NaCl increased the lag phase to 20 h; the population was <10^7 CFU/g after 30 h. In TSB with 8% NaCl, the population decreased to <1 CFU/g by 28 h, indicating that this treatment was bactericidal to *E. coli* O157:H7. In contrast, the inhibitory effects of NaCl at 37°C were far less pronounced in chicken meat. *E. coli* grew in the presence of both 6 and 8% NaCl, but at a lower rate than in the control. At 24 h, populations were similar (>10^8 CFU/g) in all NaCl treatments chicken meat. TSB contains 0.5% NaCl; therefore, this additional NaCl may have accounted for the difference between treatments in chicken meat versus TSB.

Sodium lactate did not affect the growth of *E. coli* O157:H7 in TSB at 37°C. In chicken meat, growth was slightly suppressed in the presence of sodium lactate. At both concentrations, the lag phase was extended by 4 h, and maximal populations were 0.50 to 1.0 $\log_{10}$ CFU/g lower compared to the control.

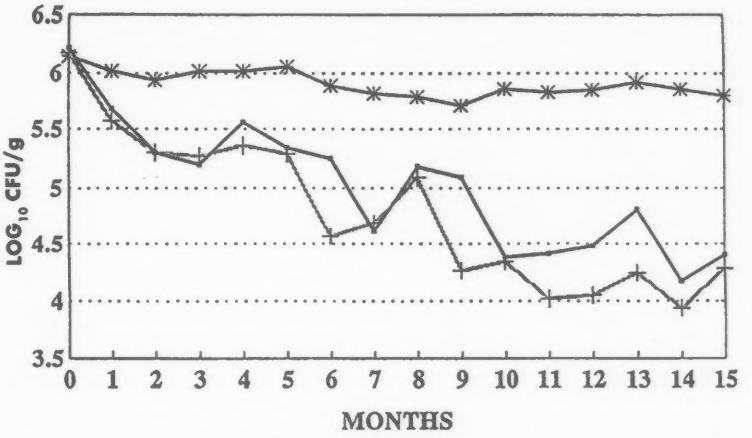
Addition of polyphosphate to TSB or chicken meat did not affect the growth of the pathogen at 37°C. Moreover, in both media at all tested temperatures, addition of polyphosphate did not change the response of *E. coli* O157:H7 compared to controls containing no polyphosphate. Thus, it appears that polyphosphate alone at <0.5% (wt/wt) has no effect on the fate of *E. coli* O157:H7 in poultry meat or TSB. No further discussion on the results of polyphosphate treatments will be provided.

At 10°C, NaCl again had a pronounced effect on the growth of *E. coli* O157:H7 in both chicken meat and TSB. In TSB no growth occurred during 30 days of storage, whereas limited growth (increase from 10^4 to ca. 10^6 CFU/g) occurred from 21 to 27 days in chicken meat containing 5 NaCl (Fig. 2). In TSB containing 6 or 8% added NaCl, the population of the pathogen decreased from 10^4 to 10^2 CFU/g during storage.

Sodium lactate did not affect the growth of *E. coli* O157:H7 in TSB, but suppressed growth in chicken meat (Fig. 3). This food additive at both concentrations increased the length of the lag phase, decreased the overall growth rate and reduced maximal populations. Maximal populations were 1 to 2 $\log_{10}$ CFU/g lower compared to the control (Fig. 3).

At 4° C, the chicken meat treatments were overgrown by 5 weeks of storage by a psychrotrophic mold that was evidently resistant to gamma

Figure 5. Survival of *Escherichia coli* O157:H7 in frozen (-20 °C) ground chicken breast meat containing 0(*), 6 (■) or 8% (wt/wt) (+) NaCl.



radiation. Thus, these samples were discarded as unreliable, and only data from TSB will be presented. As stated above, *E. coli* did not grow in controls at 4°C. In actuality, populations decreased over time in most cases. However, NaCl enhanced the survival of *E. coli* O157:H7. Higher populations were consistently recovered from TSB containing NaCl (8% > 6%) than from TSB with no added NaCl for up to 10 weeks of storage.

Addition of sodium lactate to TSB stored at 4°C provided striking results (Fig. 4). Not only did sodium lactate enhance the survival of *E. coli* O157:H7 during the first 3 weeks of storage, but it stimulated growth of the pathogen at 4 weeks at 4% and at 5 weeks at 3%. Evidently, sodium lactate is stimulatory to the growth of *E. coli* at 4°C, indicating that food formulation can influence the minimum temperature for bacterial growth.

E. coli O157:H7 survived at -20°C. Over 15 months, the population of the pathogen in chicken meat (no additives) had decreased by <0.5 $\log_{10}$ CFU/g (Fig. 5). In contrast to the results obtained at 4°C, NaCl decreased survivability of *E. coli* O157:H7 at -20°C storage. However, after 15 months, $>10^4$ CFU/g persisted, and at 18 months, $>10^3$ CFU/g persisted in chicken meat containing 6 or 8% NaCl. Sodium lactate had little effect on the survival of the bacteria in chicken meat held at -20°C. In all treatments $>10^5$ CFU/g survived for 18 months.

The results obtained here generally agree with those reported elsewhere *(2, 5, 9)* and suggest that *E. coli* O157:H7 is similar in growth and survival characteristics to other nonpathogenic types of *E. coli*. The salt tolerance of this pathogen is greater than that of other foodborne pathogens such as *Salmonella* spp. and *Campylobacter jejuni/coli*, which are typically inhibited by 2 to 4% NaCl *(6, 12)*. The data collected here further indicate that the survival of *E. coli* O157:H7 in refrigerated storage can be enhanced by commonly used food additives.

One of the most significant findings here was that sodium lactate stimulated the growth of the pathogen at 4°C. This is below the generally recognized minimum temperature for growth of *E. coli* O157:H7 and may justify classifying this pathogen as psychrotrophic. This finding is also significant given the widespread use of lactates in processed meats as flavor enhancers, firming agents, humectants, and antimicrobial agents. Lactates have been shown to suppress the growth of other psychrotrophic foodborne pathogens and spoilage bacteria *(4)*, which is in contrast to the findings here. This stimulatory activity of sodium lactate on the growth of *E. coli* O157:H7 at 4°C warrants further research.

References

1. Beery, J. T., M. P. Doyle, and J. L. Schoeni. 1985. Colonization of chicken cecae by *Escherichia coli* associated with hemorrhagic colitis. Appl. Environ. Microbiol. 49:310–315.
2. Buchanan, R. L., and L. A. Klawitter. 1992. The effect of incubation temperature, initial pH, and sodium chloride on growth kinetics of *Escherichia coli* O157:H7. Food Microbiol. 9:185–196.
3. Carter, A. O., A. A. Borczyk, J. A. Carlson, B. Harvey, J. C. Hockin, M. A. Karmali, M. A. C. Krishnan, D. A. Korn, and H. Lior. 1987. A severe outbreak of *Escherichia coli* O157:H7-associated hemorrhagic colitis in a nursing home. N. Engl. J. Med. 317:1496–1500.
4. Chen, N., and L. A. Shelef. 1992. Relationship between water activity, salts of lactic acid and growth of *Listeria monocytogenes* in a meat model system. J. Food Prot. 55:574–578.
5. Conner, D. E. 1992. Temperature and NaCl affect growth and survival of *Escherichia coli* O157:H7 in poultry-based and laboratory media. J. Food Sci. 57:532–533.
6. D'Aoust, J. Y. 1989. *Salmonella*, p. 327–446. *In* M. P., Doyle (ed.), Foodborne bacterial pathogens. Marcel Dekker, Inc., New York.
7. Doyle, M. P. and V. V. Padhye. 1989. *Escherichia coli*, p. 235–281. *In* M.P. Doyle (ed.), Foodborne bacterial pathogens. Marcel Dekker, Inc., New York.
8. Doyle, M. P. and J. L. Schoeni. 1987. Isolation of *Escherichia coli* O157:H7 from retail fresh meats and poultry. Appl. Environ. Microbiol. 53:2394–2396.
9. Padhye, N. V. and M. P. Doyle. 1992. *Escherichia coli* O157:H7: epidemiology, pathogenesis and methods for detection in food. J. Food Prot. 55: 555–565.
10. Ryan, C. A., R. V. Tauxe, G. W. Hosek, J. G. Wells, P. A. Stoesz, H. W. McFadden, P. W. Smith, J. F. Wright, and P. A. Blake. 1986. *Escherichia coli* O157:H7 diarrhea in a nursing home. Clinical, epidemiological and pathological finding. J. Infect. Dis. 154:631–638.
11. Sack, R. B. 1987. Enterohemorrhagic *Escherichia coli*. New Eng. J. Med. 317:1535–1537.
12. Stern, N. J. and S. V. Kazmi. 1989. *Campylobacter jejuni*. p. 71–110. *In* M. P. Doyle (ed.), Foodborne bacterial pathogens. Marcel Dekker, Inc., New York.

Dairy, Food and Environmental Sanitation, Vol. 16, No. 3, Pages 154-156

Reprinted from *Reinventing Food Regulations*, January 1996

OVERVIEW

Managing Editor's Note:

The following is a National Performance Review from the White House focusing on U.S. Food Regulations. After evaluation from Bill LaGrange and myself, we felt the information would be of interest and for the next few issues we'll be publishing excerpts from this review.

The publication of this review does not signify any endorsement of this policy by IAMFES or its officers.

INTRODUCTION

The American food system is justifiably admired around the globe for its ability to provide consumers with an abundant supply of convenient, economical, high quality and safe food products. This system is built on the enterprise and innovative capacities of those who produce and market food in the United States, and it is driven by the high expectations of American consumers for the foods they purchase for their families.

Protecting the safety and integrity of the food supply is one of the oldest functions of government, and it is one of the core functions the American people expect their government to perform. The Federal government's oversight of food safety, wholesomeness and labeling has contributed significantly to the success of the U.S. food system, especially where it has set and successfully enforced sound standards for sanitation and safety and fostered accurate and informative labeling consumers can use to exercise choice in the marketplace.

The Federal system of food regulation is, however, nearly a century old. Regulatory efforts successful in protecting the public over the past century must be reassessed as new food safety and other consumer concerns come increasingly into focus. Federal food regulations must be revised continually for a number of reasons: so that consumers are provided the safest possible foods and can make more informed choices in the marketplace, so that food companies have the flexibility to innovate and incentives to engage in vigorous competition for consumers' dollars, and so that taxpayers are assured that government resources are used in the most effective and efficient manner possible.

Today's food safety and consumer challenges demonstrate that current Federal regulations are in need of reform. Foodborne illness caused by harmful bacteria and other pathogenic microorganisms in meat, poultry, seafood, dairy products, and a host of other foods is a significant public health problem in the United States. Estimates range from 6 million to 33 million foodborne illnesses per year. The present system of food regulation has not adequately addressed this problem in large part because it depends heavily on detecting and correcting problems after they occur, rather than preventing them in the first place. The current system often relies on prescriptive "command and control" regulations that can deter beneficial innovation.

This is especially true of the current system of meat and poultry inspection. It relies primarily on extensive command and control oversight of the plants that slaughter animals and process meat and poultry products, and does not target control and reduction of harmful bacteria on raw meat and poultry products. The result is a system that provides inadequate incentives and flexibility for meat and poultry plants to address the most significant food safety hazards in innovative ways.

HACCP is designed to reduce reliance on command and control regulations and increase reliance on science-based preventative measures and performance standards to improve food safety. Under a HACCP system, each company must meet the same, rigorous safety standards, yet each has the flexibility to devise and adopt food safety plans uniquely suited to its circumstances. As the common conceptual framework for the future of U.S. food safety programs, a primary strength of HACCP is that its principles can be applied to many food categories and can be tailored to the needs of individual food manufacturing and

processing plants, thereby providing flexibility while also improving food safety.

In addition to improving the safety of the domestic food supply, HACCP will be a valuable tool in advancing the progress of food safety internationally and a critical element in expanding U.S. food trade. Many other countries, including the 15 member countries of the European Union, Canada, Australia, New Zealand, and Norway, are also committing to HACCP-based food safety programs.

FDA and FSIS are also reviewing and will revise their existing regulations to eliminate unnecessary burdens and requirements. Regulations being reviewed and revised include regulations directly affecting food safety and food labeling, and regulations regarding certain animal drug and feed applications that also may affect the food supply.

Food and Drug Administration Background

FDA has had a mandate to protect Americans from unsafe foods and drugs since 1906. FDA is charged with ensuring foods are safe, wholesome, and properly labeled, that drugs, vaccines, and medical devices are safe and effective, and that cosmetics are safe. FDA also protects consumers from economic fraud and promotes sound nutrition.

FDA oversees a vast food industry that includes about 46,000 U.S. food processors and warehouses, and comprises a significant segment of the nation's economy. FDA regulated products account for about two-thirds of consumer spending on food, with an annual retail value of $430 billion. Every year, U.S. food processors spend $1.4 billion on research and development and introduce 15,000 new products. The following is just a partial list of matters of concern to the public that are addressed by FDA's food-related regulations:

- Pathogens (bacteria, viruses, parasites)
- Chemical contaminants (pesticides, natural toxins, heavy metals, animal drug and antibiotic residues)
- Loss of wholesomeness (molds, decomposition)
- Mislabeling (false nutrition information or other misleading statements)
- Economic deception (violation of standards, counterfeit foods)
- Safety of food and color additives

In addition, FDA is responsible for setting standards for safe and sanitary production of food, resolving issues involving imported foods, and advising state and local governments on safety and sanitation standards for supermarkets, restaurants, and other retail food establishments. FDA carries out its food mission with about 2,700 employees, 900 at headquarters and 1,800 people at 160 other sites around the U.S.

In most instances, FDA regulations permit foods to be marketed without prior approval by the agency. FDA enforces its regulations primarily through inspections of food processing facilities, examination of imports, collection and testing of food products on the market, and imposition of enforcement measures as required to protect consumers.

FDA also regulates animal drugs, medicated feeds, and animal food additives, all of which may affect the human food supply. FDA protects the public health from harmful veterinary products in several ways. FDA reviews new animal drug applications, investigational new animal drug applications, abbreviated new animal drug applications, medicated feed applications, and food additive petitions. FDA also regulates marketed products through review of drug experience reports and compliance programs. Finally, FDA assesses the environmental impact of product approvals. Through these efforts, FDA ensures that animal drugs and medicated feeds are safe and effective and that food from treated animals is safe to eat.

Food Safety and Inspection Service Background

FSIS is a consumer protection agency of the U.S. Department of Agriculture that regulates meat and poultry products, primarily by means of inspection activities at the facilities producing those foods, to ensure they are safe, wholesome, and accurately labeled.

FSIS-regulated meat and poultry products account for close to a third of consumer spending for food, with an annual retail value of about $210 billion. FSIS regulated products include raw beef, pork, lamb, chicken, and turkey, as well as about 250,000 different processed meat and poultry products, including hams, sausage, soups, stews, pizzas, and frozen dinners (any product that contains 2% or more cooked poultry or 3% or more raw meat). Consumers purchase these products under 500,000 different USDA-approved labels.

Under the Federal Meat Inspection Act and the Poultry Products Inspection Act, FSIS inspects all meat and poultry sold in interstate and foreign commerce, including imported products. About 7,400 Federal inspectors carry out inspection laws in some 6,200 plants.

Inspectors check animals before and after slaughter, visually examining over 6 billion poultry carcasses and 125 million livestock carcasses each year. They prevent diseased animals from entering the food supply and examine carcasses for visible defects that can affect safety and quality. FSIS also inspects products during processing, handling, and packaging to ensure that they are safe and truthfully labeled.

Unfortunately, these activities have been inadequate to prevent illnesses attributable to pathogenic

microorganisms found in and on meat and poultry. The best available data indicate that foodborne microbial pathogens such as *Salmonella*, *E. coli* O157:H7, *Campylobacter*, and *Listeria monocytogenes* contaminating meat and poultry products are associated with as many as 5 million cases of illness and more than 4,000 deaths annually. There are many factors contributing to such illnesses, however it is clear that there are also many technologies and procedures available for keeping raw meat and poultry products from being contaminated with pathogenic bacteria during processing, and for minimizing the growth of bacteria that nonetheless may be present. The current system of meat and poultry inspection must be reformed to provide more incentive and flexibility for the use of these technologies and procedures.

FSIS is pursuing a broad and long-term science-based strategy to improve the safety of meat and poultry products and to better protect Americans from foodborne pathogens. FSIS has adopted a farm-to-table approach that includes steps to improve the safety of meat and poultry at each stage in food production, processing, distribution, and marketing. For example, safe handling labels are now required on all raw products, informing consumers of the crucial role proper handling and cooking play in preventing foodborne illness.

Federal Cooperation in Food Safety

FDA and FSIS routinely work together to coordinate food regulatory policy and ensure the most efficient use of Federal resources in areas of mutual interest. Matters on which the agencies have coordinated closely include:

- **HACCP**–FDA and FSIS are working cooperatively to develop a consistent HACCP based approach to improve the safety of seafood, meat and poultry products, and other foods.
- **Food safety science and data**–The agencies work to coordinate and to implement a variety of food safety research and data gathering programs and to resolve microbiological scientific issues that affect food safety through the interagency National Advisory Committee on Microbiological Criteria for Foods. Most recently, the agencies have jointly contracted with the Centers for Disease Control and Prevention to conduct in depth surveys in association with state health departments in five locations around the country to better determine the incidence and causes of foodborne diseases.
- **Transportation and distribution of foods**–FSIS and FDA are working together to develop basic standards for maintaining food safety during the transportation and distribution of meat and poultry products and other foods.
- **Retail stores and restaurants**–FSIS has worked closely with FDA to provide guidance and assistance to local and State authorities that have responsibility for the regulation of retail stores and restaurants.
- **International standards**–FSIS and FDA coordinate efforts to achieve consistency between national regulatory policies and international standards and guidelines through the establishment of objective, science-based, internationally recognized health and safety food standards.
- **Animal production**–FDA and FSIS work together in resolving animal health issues that impact on food safety. FSIS routinely samples animal tissues for chemical adulterants; findings are provided to FDA because they may indicate illegal or improper use of drugs and antibiotics in food producing animals and other matters within FDA's jurisdiction.
- **Egg products**–FDA and FSIS share authority and responsibility for overseeing the safety of egg products.
- **Labeling**–FDA and FSIS work together to make their regulations governing the labeling of food products as consistent as possible. Under the Nutrition Labeling and Education Act of 1990, FDA issued regulations (fully effective in August of 1994) requiring manufacturers to provide complete nutrition information in an easy-to-use format that enables consumers to choose foods that contribute to a healthy diet. FSIS issued nearly identical regulations for nutrition labeling of meat and poultry, resulting in a comprehensive, uniform approach to nutrition labeling applicable to all foods.

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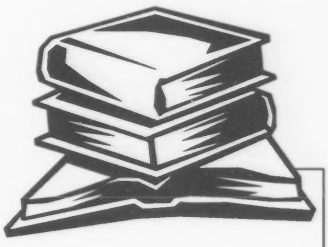
Book reviewed by: N. F. Haard, University of California–Davis

Book Review



"Evaluation of Seafood Freshness Quality"

J. R. Botta, VCH Publishers, Inc.
New York, New York

Evaluating freshness quality of any food is complex because "freshness" and "quality" are concepts rather than absolutes. "Beauty is in the eye of the beholder." The problem of evaluating freshness quality is more acute for the seafood technologist than it is for the dairy technologist because of the enormous diversity of biological material that makes up the class of foodstuff called seafood. About fifty taxonomic orders, including many thousands of distinct species, comprise the vertebrate fish. Seafoods also include other taxonomically diverse Phyla such as the invertebrate Echinoderms, Mollusca, and Arthropoda. Moreover, aquatic animals are ectotherms that inhabit a wide range of ecological niches ranging from tropical to cold water temperatures, high pressures in the deep ocean to low pressures in coastal waters and cyclical patterns of oxygen availability in tidal organisms. Thus it is no surprise that there is no standardized method to evaluate seafood quality. This is an arguable subject in academic and industrial circles.

This book does an excellent job of compiling and discussing some of the different approaches that have been used to evaluate seafood quality. The author has a distinguished career dedicated to the subject of the book. The outline includes introductory and concluding chapters which have chapters on chemical methods, physical methods, and sensory methods between them. Unfortunately, there is no chapter dealing with microbial methods of evaluating seafood freshness.

The Introduction does an excellent job of discussing the "concepts" of freshness and quality as applied to seafood. The emphasis of the entire book is on the raw material destined for immediate consumption and less on suitability of the raw material for processed products. This will be a disappointment to some readers. The chapter on chemical methods nicely covers the variety of methods that have been used to evaluate seafoods and critically evaluates their limitations and shortcomings.

On page 10 the author states "Unlike freshness quality grading (Chapter 4) or some types of attribute assessment (Chapter 5), chemical methods of evaluating freshness quality indirectly measure the level of the sensory attribute." While there is an element of truth in the statement it avoids the fact that some important quality attributes of seafood, notably safety indices, are not related to sensory indices. On page 29 the author states "The usefulness of any specific chemical method of evaluating seafood freshness quality depends on both the species being evaluated and the manner in which that species has been stored." True, but the same limitation applies even more so to the sensory methods.

For copies of "Evaluation of Seafood Freshness Quality":

Mail requests to: VCH Publishers, Inc., 220 East 23rd St., New York, NY 10010-4606; phone (212) 683-8333 • fax (212) 481-0897.

I have had the experience of spending months training a sensory panel to evaluate freshness quality of one specie of California rockfish *(Sebastes)*. The sensory panel was thrown into chaos and were unable to distinguish the freshness during the first 4–5 days of ice storage when presented with a closely related specie of California rockfish. This is disconcerting given there are about 50 specie of *Sebastes* all marketed under the same name. On the other hand, using nucleotide degradation as an indice of freshness gave consistent results regardless of the *Sebastes* specie. In addition to a more balanced perspective on chemical methods, it would have been helpful if this chapter more thoroughly illustrated and pointed to specific examples of where chemical indices do and do no reflect sensory attributes of fishery products.

Chapter 3 is an excellent summary of physical methods to evaluate freshness with an emphasis on a number of devices developed at the Canadian Department of Fisheries and Oceans, Inspection Branch, St. John's, NF. Physical methods discussed include methods of texture evaluation, abridged devices to simulate the "finger test," imaging techniques to measure uniformity, size, shape and color as well as devises to measure the dielectric properties of the skin and muscle. More than half of the book is dedicated to sensory evaluation (Chapters 4 and 5).

Chapter 4 deals with "Freshness Quality Grading" and Chapter 5 is on "Attribute Assessment." These chapters thoroughly cover the basics of sensory evaluation with examples given to the application of sensory science to seafoods. More than half of the text is dedicated to chapters 4 and 5. The book also includes a useful Glossary on pages 147–155 and a list of 352 references and a subject index. Overall, the book will be an excellent resource for individuals interested in quality evaluations of seafoods.

Affiliate Council of IAMFES Operating Guidelines

Adopted by Vote of Affiliate Council, July 30, 1995
Approved by the IAMFES Board, November 22, 1995

The "Operating Guidelines" of the Affiliate Council of IAMFES have been revised to add two duties of the past Council Chairperson. They are: 1) Chair of the Nominating Committee, and 2) Appoint Chairs of the IAMFES Awards Committee. In addition, the Executive Board recommended removing some redundancy in the language of the Operating Guidelines. We can improve the way in which we operate by implicating these guidelines in conjunction with the constitution and by-laws.

I. Name:

The name of this group shall be the Affiliate Council (the "Council") of the International Association of Milk, Food and Environmental Sanitarians, Inc. (IAMFES)

II. Purpose:

The purpose of the Affiliate Council is to advise the Executive Board of the IAMFES with respect to the Mission of the IAMFES, to recommend programs or activities to the IAMFES Executive Board that enhance the goals of the Association and to advise in the development of the Annual Meeting Educational Program.

III. Organization:

A. Membership: The Affiliate Council shall consist of a designated elected or appointed member from each affiliate in good standing in their affiliate and in IAMFES and the Immediate Past President of IAMFES. The Executive Director of IAMFES shall serve as a liaison to the Affiliate Council from the IAMFES staff.

No individual shall receive compensation above expenses paid by their affiliate for his/her volunteer services as a member of the Affiliate Council.

B. Officers of the Affiliate Council.

1. The members shall elect from amongst themselves, a Chairperson and Secretary. The Secretary of the Affiliate Council shall be elected for a two year term serving as Affiliate Council Secretary the first year and automatically succeeding to Affiliate Council Chairperson the second year. The officers may be a elected at the Annual Meeting of the Affiliate Council or by mail ballot as described.

2. Duties of the Officers of the Affiliate Council;

The Chairperson shall:

1) Preside at all meetings of the Council;

2) Serve as a voting member of the IAMFES Executive Board;

3) Appoint all Council committees unless otherwise directed by vote of the Council;

4) Perform other duties as usually fall upon the presiding officer;

5) Report annually on the activities of the IAMFES Affiliate Council to the IAMFES members during the Annual Business Meeting of IAMFES and shall provide regular communications through the year to the Affiliate Delegates regarding activities of the Board;

6) As Past Chairperson, Chair the Affiliate Council Nominating Committee (see Section V);

7) As Past Chairperson, appoint the chairpersons for the Association's awards, including the Sanitarian's Award, the Educators Award, the Citation Award, the Harold Barnum Industry Award, the Honorary Life Membership and the Black Pearl Award.

The Secretary shall:

1) Keep an accurate record of the proceedings and activities of the Council;

2) Assume duties of the Council Chairperson in the absence of the Chairperson;

3) Keep an up-do-date current record of authorized representatives to the Council;

4) Serve as an ex-officio, non-voting member of the IAMFES Executive Board, without travel support unless voted on by the Executive Board and

5) Be responsible for submitting current Council Operating Guidelines to the IAMFES.

3. Election of Officers. The Affiliate Council Chairperson will appoint a Nominating Committee (See Section V). The committee will:

a. Request in writing that each Affiliate submit a nomination for Council Secretary.

b. Screen nominated candidates and determine their willingness to serve.

c. Select two candidates for the position of Council Secretary.

2. Election Process:

a. Affiliate delegates shall vote by ballot provided by the Nomination Committee 60 days prior to the Annual Meeting of IAMFES or by direct election at the beginning of the Affiliate Council meeting

b. The newly elected Affiliate Council Secretary will be introduced at the Annual Meeting of the Affiliate Council held in conjunction with the Annual Meeting of IAMFES and will take office at the same time as the new IAMFES officers.

C. Operations: The Affiliate Council parliamentary procedures shall be governed by the Operational Guidelines, adopted by majority vote of Affiliate Representatives representing all of the member affiliates and approved by the IAMFES Executive Board. A copy of the current Affiliate Council Operational Guidelines shall be filed with the IAMFES Executive Director by the Council Secretary.

IV. Meetings:

A. Frequency and Purpose: The Affiliate Council shall meet at the time of the IAMFES Annual Meeting. The Affiliate Council may meet at other times as necessary to conduct the business of the Affiliate Council. The time and place shall be determined by the Chairperson.

B. Quorum: A quorum shall consist of a majority of delegate members present and voting. Affiliate Council business may be conducted by majority vote of the members present and voting at any meeting or by a recorded majority vote taken via mail, e-mail, telephone, or facsimile ballot. Officers shall retain their voice and vote.

C. Special Meetings: Other meetings of the Affiliate Council may be called by a petition signed by no less than one-half of the delegates to the last meeting of the Affiliate Council.

D. Voting: Each delegate shall represent only one affiliate, where appropriate. Voting by facsimile or other electronic means, shall be considered as the same as by mail.

V. Committees:

A. There shall be a Nominating Committee of six members representing the broad representation of Affiliate Council members. The Nominating Committee Chairperson shall be the immediate past Affiliate Council Chairperson. The Nominating Committee shall be appointed by the Affiliate Council Chairperson following the Annual Meeting. Committee members may serve more than one (1) year, but not more than three (3) consecutive years. The Committee shall solicit from each Affiliate delegate names to be placed in nomination for Secretary and shall report to the Affiliate Council delegate the slate 60 days prior to the Annual Meeting. Nominations may also be made from the floor.

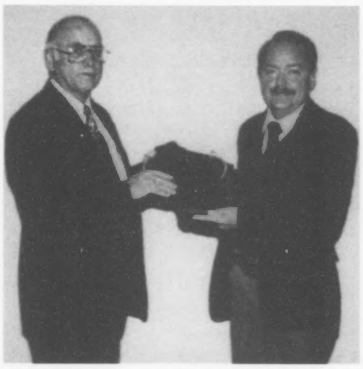
VI. Amendment of Operating Guidelines:

These operating guidelines may be amended by a majority of the delegates present and voting the IAMFES Affiliate Council Annual Meeting or by ballot as described in IV B.

AFFILIATE ASSOCIATIONS

A. IAMFES members residing in the same geographical area, and, also functioning organizations of milk, food and/or environmental sanitarians or any closely related groups whose objectives are consistent with those of IAMFES, may apply to the Executive Committee of IAMFES for a Charter as an Affiliate Association.

B. Each Affiliate Association shall have one delegate, appointed or elected by the affiliate on the Affiliate Council. The delegate must be a current member of IAMFES and their local affiliate.



Randy Daggs, (right) Secretary of WAMFS presents Joe Disch (left) with the Sanitarian of the Year Award

Joe Disch, Receives 1995 WAMFS *Sanitarian of the Year,* Award

Joseph J. Disch was honored as WAMFS 1995 Sanitarian of the Year at the annual Dairy, Food and Environmental Health Symposium in Appleton on September 28th. Joe was honored for his long standing contributions in dairy & food sanitation and public health. He is currently a Food Safety Supervisor for the Bureau of Food Safety, WI Dept. of Agriculture, Trade and Consumer Protection (DATCP).

Joe, a native of New Glarus, grew up on the family dairy farm that had been handed down through four generations. After high school Joe served in the U.S. Army from 1953-56, including tours as a Combat Engineer in both Korea and Hawaii. In 1963, Joe earned his Bachelor of Science degree at UW-Platteville with a major in Agricultural Education and a minor in Biological Science.

His professional career began as a Dairy Plant Field Representative with Sealtest Foods, Milwaukee from 1963 to 1972. In 1972, Joe began his career with DATCP as a Food Inspector. He became a Registered Sanitarian in 1973. In March of 1977 he was promoted to Agricultural Supervisor, and, after several additional promotions, has served in his present capacity as Food Safety Supervisor since 1992. In 1993, Joe was honored by DATCP with an Exceptional Performance Award.

Joe has been a member of WAMFS and IAMFES since 1977. He served on the WAMFS Executive Board from 1988 to 1993 and presided as WAMFS President in 1992. In 1993, due mostly to his own efforts and initiative, Joe compiled a chronological history of WAMFS from its inception in 1943. His hard work and perseverance for WAMFS 50th Anniversary celebration paid off handsomely-our affiliate was recognized by IAMFES with the Shogren Citation Award for hosting the best affiliate annual meeting.

Over the past few years, Joe has taken on the time consuming and thankless task of promoting WAMFS and individual members, for IAMFES recognition. His diligence in submitting detailed nominations has resulted in the following IAMFES awards: Ken Kirby, Honorary Life Member, 1994; Everett J. Johnson, Sanitarian Award, 1995; Shogren Citation Award for best Annual Meeting, 1994; Shogren Citation Award for the best Educational Programs, 1995; and the Shogren Award, 1995. Joe has also taken on a number of editorial responsibilities on the WAMFS Newsletter.

As a member of IAMFES, Joe's efforts have been no less spectacular. He served on the Planning Committee for the IAMFES Annual Meetings in Milwaukee in 1972 (as a member of the Fieldman's Assn.) and in 1990 in Arlington Heights, IL. Joe has served as the WAMFS affiliate delegate to IAMFES since 1990. Last year he served as Secretary to the IAMFES Affiliate Council and this year assumes the responsibilities of Chairman of the Affiliate Council.

Joe's leadership and sense of community are reflected in his 15 consecutive years as a Deacon and Board member for Windsor United Church in DeForest, where he and his wife Katherine currently reside.

Always highly regarded and respected by his peers, Joe's selection as Sanitarian of the Year was warmly received by those present at the award ceremony. Congratulations Joe, on a well-deserved honor.

Reprinted from the WAMFS Newsletter, Vol. 7, No. 2.

New Members

ARIZONA

Jean Hanson
Arizona Department of Ag State Ag Lab, Phoenix

Jacquelyn Olsen
McLane Foods, Phoenix

BELGIUM

A. Mathieu
BCMFE, Brussels

CALIFORNIA

Victorio Carrillo
Nutrilite Products, Lakeview

Michael Harris
Puritan/Churchill Chemical Co. Alameda

Joe Joshi
Baskin-Robbins National Lab Burbank

CANADA

Hanna Hobrzanska
St. Joseph's Health Centre London, Ontario

Mark Yoshimasu
University of Manitoba Winnipeg, Manitoba

CONNECTICUT

Patrick Harewood
GEM Biomedical Inc., Hamden

FLORIDA

Icela Tejeina de Palma
Expert Lab, Inc., Miami

Joseph Neil Watson
Puritan/Churchill Chemical Co. Oviedo

GEORGIA

Jennifer L. Flanagan
Puritan/Churchill Chemical Co. Atlanta

Donna Mae Garren
University of Georgia, Athens

IDAHO

John Gifford
Puritan/Churchill Chemical Co. Kagle

ILLINOIS

Lynda L. Fuqua
The HVR Company, Wheeling

INDIANA

David Eaton
Universal Flavors, Indianapolis

Mark H. Hellinger
CME Corporation, Fort Wayne

IOWA

Jerry Erdmann
Iowa State University, Ames

ITALY

Galvano Giacoho
Istituto Di Scienze Tecnologie Delle Produzioni Animali, Catania

KANSAS

Deanna D. Retzlaff
Kansas State University, Manhattan

MAINE

Polly Wilkey Goff
FMC Corporation, Rockland

MICHIGAN

Dur Efaw
Meijer Inc., E. Lansing

MISSISSIPPI

Reda Darlene Reuss
Alcorn Co. Health Dept., Corinth

MISSOURI

William R. Cary
W. R. Cary Engineering Inc. Springfield

NEBRASKA

Andrew K. Benson
University of Nebraska, Lincoln

Charlene Wolf-Hall
University of Nebraska, Lincoln

NEW JERSEY

Kuen Ho Lee
T. J. Lipton, Co., Englewood Cliffs

Tim Pettitt
Nabisco Biscuit Co., E. Hanover

Bob Vanderbilt
M & M/Mars, Hackettstown

NEW YORK

Michael Magner
Price Chopper Supermarkets Schenectady

NORTH CAROLINA

Shahriar Vojdani
Puritan/Churchill Chemical Co. Charlotte

NORTH DAKOTA

Don Skarphol
R. D. O. Specialty Foods, Fargo

OHIO

Julia Byard
Ross Prod. Division/Abbott Labs Columbus

Joseph D. Eifert
Nestle USA, Inc., Dublin

Karrick M. McKinney
Borden Inc., Columbus

Terry Ryan
Stearns & Lehman, Mansfield

Jeffery S. Zornow
Sanitary Couplers, Inc., Springboro

PENNSYLVANIA

Alex Y. Teo
The Pennsylvania State University
University Park

SOUTH CAROLINA

Cheryl L. Ramey
C. F. Sauer, Mauldin

John D. Robinson, Jr.
Puritan/Churchill Chemical Co.
Lexington

TAIWAN

Jeng-huh Yang
National Taiwan University, Taipei

TENNESSEE

John B. Bush
Puritan, East Ridge

TEXAS

Bradley A. Stawick
Silliker Laboratories, Houston

Steve Young
Professional Service Industries
Arlington

UTAH

Monroe Davidson
WDCI, Salt Lake City

Christopher K. Larsen
Puritan/Churchill Chemical Co.
Salt Lake City

WASHINGTON

Erik Opsahl
Puritan/Churchill Chemical Co.
Seattle

WISCONSIN

Robert Bagley
City of Racine-Health Department
Racine

H. Stephen Gradus
City of Milwaukee-Health Department, Milwaukee

Walter P. Heil, Jr.
Morning Glory Dairy, DePere

Bill Rieken
Dean Foods Vegetable Co.
Green Bay

Henry Schmitt
Tetra Pak, Pleasant Prairie

New IAMFES Sustaining Members

Trevor Hopkins
Applied Research Institute
Newtown, CT 06470

Jon Bain
Copesan Services, Inc.
Brookfield, WI 53005

NewMembers

ARIZONA

Jean Hanson
Arizona Department of Ag State
Ag Lab, Phoenix

Jacquelyn Olsen
McLane Foods, Phoenix

BELGIUM

A. Mathieu
BCMFE, Brussels

CALIFORNIA

Victorio Carrillo
Nutrilite Products, Lakeview

Michael Harris
Puritan/Churchill Chemical Co.
Alameda

Joe Joshi
Baskin-Robbins National Lab
Burbank

CANADA

Hanna Hobrzanska
St. Joseph's Health Centre
London, Ontario

Mark Yoshimasu
University of Manitoba
Winnipeg, Manitoba

CONNECTICUT

Patrick Harewood
GEM Biomedical Inc., Hamden

FLORIDA

Icela Tejeina de Palma
Expert Lab, Inc., Miami

Joseph Neil Watson
Puritan/Churchill Chemical Co.
Oviedo

GEORGIA

Jennifer L. Flanagan
Puritan/Churchill Chemical Co.
Atlanta

Donna Mae Garren
University of Georgia, Athens

IDAHO

John Gifford
Puritan/Churchill Chemical Co.
Kagle

ILLINOIS

Lynda L. Fuqua
The HVR Company, Wheeling

INDIANA

David Eaton
Universal Flavors, Indianapolis

Mark H. Hellinger
CME Corporation, Fort Wayne

IOWA

Jerry Erdmann
Iowa State University, Ames

ITALY

Galvano Giacoho
Istituto Di Scienze Tecnologie Delle
Produzioni Animali, Catania

KANSAS

Deanna D. Retzlaff
Kansas State University, Manhattan

MAINE

Polly Wilkey Goff
FMC Corporation, Rockland

MICHIGAN

Dur Efaw
Meijer Inc., E. Lansing

MISSISSIPPI

Reda Darlene Reuss
Alcorn Co. Health Dept., Corinth

MISSOURI

William R. Cary
W. R. Cary Engineering Inc.
Springfield

NEBRASKA

Andrew K. Benson
University of Nebraska, Lincoln

Charlene Wolf-Hall
University of Nebraska, Lincoln

NEW JERSEY

Kuen Ho Lee
T. J. Lipton, Co., Englewood Cliffs

Tim Pettitt
Nabisco Biscuit Co., E. Hanover

Bob Vanderbilt
M & M/Mars, Hackettstown

NEW YORK

Michael Magner
Price Chopper Supermarkets
Schenectady

NORTH CAROLINA

Shahriar Vojdani
Puritan/Churchill Chemical Co.
Charlotte

NORTH DAKOTA

Don Skarphol
R. D. O. Specialty Foods, Fargo

OHIO

Julia Byard
Ross Prod. Division/Abbott Labs
Columbus

Joseph D. Eifert
Nestle USA, Inc., Dublin

Karrick M. McKinney
Borden Inc., Columbus

Terry Ryan
Stearns & Lehman, Mansfield

Jeffery S. Zornow
Sanitary Couplers, Inc., Springboro

PENNSYLVANIA

Alex Y. Teo
The Pennsylvania State University
University Park

SOUTH CAROLINA

Cheryl L. Ramey
C. F. Sauer, Mauldin

John D. Robinson, Jr.
Puritan/Churchill Chemical Co.
Lexington

TAIWAN

Jeng-huh Yang
National Taiwan University, Taipei

TENNESSEE

John B. Bush
Puritan, East Ridge

TEXAS

Bradley A. Stawick
Silliker Laboratories, Houston

Steve Young
Professional Service Industries
Arlington

UTAH

Monroe Davidson
WDCI, Salt Lake City

Christopher K. Larsen
Puritan/Churchill Chemical Co.
Salt Lake City

WASHINGTON

Erik Opsahl
Puritan/Churchill Chemical Co.
Seattle

WISCONSIN

Robert Bagley
City of Racine-Health Department
Racine

H. Stephen Gradus
City of Milwaukee Health Department, Milwaukee

Walter P. Heil, Jr.
Morning Glory Dairy, DePere

Bill Rieken
Dean Foods Vegetable Co.
Green Bay

Henry Schmitt
Tetra Pak, Pleasant Prairie

New IAMFES Sustaining Members

Trevor Hopkins
Applied Research Institute
Newtown, CT 06470

Jon Bain
Copesan Services, Inc.
Brookfield, WI 53005

UpDates

Donald W. Quass and Barry E. Homler Named Co–Directors of EPRI Food Technology Center

The Electric Power Research Institute (EPRI), the R&D arm of the electric power industry, announces the appointment of Donald W. Quass, Ph.D. and Barry E. Homler, Ph.D. as co-directors of its new Food Technology Center (FTC). The Center, with offices in Minnesota and Ohio, was formed by EPRI in May 1995 to advance food processing electrotechnologies, improve productivity and product quality, and meet environmental challenges.

Quass, 55, assumed directorship of the FTC Research and Development branch on November 1,1995. Located at the University of Minnesota's St. Paul Campus, this branch will manage technology development that focuses on bridging the gap between laboratory development and commercial plant application.

A former director of R&D for Grande Cheese Co., Quass has also directed major production startups in the dairy, soy, and meat industries. He received his Ph.D. in Muscle Chemistry and Physiology from the University of Wisconsin. He also holds a B.A. in Chemistry from St. Olaf College, Northfield, Minn.

Homler, 57, began his work as Director of the FTC Outreach and Implementation branch on October 23, 1995. This branch, which focuses on the deployment of new and existing technologies, is located at the Edison Industrial Systems Center in Toledo, Ohio. Most recently director of business development at The NutraSweet Company, Homler played a key role in the evolution of that product.

Homler's broad food industry experience includes new product development, technical service, and customer support. He holds M.S. and Ph.D degrees in Food Technology from Purdue University and a B.S. in Food Science from Cornell University.

Quass and Homler will manage partnerships with electric utilities, research institutions and universities to develop and implement the food electrotechnologies.

EPRI, founded in 1972 and headquartered in Palo Alto, California manages technology research and development programs for the electric utility industry to improve electricity production, distribution and use. Some 700 utilities are members of the Institute.

Hofmann and Trout Join Affiliated Research Centers, Inc.

Affiliated Research Center, Inc., a company that conducts research on investigational medications, is pleased to announce that Lorenz Martin Hofmann, Ph.D. and David H. Trout have joined the company. Hofmann has been appointed Vice President, Business Development of Urology Research, and Trout has been appointed Senior Account and Marketing Manager.

Prior to Hofmann's appointment to Vice President of Operations, he served as Associate Director, Clinical Research for Schwarz Pharma Kremers Urban Co. in Mequon, Wisconsin. With 20 years experience, he has served in a variety of capacities in the pharmaceutical industry. He has extensive experience in Phase I-IV drug development, and is accredited with numerous publications, abstracts, and lectures. Hofmann has served as Adjunct Assistant Professor at The Ohio State University College of Pharmacy and College of Medicine. Hofmann holds a Bachelor of Science in Pharmacy, a Masters of Science in Pharmacology, and a Doctorate in Pharmacology.

Prior to joining ARC, David Trout worked as an international Pharmaceutical Marketing Consultant to Storz Ophthalmics in St. Louis, Missouri. He was also Product Manager, Analgesic Products and Marketing Manager, Managed Care Segments for Genderm Corporation in Lincolnshire, Illinois. Trout also served as Product Manager at Schwarz Pharma in Mequon, Wisconsin.

Elsag Bailey Process Automation N.V. Announces Completion of the Acquisition of the Hartmann & Braun Group of Companies

Elsag Bailey Process Automation N.V. (NYSE:EBY) announced that it completed the acquisition of the Hartmann & Braun Group of Companies on January 2, 1996. The acquisition has been financed through a $207 Million offering of 5.5% Convertible Trust Originated Preferred Securities (TOPrS℠) made through Merrill Lynch and a placement with majority shareholder Finmeccanica of $80 Million of TOPrS and $120 Million of the company's common shares and the balance was funded through a new credit agreement arranged by Bank of America and Merrill Lynch, which also replaces Bank of America' s current credit arrangements with the company.

"We are pleased to have received the necessary regulatory approvals both in Europe and the United States and to have completed this transaction in such an expeditious manner," said Vincenzo Cannatelli, Chief Executive Officer. "This acquisition combines the prestigious brand names of Hartmann & Braun and Elsag Bailey to create one of the broadest based portfolios of products and services in the process control industry."

Hartmann & Braun, based in Frankfurt, Germany, is a leading producer of systems and instrumentation for the automation of energy production and other industrial processes in Germany and Europe. The company is also a world leader in gas analysis technologies. The Hartmann & Braun Group of Companies had 1994 revenues at DM 1.3 Billion (US $905 Million).

U.S. Dairy Export Council Names Tom Suber as Executive Director

The Board of Directors of the U.S. Dairy Export Council (USDEC) has named Thomas M. Suber as executive director. USDEC, an independent membership organization representing dairy industry members in research and marketing efforts to increase product exports around the world, was formed and is staffed by Dairy Management, Inc. (DMI).

Suber, 42, will lead USDEC in establishing integrated international marketing programs, aimed at helping U.S. dairy processors and suppliers grow their business by opening and expanding foreign markets. These programs include increasing market access; overcoming market research and import documentation challenges; domestic and overseas trade education; and consumer promotion campaigns. USDEC sees its current primary markets as Mexico, Japan, Korea, and Southeast Asia.

Suber, formerly senior vice president with USDEC and DMI, established the communication and consultative program that led to the creation of USDEC. He was also responsible for creating the first-ever export market development program for the dairy industry, and was instrumental in placing the first dairy representatives in Mexico, Japan, and Taiwan.

Before joining USDEC, Suber created the international marketing strategy for the National Dairy Board while with the International Advisory Services Group. He has also led and coordinated export marketing and sales efforts for a variety of commodity suppliers and industrial products manufacturers.

Milk Monitoring with Antimicrobial Drug Screening Tests

Under the Public Health Service Act, the Food and Drug Administration (FDA) and the States administer the Interstate Milk Shippers Program, a voluntary Federal/State program established to ensure the safety and wholesomeness of fresh milk in the United States. Under this program, the FDA published the *Grade A Pasteurized Milk Ordinance* (PMO), a model regulation used in voluntary, cooperative interstate milk safety programs in which all 50 States, the District of Columbia, and Puerto Rico participate. The PMO specifically requires that all bulk milk pickup tankers be tested for the presence of beta-lactam drug residues.

Prior to 1991, the PMO recognized only one official test method for detecting drug residues in milk, the *Bacillus stearothermophilus* Disc Assay (BSDA). Changes to the PMO in 1991 required intensified testing of milk for beta-lactam residues and created the need for additional rapid, reliable screening tests that "have been evaluated through AOAC and accepted by FDA." (AOAC International, formerly known as the Association of Analytical Chemists, is a scientific organization whose primary objective is to validate and improve analytical methods.) As a result of this change to the PMO, 17 screening tests for beta-lactam antibiotics, one test for chloramphenicol, and one test for sulfonamide drugs have been evaluated and accepted by FDA. These tests are accepted for the monitoring of truck tanker loads of raw, commingled, bovine milk in accordance with Appendix N of the PMO and from bulk tank producer samples in accordance with Section 6 of the PMO.

The reliability of these tests to monitor the nation's milk supply has been questioned by some individuals. This article addresses these issues and clarifies the role of screening tests for monitoring raw milk.

The accepted screening tests have met a standard for a low incidence of false positive and false negative finding. Combined with these standards, there are important principals of use which must be considered. These are:

1. A positive result from a screening test is a presumptive indication that an analyte is present in the milk sample.

2. The screening test does not necessarily identify the specific analyte causing the test to be positive nor does it measure the quantity.

3. All the accepted tests may produce a positive result when the drug concentration is below the tolerance/safe level. This is a false violative result, not a false positive result.

4. A chemical analysis is required to determine whether or not a given milk sample contains antimicrobial drug residues above the tolerance/safe level (violative).

5. Despite their limitations, the accepted tests represent the "state of the art" in rapid detection of drug residues in milk.

The percentage of truck tankers found positive in 1994 (National Milk Drug Residue Third Party Data Base) was 0.063%. This low incidence of positive truck tankers supports our standard for selectivity (false positive test result). Further, this low incidence also demonstrates that the majority of the milk producers are using drugs in a responsible manner. The FDA has found no evidence which would indicate that the use of approved beta-lactam drugs in accordance with label directions will cause a violative or non-violative residue in a truck tanker. The FDA believes the use of the accepted tests under the provisions of Appendix N, PMO, has reduced the amount of positive milk entering the food supply.

The FDA recognizes the economic losses to the milk producer which would result from false violative and false positive test results. With this issue in mind, the NCIMS and the FDA agreed to retest all original positive truck tanker samples using the same test when the initial test is conducted by an industry analyst. Only after the results from retesting indicate a positive finding is a truck tanker rejected. Retesting increases the probability of acceptance of a non-violative milk tanker and decreases the number of non-violative truck tanker rejections. The FDA must also be concerned with the incidence of false negative results to ensure public health.

The low incidence of positive truck tanker results do not appear to be caused by unreliable tests. Based on reports from the States, the FDA has concluded that misuse of animal drugs is the cause of most positive test results from truck tanker testing even when residue concentrations are below the tolerance/safe level. The FDA has found no evidence which indicates that treating lactating cows in accordance with labeled directions will cause a positive truck tanker. The follow-up by the State regulatory agencies on positive truck tankers indicates that the positive test results are primarily the result of misuse of animal drugs.

It has been suggested by some individuals that testing under the provisions of Appendix N, PMO,

that the FDA and NCIMS accepted screening tests be discontinued. The FDA takes the position that discontinuing tanker truck testing is not consistent with a commitment to a safe milk supply, and therefore would be unacceptable to the Agency. Prior to the implementation of Appendix N, PMO, the Government Accounting Office concluded that there was no comprehensive strategy to ensure the safety of the milk supply. The State regulatory agencies and FDA are committed to maintaining a safe milk supply and have developed a comprehensive strategy for ensuring a safe milk supply. The strategy adopted by FDA and NCIMS includes monitoring of truck tankers in accordance with Appendix N, PMO, monitoring producer built tanks in accordance with Section 6, PMO, participation in the ten point Milk and Dairy Beef Quality Assurance Program in the event of a violation, monitoring the use and labeling of drugs through the PMO Farm Inspection Program, and individual cow testing.

Although research indicates that some screening tests may produce false positive test results in milk from individual cows, the FDA is not aware of any data which supports the conclusions that unique factors in the milk from individual cows produce false positive findings in truck tanker milk samples. The FDA maintains the view that the misuses of animal drugs causes a majority of screening test positives at the truck tanker.

No screening test has been evaluated by the Center for Veterinary Medicine or the AOAC International Research Institute for use on milk from individual cows. Nine of the currently accepted test for testing truck tanker milk are being evaluated for this use.

FDA has prepared a document entitled "Evaluation and Use of Milk and Antimicrobial Drug Screening Tests" which provides a detailed discussion of the evaluation and use of the screening tests as well as related issues regarding the monitoring for animal drug residues in milk. Copies of this document are available by calling CVM's Communications and Education Branch at (301) 594-1755 or by writing to Communications and Education Branch, HFV-12, CVM/FDA, 7500 Standish Place, Rockville, MD 20855. Comments or questions on this issue may be addressed to Dr. Norris E. Alderson, HFV-500, CVM/FDA, 7500 Standish Place, Rockville, MD 20855. Phone 301-594-1702; email alderson@a1.cvm.fda.gov.

ATP–Adenosine Triphosphate is a Chemical Found in all Living Cells

ATP technology in microbiology The technology is based on special materials which are found naturally in the tails of fireflies. In nature, these materials allow the firefly to produce light, a phenomenon known as *bioluminescence*. Scientists have been able to harness this bioluminescence to measure microorganisms and, under some circumstances, to measure dirt. The first steps towards this were taken in the 1940s, but the techniques were advanced considerably by the involvement of NASA in the 1960s. Recent improvements in the chemistry of reagents and the electronics of light measuring devices have made the technique available to industry at large. The take up over the last few years has been astounding. Currently, more than 10 million tests are carried out annually.

ATP 88 In 1988 a symposium was held on ATP and bioluminescence technology at the University of Sussex in Brighton, UK. The event was jointly sponsored by government (the Department of Trade and Industry) and the Society for Applied Bacteriology. A smaller event was held in Cambridge in 1992. These meetings stimulated developments in the field and established the UK as a centre of excellence.

ATP bioluminescence industry There are now more than 20 companies involved in this technology throughout the world, with a substantial and rapidly expanding user base. In the UK, two companies (Biotrace International plc and Celsis International plc) have obtained full stock exchange listings. Such companies operate globally. In 1995, analysts Frost & Sullivan predicted phenomenal growth for the sector. Currently, the European market for such tests is of the order of £12M but is estimated to reach £1,200M by the year 2000.

Government sponsorship of the technology The UK government has continued to sponsor the development of this technology and the promotion of the UK as a centre of excellence. In 1995, a £AM DTI/BBSRC stand alone LINK initiative entitled *Novel Rapid Detection Systems for Microbial Quality Assurance Testing* was established. The UK government has contributed £1.8M toward this program.

Cara Technology Limited is a UK-based consultancy and training organization that provides services to Industry throughout the world. The company was founded in 1987 as an Information Technology Consultancy. Since then its customer base has expanded to include the Brewing, Biotechnology, and Information Technology Industries.

Advanced Instruments Receives ISO 9001 Registration

Advanced Instruments, Inc., manufactures of clinical/industrial laboratory equipment and dairy quality control instrumentation and assays, received official notification on December 19, 1995 that the

company had passed the final audit to be become ISO 9001 registered. ISO 9001 registration requires that an organization meet twenty different elements of compliance in quality assurance, impacting all areas of the company from design, development, and production to installation and service. Established by the International Standards Organization, ISO 9001 registrations has become an international benchmark of quality management in manufacturing.

ISO 9001 registration acts as an indicator to purchasers that the registered company manufactures to documented standards. Of particular value to American companies exporting goods to Europe, ISO 9001 registration is often cited by individual industries as a requirement for purchase. "We have found that the European purchasers such as hospitals are increasingly demanding ISO 9001 registration from manufacturers of products they buy," remarks Jackie Page, International Sales Manager with Advanced Instruments.

In addition to ISO 9001 registration, Advanced Instruments' products have been tested and approved for compliance with all major safety regulatory directives from the Occupational Safety and Health Administration (OSHA), the Standards Council of Canada, and the European Union. Products now carry the ELT mark recognized by the United States and Canada and the CE mark required by the European Union.

Labconco Introduces Web Site on the Internet

Labconco Corporation, Kansas City, Missouri, U.S.A., now has a home page on the Internet. Our home page address is: http://www. labconco.com

Labconco's home page will provide information and graphics on our company background, product lines, contact information, press releases and latest newsletter. It will also contain an interactive questionnaire for Web site visitors to make comments or requests. Visitors can navigate the home page in a nonlinear fashion by simply clicking on context sensitive buttons located in the "table of contents" and throughout the site. The home page will be updated regularly.

The home page will by hyperlinked to our electronic mail page, or you can also access our e-mail directly by dialing: labconco@ labconco.com

Cooper Offers New Temperature & Time Food Safety Guide Featuring HACCP Guidelines

Cooper Instrument Corporation introduces a new comprehensive Food Safety Guide illustrating the Hazard Analysis Critical Control Point (HACCP) food safety system, tracing temperature and time elements through the foodservice establishment.

The new guide is an excellent training tool that details important steps to ensure safe food handling at every stage of operation from receiving to serving. It also features important tips such as "how" to choose the right thermometer, and the correct methods for recalibrating mechanical thermometers. It also includes a kitchen layout illustrating the importance of how thermometers and timers are used throughout.

The brochure is an excellent training tool for students, new chef's or any professionals that sell, service or supply food safety products. It is especially ideal for foodservice operators who have not had formal training in food safety. The brochure acts as a quick reference guide.

For a free copy of the new Food Safety Guide, please send a self addressed, stamped envelope to: Cooper Instrument Corporation, c/o Marketing Dept., FS Guide, 33 Reeds Gap Road, Middlefield, CT 06455.

NMC Office Moved to Wisconsin

The National Mastitis Council has a new headquarters–the *World Dairy Center* in Madison, Wisconsin.

Located on Madison's southeast side, the World Dairy Center is part of a 500 acre business park dedicated exclusively to ag-related business. Anchored by the Wisconsin Department of Agriculture building, the World Dairy Center campus has both single-tenant and multi-tenant buildings. The NMC office will be housed in a multi-tenant building; other tenants in the building include: World Dairy Expo; U.S. Department of Agriculture; Protiva, a Unit of Monsanto; Holstein World; Mid-America Dairymen, Inc.; Grande Cheese; Request; and Agri-Management, Ltd.

High School Students Take First Step on Foodservice Career Ladder

"t's always been my dream to own a restaurant. To prepare myself, I have taken classes in home economics, foods, business, and accounting, but I needed something more," said Neal Fuehling, a junior at Buffalo Grove High School in Illinois. "This program has given me what I needed. I feel more confident that once I'm done with college, I will have a better chance of owning a restaurant."

Neal is one of approximately 32 students who are now in the second year of the foodservice school-to-work program developed by The Educational Foundation in partnership with the Foodservice Internship Alliance, a coalition of the Illinois Restaurant Association, the American Express Foundation, leading area foodservice operations, and the Illinois Department of

Education. The program was introduced in five Illinois high schools in September 1994. It is now being used by 30 schools across the country.

"The purpose of The Foundations' school-to-work program is to help the industry fill its need for entry-level employees who can be developed into successful managers," said Paul Martin, FMP, director of educational programs for The Educational Foundation. "At the same time, industry can take in improving the workforce development process and enhancing the image of the foodservice industry as a rewarding career opportunity."

Designed for 11th and 12th grade high school students, the program teaches the basic skills and knowledge necessary to operate and manage a foodservice facility, with courses in food preparation, basic accounting, workplace safety and communications.

Students also gain hands-on experience from mentored internships in various segments of foodservice including fast food, corporate dining, fine dining, and hotels/motels. Some of the establishments where the students have interned so far include operations of Boston Market, Motorola Food Works Management Services, and the Levy Restaurants' Arlington Trackside Restaurant in Arlington Heights, Illinois.

During the internships, students develop relationships with individuals in the operations who serve as mentors. These mentors work directly with the students to ensure that they are getting the most out of the work experience and practicing what they have learned in the classroom.

"This program sets a national industry standard," said Pamela Block, director of the Educational Foundation of the Illinois Restaurant Association. "Students have the opportunity to learn industry theories during the academic classes while gaining workforce preparation and applying those theories during their internships. The strength of the individual mentors is significant in raising the caliber of the training the students receive."

The Educational Foundation is now encouraging other foodservice companies and establishments to become involved in the school-to-work process in their communities.

In three communities schools have been "adopted" by foodservice companies, which means the foodservice company or organization purchases the two-year curriculum on behalf of a school and provides internships for students. Harman Management, the largest Kentucky Fried Chicken franchise, has adopted two schools in California, while members of the Society for Foodservice Management's school-to-work committee recently adopted a school in New York state.

For more information of the Foundation's school-to-work program, please call Suzanne Morrison at 312-715-6773.

The Educational Foundation of the National Restaurant Association, a nonprofit organization based in Chicago, is dedicated to enhancing the professionalism of the foodservice/hospitality industry through education and training.

FDA Proposes Elimination of Standards of Identity for Lower Fat Milks and Milk Products

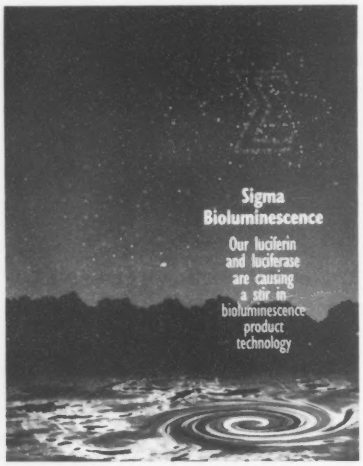
According to the International Dairy Foods Association, the Food and Drug Administration (FDA) has announced a proposed rule that would eliminate the standards of identity for all lowfat and skim milk products. If finalized, the new Nutrition Labeling and Education Act (NLEA) fat content descriptors ("reduced fat," "lowfat," "light," "non-fat" or "fat-free") would be used where appropriate with the term "milk" (or "yogurt," etc.) to describe the lower fat and fat-free versions of milk and milk products. The FDA proposed rule mirrors a joint petition filed in May, 1995 by the Milk Industry Foundation (MIF) and the Center for Science in the Public Interest (CSPI).

The current standard of identity for lowfat milk products allow 2%, 1%, and 1/2% milk products to be labeled as lowfat, even though 2% milk does not meet the NLEA definition of "lowfat." Under the proposed rule, the name for 2% lowfat milk would be changed to 2% reduced fat milk, and 1% and 1/2% milks would still be called lowfat since those products meet the NLEA "lowfat" definition. In addition, many fluid milk and cultured products which contain 1% milk fat or less will be able to use the term "light," since such products have at least one-third fewer calories than whole milk.

Milk containing less than .5 grams of fat per serving would be called "nonfat" or "fat-free" milk. In addition, the proposed rule permits the use of the word "skim" as a synonym for the terms "fat-free" or "nonfat" when used in the labeling of milk products. Other products affected by the proposed rule are sour and acidified half-and-half, lowfat and nonfat yogurt and lowfat cottage cheese.

The FDA has invited public comments on the proposed regulation to be submitted by January 23, 1996. The FDA has stated that manufacturers will be able to comply with the proposed changes (label changes) as soon as a final rule is published, most likely in the Spring of 1996.

Industry**Products**



Sigma Chemical Co.

New Bioluminescence Products from Sigma Chemical Company

Luciferin phosphate, a new bioluminescent substrate for alkaline phosphatase, offering a sensitivity 50 times greater than the colorimetric substrate p-nitrophenyl phosphate, is highlighted in a new publication from Sigma Chemical Company. In addition, the company offers a complete line of bioluminescence reageants and kits which are also described in this comprehensive brochure. Of special interest is a new SigmaUltra grade of D-Luciferin which shows superior performance characteristics compared to similar products on the market.

Sigma Chemical Co., St. Louis, MO

Reader Service No. 390

New Hand Held Homogenizer

The Tissumite is a hand-held homogenizer designed for small quantities and may be placed in 1.5ml microcentrifuge tubes. With 100 watts of power, the motor has a speed range of 5,000 to 25,000 rpm and a built-in speed control. An optional stand is available for hands-free operation. A variety of interchangeable rotor-stator probes are available.

Tekmar Co., Cincinnati, OH

Reader Service No. 391

Large Volume Conductance Cell Increases Microbial Detection Sensitivity

A new design of large volume cell for rapid, conductance-based microbial testing, that increases detection sensitivity and offers cost savings for the water, beverage and pharmaceutical industries, is now available from Malthus Instruments.

Using large sample volumes increases the chances of detection, particularly if the initital microbial loading is small–perhaps only one or two cells per 100ml. This has long been possible by membrane filtration but not until now, with rapid testing methodologies.

Designed for use with the Malthus System V microbiology analyser, the large volume cell (LVC) allows the testing of samples of up to 100ml. It is now more durable, and easier to clean and maintain. Specific details include a stronger electrode and improved connectors. In addition, its modular design allows individual components to be changed rather than buying a complete replacement cell.

The new LVC has a purpose built CO_2 option for the indirect detection method. This has been designed specifically to facilitate inoculation of the cell. It can now also be used in the same incubator as standard cells. For example, a 240 cell incubator can be converted to accommodate either 40 LVCs or 20 LVCs and 120 standard cells.

The LVC has been used successfully by IFREMER in France to measure faecal organism content in shellfish around the entire French coastline as a water quality indicator.

Malthus Instruments, West Sussex, England

Reader Service No. 392

Sparta Announces Spectrum™ Color–Code Brush System

Sparta Brush Company has introduced the Spectrum™ Color-Code Brush System designed to fight cross-contamination in Process Plants.

The Spectrum System includes a complete selection of clean-up brushes, in seven bristle colors, for every application from floor to ceiling and equipment in between. Users can develop color-coded systems for room, department or work zone.

Some suggested system color designations are:

- Red for raw product contact areas, unpasteurized or unprocessed product
- White for pasteurized, cook or processed product
- Yellow for environmental clean-up of non-food contact surfaces, such as pipes, floors and outside of equipment. Other work zones to consider are receiving, warehousing, lab areas, and shipping.

Sparta Brush Co., Sparta, WI

Reader Service No. 393

Rapid Results with Culture Confirmation of Foodborne Pathogens with Dynabeads® Microbiology Selective Enrichment Products

Dynabeads® anti-E. coli O157 and Dynabeads® anti-Salmonella are designed for rapid, immunomagnetic selective enrichment of microorganisms directly from pre-enrichment broths. The rapid and simple protocol (less than 1 hour) saves 24 hours of valuable testing time compared to culture methods using conventional selective enrichment media. Isolated colonies are achieved in 24 hours for *E. coli* O157 and 48 hours for *Salmonella*. A method for EHEC isolation which utilizes Dynabeads® anti-E. coli O157 appears in the 8th edition of the Bacteriological Analytical Manual (BAM).

Dynabeads® are uniform, superparamagnetic microspheres (2.8 microns in diameter) with affinity purified antibodies on their surface. When incubated with a sample, Dynabeads® will bind their target bacterium forming a bacterium:magnetic bead complex. This complex is separated from the heterogeneous sample by performing the test in a magnetic test tube rack (Dynal MPC®-M). The isolated and concentrated bacterium:bead complex can then be cultured on any selective culture medium or used in other detection systems.

The benefits of Dynabeads® Immunomagnetic Separation are many. This highly sensitive system will detect as few as 100 organisms/ml of pre-enriched sample. Complete detection is achieved: over 200 serotypes (1400 strains) of *Salmonella* and both motile and non-motile strains of *E. coli* O157 have been tested. Improved bacterial isolation with this method also makes it useful for the culture confirmation of other presumptive methods. Protocols are simple and reagents are shelf stable. The versatility provided by this methodology will allow testing of many different sample types while enhancing the efficiency of existing manual and automated detection methods.

Dynal, Inc., Success, NY

Reader Service No. 394

REMEL

RIM® *E. coli* 0157:H7 Latex Kit

The RIM® *E. coli* O157:H7 Latex Test is for the presumptive identification of *Escherichia coli* serogroup O157:H7 cultured on laboratory media.

The RIM® *E. coli* O157:H7 Latex test is a rapid, simple procedure which allows quick turn–around on test results. Each latex reagent is coated with a different antibody–one with an antibody against *E. coli* serotype O157, another with an antibody against *E. coli* H7, and the third with normal rabbit globulin as a control latex. When the sensitized latex particles are mixed on a test slide with fresh colonies of O157 and/or H7 strains of *E. coli*, an immunochemical reaction takes place resulting in a black agglutination of the finely dispersed particles.

REMEL, Lenexa, KS

Reader Service No. 395

Wake Up and Smell the Coffee!!... or the Milk... or the Cheese... or the Meat...!!

Foss Food Technology Corporation and AromaScan, plc., have announced a marketing agreement whereby Foss Food Technology will market the AromaScanner "**electronic nose**" to the Dairy, Meat, and Grain industries in North America.

The AromaScanner is an automated rapid analyzer that can detect aroma/smell in a very wide range of products. Electronic noses have an increasing role to play in the areas of incoming product inspection, routine quality control, product development, and in process analysis. AromaScan, plc., is the leading developer of this technology in the world and has recently raised $30M on the London Stock Exchange.

Foss Food Technology is the leading supplier of rapid automated quality control instrumentation to the Dairy, Meat, Grain, and Food Industries worldwide. It is well placed to support electronic nose technology with its regionally-based sales & customer support locations throughout the USA and Canada.

Foss Food Technology Corporation is part of the worldwide Foss Electric Group, which celebrates its 40th anniversary in 1996, in serving the Food Industry with instrumentation for rapid compositional & microbiological analysis.

Foss Food Technology, Eden Prairie, MN

Reader Service No. 396

Idetek, Inc.

BIND® Offers Speed and Simplicity in *Salmonella* Detection

BIND® from Idetek, Inc. detects *Salmonella*, with unprecedented and simplicity. Based on a unique technology using phage, BIND requires only 22 hours from sampling to completion, and a single preenrichment. With less than 5 minutes hands-on time per sample, a single BIND instrument can process more than 200 samples per shift.

Idetek develops, manufactures and sells rapid test kits used for food safety and food quality control. In addition to BIND, Idetek offers Parallux™ and LacTek™ for the detection of drug residues in dairy and meat products, kits for *Staphylococcus* Enterotoxin in foods, and the HY-LiTE bioluminescence system for in-plant sanitation monitoring.

Idetek, Inc., Sunnyvale, CA

Reader Service No. 397

Microsure *E. coli* Test Kit from Gelman Sciences Provides Rapid *E. coli* Confirmation In 18 Hours

Gelman Sciences new MicroSure™ *E. coli* test kit provides fast sample turnaround and allows users to enumerate and identify in one step. Designed for the simultaneous detection, enumeration and confirmation of Total Coliforms and *E. coli* in many types of water, this innovative kit effectively replaces the need for two isolation media and other associated media for the lengthy confirmation steps.

With the new medium in the MicroSure test kit, confirmed results are available in 18 to 24 hours, significantly less time than the current methodology requiring 24 to 72 hours to complete. The unique media formulation facilitates coliform growth and allows for a shorter incubation time.

Users of the MicroSure test kit significantly reduce the labor material costs associated with current multi-step techniques for enumeration and identification. In addition, detection is simplified by using fluorescence to differentiate the *E. coli* from other coliform colonies.

The MicroSure *E. coli* test kit is available in 10 and 50-test packages providing the necessary media, petri dishes and GN-6 Metricel® membrane. The MicroSure media also is available separately, with 50, 2 mL plastic ampoules per package.

Gelman Sciences, Ann Arbor, MI

Reader Service No. 398

Build Your Own Pneumatic Bulk Handling System with Components from Fluidizer

Over forty years of continuous research and development stands behind the new, 24 page, fully illustrated, Fluidizer Component Catalog. It's your answer to cutting costs and increasing your bulk handling productively and efficiently.

The catalog presents the full Fluidizer line of components, packages and accessories. We're equipped to fill any need even if you require a "customized fit". The user can solve their pneumatic material handling and dust control problems right at plant level.

General Resource Corporation, Hopkins, MN

Reader Service No. 399

BusinessExchange

Services/Products

BusinessExchange

Employment Opportunities

FACULTY POSITION
GENERAL ENVIRONMENTAL HEALTH

Responsibilities include courses primarily in General Environmental Health, also in Industrial Hygiene, Safety and Hazardous Waste Management, Food Safety and Nutrition, advising, cirriculum development, and internship supervision. M.S. in General Environmental or Public Health required; Ph.D. preferred. Five years recent broad based experience in General Environmental Health; appropriate certification; teaching experience; appropriate writing and speaking skills; ability to work with students and people in industry are minimum qualifications. Application deadline; April 1, 1996. Send letter of application and resume to: Dr. Janice Webster, Department Head, College of Applied Health Sciences, Ferris State University, 200 Ferris Drive, Big Rapids, MI 49307-2740; (616) 592-2314.

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Ta explare this appartunity and athers in Product Develapment, QA, and Packoging Engineering, send yaur resume, in canfidence, to Gory Dovis, RD&QA recruitment, Ocean Spray Cranberries, Inc., One Ocean Spray Drive, Lakeville-Middlebora, MA 02739; Fax (508) 946-7267; E-mail gdavis@oceanspray.com.

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ANNOUNCING!

In-Line Business Exchange Advertisements are now available in the Business Exchange Section of *Dairy, Food and Environmental Sanitation.*

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All in-line business exchange ads must be paid in advance. $20.00 per ad minimum charge.

For more information on how your organization may utilize these ads, call Rick McAtee, IAMFES Advertising/Exhibits Manager at (800) 369-6337 or (515) 276-3344.

Dairy, Food and Environmental Sanitation, Vol. 16, No. 3, Page 175

Editorial Corrections to 3-A Sanitary Standards for Multiple–Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20–17 as Amended

Editorial Correction 1

Farmulated By
International Assaciation of Milk, Food and Enviranmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment heretofore or hereafter developed which so differ in specifications or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at any time.

The 3-A Sanitary Standards for Multiple–Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-17 are hereby Editorially Corrected as indicated in the following:

Section H Standards for Acceptability

Sub–paragraph (H2)–Add the following materials to the list of Generic Classes of Plastics:

	Maximum Percent Weight Gain		
	Cleanability Response (Section E Regimen)	Product Treatment (Section F Regimen)	
Generic Classes of Plastics		Solution I	Solution J
Fluorocarbons–CTFE, PTFE, FEP, **PFA** and **ETFE** types	0.05	0.05	0.05

These editorial corrections shall become effective October 1, 1995.

Coming Events

APRIL

·**2-4, South Dakota Environmental Health Association Annual Conference,** Holiday Inn, Mitchell, SD. For further information, contact Rex Van Den Berg at (605) 773-3364.

·**3-5, Missouri Milk, Food & Environmental Health Association 1995 Annual Educational Conference,** in Columbia, MO. For further details, contact Stephen St. Clair, R.S. at (314) 221-1166.

·**9-11, Backflow Prevention Assembly Repair and Maintenance,** in Gainesville, FL. This course is offered by The University of Florida's Center for Training, Research and Education for Environmental Occupations (UF/TREEO). This program provides participants with hands-on experience repairing large diameter models from various manufacturers. For more information, contact Tammy Gumbiner at (904) 392-9570 ext. 129.

·**10-15, The Conference for Food Protection,** at Adam's Mark Hotel in Denver CO. Information may be received from Leon Townsend, CFP Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601 or phone (502) 695-0253.

·**11-13, NAMA Western Convention and Exhibition,** Anaheim Convention Center, Anaheim, CA. Exhibitors of vending machines, food products and services related to the industry. For additional information, contact Larry Eils at (312) 346-0370.

·**11-13, The Association of Water Technologies Spring Conference,** to be held in Anaheim, CA at the Disney Land Hotel. Please contact Mary Beth Belka at (703) 524-0905 or fax (703) 524-2303 for further information.

·**14-16, Annual Meeting of the Milk Industry Foundation Board, the National Cheese Institute Board and the International Ice Cream Association Board,** to discuss current issues. For more information, contact IDFA, 1250 H St., N.W., Suite 900, Washington, D.C. 20005; phone (202) 737-4332; fax (202) 331-7820.

·**14-18, The Fourth Latin American Congress on Food Microbiology & Hygiene,** will be held in Lima, Peru. The program of activities includes plenary speeches by worldwide known specialists, round tables, posters and oral presentations, courses and seminars. For more information, contact Dr. Fernando Quevedo, Honorary President, 11604 Deborah Dr., Potomac, MD 20854; phone (301) 299-9291; fax (301) 299-9448, USA; or in Peru: Santa Luisa 155, Suite 204, San Isidro, Lima 27, fax (5114) 218 317 or (5114) 373 152. President of the Congress: Dr. Alina Ratto, Av. del Ejercito 467 Miraflores, Lima, Peru Tel/fax (5114) 413 939.

·**17, Enhancing the Safety of Pennsylvania Foods: A Team Approach to Seeking Solutions,** a statewide forum on food safety, Hilton & Towers, Harrisburg, PA. The forum is sponsored by Penn State Cooperative Extension of The Pennsylvania State University and is supported by the U.S. Dept. of Agriculture: Cooperative State Research, Education, and Extension Service. For more information, contact Claudine Nuernberger, Forum Coordinator, Veterinary Science Dept., College of Agricultural Sciences, The Pennsylvania State University, 115 William L. Henning Bldg., University Park, PA 16802-3500 or call (814) 863-5846.

17-19, Chemical Leavening, San Diego, CA sponsored by the American Association of Cereal Chemists. For more information, contact the AACC Short Course Dept., 3340 Pilot Knob Rd., St. Paul, MN 55121-2097, USA; phone (612) 454-7250; fax (612) 454-0766; E-mail aacc@scisoc. org.

·**21-24, American Dairy Products Institute Annual Meeting and Technical Conference,** Rosemont, IL. Informative programs have been arranged for these events and a wide range of subjects will be addressed by speakers. Additional information can be obtained by contacting Dr. Warren S. Clark, Jr., Chief Executive Officer, 130 N. Franklin St., Chicago, IL 60606; phone (312) 782-4888 or (312) 782-5455; fax (312) 782-5299.

·**22-23, Safe Food Preparation in Commercial and Institutional Kitchens: Critical Ingredients, co-sponsored by IAMFES.** University of Vermont, Burlington, VT. This food safety program has been designed to provide food service personnel with state-of-the-art knowledge concerning the prevention of foodborne illness in food service facilities. For more information call Lee Mallen (802)656-5812

·**29, Train-the-Trainer for Environmental Occupations,** in Gainesville, FL. This course is offered by The University of Florida's Center for Training, Research and Education for Environmental Occupations (UF/TREEO). This course provides participants with an understanding of the agencies under which they may be regulated: EPA, OSHA, and DOT. For more information, contact Richard Zelonka at (904) 392-9570 ext. 122.

• **29-May 1, Food Protection Workshop,** at the Holiday Inn Downtown-Riverfront, St. Louis, MO. This comprehensive 3-day seminar covers GMP's, HACCP, ISO 9000, food safety issues and regulatory trends, insect and rodent control, cleaning and sanitizing techniques, proper conditions for storage and transportation of food products. For more information, contact Vicki Bodrow, ASI Food Safety Consultants, Inc., 7625 Page Blvd., St. Louis, MO 63133 or call (314) 725-2555 or (800) 477-0778.

• **30-May 3, Experimental Baking and Dough Rheology,** Fargo, ND sponsored by The American Association of Cereal Chemists. For more information, contact the AACC Short Course Dept., 3340 Pilot Knob Rd., St. Paul, MN 55121-2097, USA; phone (612) 454-7250; fax (612) 454-0766; E-mail aacc@ scisoc. org.

MAY

• **1-3, IFT, FDA, AIB Cooperate on Basic Food Labeling Seminar,** in Rosemont, IL, near Chicago. The seminar will include the basics of labeling as well as new requirements resulting from the Nutrition Labeling and Education Act. For additional information or to enroll, contact: AIB, 1213 Bakers Way, Manhattan, KS 66502; or call (913) 537-4750; fax (913) 537-1493.

• **2-4, Symposium on Dairy Microorganisms as Probiotics and Nutrition Week,** Potsdam, Germany. For further information, contact Prof. Dr. Chr Barth, Director, DIFE, Arthur-Scheunert-Allee 114-116, D-1505 Bergholz-Rehbrücke (Germany); telephone +49 33 20088216; fax +49 33 200 85250.

• **6-8, Third International Conference on Residues of Veterinary Drugs in Food,** Veldhoven, The Netherlands. Inquiries to Dr. N. Haagsma, Utrecht University, Faculty of Veterinary Medicine, Dept. of the Science of Food of Animal Origin, section Food Chemistry, P.O. Box 80.175, NL-3508 TD Utrecht, The Netherlands; telephone +31-30-535365/535367; fax +31-30-532365.

• **6-8, Introduction to Food Chemistry,** Chicago, IL sponsored by the American Association of Cereal Chemists. For more information, contact the AACC Short Course Dept., 3340 Pilot Knob Rd., St. Paul, MN 55121-2097, USA; phone (612) 454-7250; fax (612) 454-0766; E-mail aacc@ scisoc. org.

• **7-9, Food Regulations and Their Impact on Additives and Ingredients Seminar,** Radisson Hotel, Newark, NJ. This new seminar presents the impact of regulations in the EC, U.S.A., and some Latin American countries on the usage of food additives and ingredients. For detailed seminar agendas and registration please call (717) 291-5609; fax (717) 295-4538.

• **9-15, Interpack 96,** in Dusseldorf, Germany. Three conference programs, an international symposium and a forum will be held in conjunction with Interpack 96. For further information contact, Dusseldorf Trade Shows, Inc., 150 Michigan Ave., Suite 2920, Chicago, IL 60601; or phone (312) 781-5180; fax (312) 781-5188.

• **12-15, Associates of Clinical Pharmacology 20th Annual Meeting,** in Nashville, Tennessee. The meeting will take place at the Opryland Hotel Convention Center. For more information contact, Dr. Frederic Harwood at (202) 737-8100 or fax (202) 737-8101.

• **13-14, PAMFES Annual Meeting and Conference,** at Nittany Lion Inn, State College, PA. For further information or details contact, Gene Frey at (717) 397-0719.

• **20, Hazardous Waste Regulations for Generators,** in Orlando, FL. This course teaches participants about the latest requirements and the proper procedure for accumulation, storage, transportation, and disposal of hazardous waste. For further information contact, The University of Florida's Center for Training, Research and Education for Environmental Occupations (UF/TREEO), 3900 SW 63rd Blvd., Gainesville, FL 32608-3848; phone (904) 392-9570; fax (904)392-6910.

• **20-24, International Training Course in Food Microbiology and Safety,** River Falls, WI. The course will emphasize systems and methods for the microbiological safety and quality assurance of foods. For further information contact, Dr. Purnendu C. Vasavada, Dept. of Animal and Food Science, Univ. of Wisconsin–River Falls, River Falls, WI 54022 or phone (715) 425-3150; fax (715) 425-3372; Internet: Purnendu. C.Vasavada@uwrf. edu.

• **21-24, Wet Milling,** Champaign, IL sponsored by The American Association of Cereal Chemists. For more information, contact the AACC Short Course Dept., 3340 Pilot Knob Rd., St. Paul, MN 55121-2097, USA; phone (612) 454-7250; fax (612) 454-0766; E-mail aacc@ scisoc. org.

• **27-29, Principles of Cereal Science and Technology,** Chicago, IL sponsored by The American Association of Cereal Chemists. For more information, contact the AACC Short Course Dept., 3340 Pilot Knob Rd., St. Paul, MN 55121-2097, USA; phone (612) 454-7250; fax (612) 454-0766; E-mail aacc@ scisoc. org.

• **27-31, Fourth World Congress on Environmental Health,** will take place in Aberdeen, Scotland. Subjects to be covered during the Congress include Pollution Control; Food Safety; Occupational Health and Safety; Waste Management; Housing; Water; Environmental Protection; and Communicable Disease Control. For further information, call (01896) 754751; fax (01896) 757003.

JUNE

• **2-4, IDDA's 32nd Annual Seminar & Expo; Dairy-Deli-Bake 96,** held at the Minneapolis Convention Center in Minneapolis, MN. For further information, contact IDDA, P.O. Box 5528, Madison, WI 53705-0528; phone (608) 238-7908; fax (608) 238-6330.

·4-6, **4th ASEPT International Conference, Sécurité Alimentaire 96/Food Safety 96, co-sponsored by IAMFES**. Laval, France, with the ASEPT/EHEDG Symposium 1996. Contact AMGAR-ASEPT-BP49-53020 LAVAL CEDEX-France or call 33-16 43 49 22 22; fax 33-16 43 53 36 53.

·9-11, **AFFI's 13th Annual Distribution and Logistics Conference,** in Chicago, IL. The conference will host leading experts in distribution and logistics, give facility tours and provide an opportunity for an industry exchange of ideas on transportation issues. For more information, contact AFFI at (703) 821-0770.

·10-12, **The 18th Mycotoxin Workshop,** organized by the Institute of Mycrobiology and Toxicology, and held in Kulmbach, Germany. Further information available by phone +49-9221-803-221; or fax +49-9221-803-331.

·11-12, **Cross-Connection Control: Survey & Inspection Course,** offered by The University of Florida's Center for Training, Research & Education for Environmental Occupations (UF/TREEO). Participants learn to identify appropriate methods to prevent backflows for isolation and containment. For further information, contact TREEO, 3900 SW 63rd Blvd., Gainesville, FL 32608-3848; phone (904) 392-9570, ext. 112; fax (904) 392-6910.

·25-26, **International Symposium on Industrial Applications of Bioluminescence in Microbiology,** at the Beaumont Conference Center. The symposium will feature experts on the application of ATP bioluminescence technology from a range of industrial sectors. These include brewing, chemicals, dairy, food, meat, personal care products, petroleum, pharmaceuticals, soft drinks and water. For further information, contact Dr. Bill Simpson, Cara Technology Limited at int+44(0)1342 836061; or fax +44(0) 1342 836 0161.

·30-July 3, **International Association of Milk, Food and Environmental Sanitarians, Inc. 83rd Annual Meeting,** in Seattle, WA. For additional information, contact Julie Cattanach at (800) 369-6337; fax (515) 276-8655.

JULY

·9-19, **World's Largest International Culinary Event Scheduled to Take Place in the United States.** World Association of Cooks Societies (WACS) has scheduled the World Cooks Tour for Hunger and Culinary Arts Festival. The event will begin at Walt Disney World Resort with a five-day international culinary competition, dubbed the World Culinary Arts Festival. For further information, contact Davin Light, Marketing A La Carte at (407) 539-1459 or Keith Keogh, World President, World Assn. of Cooks Societies at (407) 560-2054.

·12-19, **Rapid Methods and Automation in Microbiology: International Workshop XVI,** Kansas State University, Manhattan, KS. A mini-symposium will occur on July 12-13. Contact Dr. Daniel Y. C. Fung, Workshop Director for further information, telephone (913) 532-5654; fax (913) 532-5681.

SEPTEMBER

·2-3, **Symposium on Years in the Dairy Industry,** Copenhagen, Denmark. The main objective of this Symposium is to provide a comprehensive view of the role of yeasts, both positive and negative aspects, in the dairy industry. For registration information, contact Prof. M. Jakobsen, The Royal Veterinary and Agricultural University, Dept. of Dairy and Food Science, Rolighedsvei 30, DK-1958 Frederiksberg C Denmark; telephone +45 35 28 32 15; fax +45 35 28 32 14.

·10-14, **The 11th International Packaging & Food Processing Machinery and Materials Exhibition,** Jakarta, Indonesia. For further information, telephone +44 (0)171 486 1951; fax +44 (0)171 486 8773 or +44 (0)171 413 8222.

OCTOBER

·2-4, **International Conference on New Developments in Refrigeration for Food Safety and Quality Call for Papers, co-sponsored by IAMFES.** Lexington, KY. Conference papers are sought from all areas of food refrigeration. The purpose of this conference is to provide an opportunity for food technologists, food processors, and refrigeration engineers from around the world to exchange current information on the role of refrigeration in the food chain. For further information, contact Food Refrigeration Conference, Univ. of Kentucky, 128 Agriculture Engineering Bldg., Lexington, KY 40546-0276; phone (606) 257-3000 ext. 111; fax (606) 257-5671; e-mail wmurphy@bae.uky.edu.

·16-18, **16th-Food Microbiology Symposium and Workshop,** Univ. of Wisconsin, River Falls, WI. The workshop is designed to provide practical demonstrations and discussion of various tests and instruments available for rapid detection, isolation and characterization of foodborne pathogens and toxins as well as prediction of shelf-life and checking hygiene and sanitation in food processing facilities. For further information, contact Dr. Purnendu C. Vasavada, Dept. of Animal and Food Science, Univ. of Wisconsin-River Falls, River Falls, WI 54022 or phone (715) 425-3150; fax (715) 425-3785; internet: Purnendu.C.Vasavada@uwrf.edu.

·31-Nov. 2, **NAMA National Convention and Exhibition,** Cervantes Convention Center, St. Louis, MO. Exhibitors of vending machines, food products and services related to the industry. For additional information, contact Larry Eils at (312) 346-0370.

Preliminary Program

of the 83rd IAMFES Annual Meeting

Monday Morning—July 1, 1996

Travellers Advisory—Don't Leave Home Without It!

8:30 Medical Advice and General Food Safety Information for Travellers—**P. SNYDER**, Hospitality Institute of Technology & Management, St. Paul, MN

9:00 Food Safety for Cruises—**D. TURNER**, CDC, Miami, FL

9:30 New Findings in Washroom Microbiology—**C. GERBA**, University of Arizona, Tucson, AZ

10:00 Break

10:20 How Safe is Airline Food—**J. SIMPSON**, Germantown, TN

10:50 Ethnic Food Safety—**G. SWICK**, Marion County General Health District, Marion, OH

11:20 The Safety of Mysterious Ethnic Foods—**J. GANS**, Santa Clara Department of Environmental Health, San Jose, CA

Technical Session—General Food Microbiology

8:30 Survival of *Yersinia enterocolitica* during Fermentation and Storage of Yogurt—**R. WILLIAMS**, P. Bodnaruk, and D. Golden, University of Tennessee, Knoxville, TN

8:45 Efficacy of Chlorine and Heat Treatment in Killing *Salmonella stanley* on Alfalfa Seeds, and Growth of the Pathogen during Sprouting and Storage—**C. JAQUETTE**, L. Beuchat, and B. Mahon, University of Georgia, Griffin, GA

9:00 Inhibition of *Listeria monocytogenes*, *Staphylococcus aureus*, and *Bacillus cereus* by the Hop ß Acid Colupulone and Its Derivative, Hexahydrocolupulone—**J. MEYER**, N. Faith, J. Schoeni, J. Luchansky, A. Wong, J. Cerveny, and M. Barney, Oscar Mayer Foods Corporation, Milwaukee, WI

9:15 A Rapid Dot-Blot Immunoassay for the Detection of *Salmonella enteritidis* in Eggs, Poultry and Other Foods—**M. YOSHIMASU** and J. Zawistowski, University of Manitoba, Winnipeg, Manitoba, Canada

9:30 Antimicrobial Properties of Linear Furanocoumarins—**J. ULATE-RODRIGUEZ**, H. Schafer, E. Zottola, and P. Davidson, University of Minnesota, St. Paul, MN

9:45 The Influence of Divalent Cations and Chelators on Aflatoxin B_1 Degradation by *Flavobacterium aurantiacum* —**D. D'SOUZA** and R. Brackett, University of Georgia, Griffin, GA

10:00 Break

10:20 Determination of Nisin Activity Using an HPLC Method—**A. LARSSON** and E. Zottola, University of Minnesota, St. Paul, MN

10:35 Comparison of Methods for Coliform and *Enterobacteriaceae* Counts Among Naturally Contaminated Food and Environmental Samples—**P. MACH** and K. Lindberg, 3M Company, St. Paul, MN

10:50 Evidence for the Occurrence of Plant Specific *Bacillus cereus* in the Dairy Industry—**H. SCHRAFT**, M. Steele, J. Odumeru, W. McNab, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

11:05 Application of Generalized Evaluation Procedure for Comparing Isolation Methodologies for Foodborne *Listeria monocytogenes*—**T. HITCHINS**, Food and Drug Administration, Washington, D.C.

11:20 The Antibacterial Effect of Tea and Tea Concentrates on *Clostridium botulinum*—**P. MCCLURE** and M. Cirigliano, Unilever Research, Sharnbrook, England

Planning for the 21st Century on the Dairy Farm

8:30 Large Farm Design from the Owner/Operator Perspective—**D. BANSEN**, Dairy Gold Cooperative, Portland, OR

8:55 Large Herd Health Management—**T. FURMAN**, Dairy Services of Arizona, Tempe, AZ

9:20 On Farm Concentration of Milk—**J. OGDEN**, New Mexico Department of Agriculture, Albuquerque, NM

9:45 Proper Design of Milking Equipment—**C. SLOANE**, Germania Equipment,

10:10 Break

10:30 Western Milk Hauling Concepts—**A. SAYLOR**, Food and Drug Administration, Washington, D.C.

10:55 ECO-Agriculture–Sustaining the Dairy Cow–**J. LOHMAN**, Blue Diamond Corporation

11:20 Electronic Communication on the Dairy Farm–**R. CADY**, Washington State University, Puyallup, WA

11:45 Farm Uses of Computer Technology–**C. JAMIESON**, Valley Agriculture Software, Tulare, CA

Global Perspectives on *E. coli* O157:H7 and Other Serotypes (Sponsored by ILSI)

8:30 VTEC Overview–**M. NEILL**, Brown University and Memorial Hospital of Rhode Island, Pawtucket, RI

8:40 Australian Views–**P. DESMARCHELIER**, CSIRO, Australia

9:10 Canadian Views–**J. WILSON**, Health Canada and University of Guelph, Guelph, Ontario, Canada

9:35 European Views–**H. KARCH**, University of Wurzburg, Wurzburg, Germany

10:05 Break

10:25 South American Views–**E. LOPEZ**, Hospital de Ninos, Buenos Aires, Argentina

10:55 U.K. Views–**N. SIMMONS**, Guys Hospital, London, United Kingdom

11:25 U.S. Views–**P. TARR**, Children's Hospital and Medical Center, Seattle, WA

11:55 Round Table

Posters–General Microbiology Pathogens

- Numerical Methods to Determine Suitability of *Listeria monocytogenes* Ribotype Patterns for Normalization and Matching–**B. TENGE**, K. Jinneman, N. Dang, F. Fry, W. Hill, and M. Wekell, U.S. Food and Drug Administration, Bothell, WA
- Differences in ELISA Reactions of Monoclonal Antibodies EM-6E11 (Genus-Specific) and EM-7G1 (Species-Specific) Against Live and Heat Killed Cells of *Listeria* and *Listeria monocytogenes*–**R. NANNAPANENI**, R. Story, A. Bhunia, and M. Johnson, University of Arkansas, Fayetteville, AR
- Evaluation of Five Methods for Detection of *Listeria* Species in Market Mussel–**D. JEONG**, C. Chung, D. Gu, and E. Nam, Kosin University, Pusan, Korea
- Antimicrobial Agents Incorporated in Edible Films to Control Microbial Growth–**J. GRABER**, M. Schnepf, S. Sumner, S. Cuppett, and C. Weller, University of Nebraska, Lincoln, NE
- Influence of Temperature and Preincubation Temperature on Survival of *Listeria monocytogenes* at pH 4.8–**M. GAY**, K. Davey, and O. Cerf, ASEPT, France
- Significance of Preincubation Temperature and Inoculum Size on Growth of *Listeria monocytogenes*–**M. GAY**, K. Davey, and O. Cerf, ASEPT, France
- Thermal Destruction of *Listeria innocua* in Solid Muscle Beef or Chicken–**J. GOFF**, M. Christie, R. Story, and M. Johnson, University of Arkansas, Fayetteville, AR
- Effect of Some Additives Used in Meat Products on Behavior of *Listeria monocytogenes*–**R. RAYBAUDI** and A. Martinez, Universidad Central de Venezuela, Caracas, Venezuela
- Evaluation of Rapid DNA Extraction Methods for Detection of *Listeria monocytogenes* in Dairy Products Using the TaqMan™ Sequence Detection System–**T. COX**, R. Behari, S. Flood, C. Yamashiro, C. Paszko-Kolva, and R. Cano, California Polytechnic State University, San Luis Obispo, CA
- Survey on *Listeria* spp. Contamination of Korean Market Pork–**C. CHUNG**, D. Gu, and D. Jeong, Kon-Kuk University, Seoul, Korea
- Predictive Modeling of *Listeria* spp. Inactivation in Whole Bovine Milk in a High-Temperature, Short-Time Pasteurizer–**R. MCKELLAR**, P. Punidadas, and S. Liou, Centre for Food and Animal Research, Ottawa, Ontario, Canada
- Survival and Growth of *Listeria monocytogenes* Scott A in Beef and Pork Stored at Different Temperatures–**A. CASTILLO**, N. Martinez-Gonzales, and M. Rodriguez-Garcia, Texas A & M University, College Station, TX
- Disinfection Efficacy Against Pure-Culture and Mixed-Population Biofilms of *Listeria innocua* and *Pseudomonas aeruginosa* on Stainless Steel, Teflon® and Rubber–**F. BOURION**, and O. Cerf, ASEPT, France
- Effect of Temperature and pH on the Growth of *Listeria monocytogenes* on Pork Packaged in CO_2–**P. BODNARUK** and B. Shay, University of Tennessee, Knoxville, TN
- Microbial Competition: Suppression of *Listeria monocytogenes* Growth by *Pseudomonas fluorescens*–**L. BAGI** and R. Buchanan, USDA, ARS, Philadelphia, PA
- Evaluation of a New Rapid Screening Test for *Listeria*–**J. GEBLER**, Murray Goulburn Co-Operative Company, Limited, Victoria, Australia
- Evaluation and Application of *Listeria monocytogenes* Specific Antibodies–**P. Schubert**, K. Kramer, and A. Bubert, MERCK KGaA, Darmstadt, Germany
- Petrifilm™ *Listeria* Count Plate: A Highly Selective Method for the Quantitative Recovery of *Listeria* from Environmental Samples–**G. SANDBERG**, M. Tochacek, and R. Young, 3M Company, St. Paul, MN

- Time to Toxin Production by Nonproteolytic *Clostridium botulinum* as Affected by Environmental Factors–**P. ELLIOTT** and D. Schaffner, Campbell Soup Company, Camden, NJ
- Development of a Twenty-Four Hour Method for the Detection of *Bacillus cereus* Spores in Raw Milk–**J. QUINLAN** and P. Foegeding, North Carolina State University, Raleigh, NC
- Development of a PCR Assay for the Detection of *Bacillus cereus*–**J. CZAJKA** and C. Batt, Cornell University, Ithaca, NY
- Effect of Modified Atmosphere and NaCl Treatment on the Growth of *Yersinia enterocolitica* on Minimally Processed Broccoli Stored at 4°C–**P. BODNARUK** and A. Draughon, University of Tennessee, Knoxville, TN
- Use of a Single Procedure for Selective Enrichment Isolation and Identification of Plasmid-Bearing Virulent Serotypes of *Yersinia enterocolitica* from Ground Pork–**S. BHADURI** and A. Pickard, USDA, ARS, ERRC, Philadelphia, PA
- Enhancement of Recovery by Removal of Blood from Standard *Campylobacter* Culture Protocol–**D. BARK**, C. Abeyta, and B. Jay, U.S. Food and Drug Administration, Bothell, WA
- Multiplex PCR for the Identification and Differentiation of *Campylobacter coli* and *C. jejuni*–**K. HARMON**, Iowa State University, Ames, IA
- Comparison of Selective Media for Primary Isolation of *Campylobacter*s Using Numerical and Graphical Tools to Indicate Optimal Media–**B. TENGE**, C. Abeyta, Jr., J. Hunt, P. Trost, D. Bark, C. Kaysner, and M. Wekell, U.S. Food and Drug Administration, Bothell, WA
- Rapid Detection of *Campylobacter jejuni* in Chicken Products by a Nested PCR–**D. WINTERS**, A. O'Leary, and M. Slavik, University of Arkansas, Fayetteville, AR
- The Measured Heat-Resistance of Non-Proteolytic *Clostridium botulinum* Spores is Increased by Endogenous Lysozyme Activity of Vegetable Extracts–**S. STRINGER** and M. Peck, Institute of Food Research, Norwich, United Kingdom
- Microbiological Quality of Cream-Fillings from Doughnuts Sold at Bulawayo, a Zimbabwean City–**R. OKAGBUE,** Applied Biology and Biochemistry, Byo, Zimbabwe
- Cross Protection by Heat and Cold Shock to Lethal Temperatures in *Clostridium perfringens*–**J. LIMÓN**, N. Heredia, and J. Garcia-Alvarado, UANL, Mexico
- Effect of Heat Shock on Sporulation, Protein Synthesis and Enterotoxin Production of *Clostridium perfringens*–**N. HEREDIA**, J. Garcia-Alvarado, and R. Labbe, UANL, Mexico

Monday Afternoon–July 1, 1996

Food Safety Education

1:30 Using a Computer-Based CD-ROM Tutorial to Strengthen Understanding of Good Sanitary Practices in Retail Food Stores–**R. GRAVANI**, K. Williams, D. Berry, S. Kern, and J. Tauer, Cornell University, Ithaca, NY

1:45 Different Ways to Get Food Safety Information to Clientele Groups–**S. BARNARD**, S. Knabel, and T. Dimick, The Pennsylvania State University, University Park, PA

2:00 Codex Alimentarius: Its Expanded Importance in Food Safety and International Trade–**H. WEHR**, TAS, Inc., Washington, D.C.

2:15 The Management and Technology of Retail Food System Food Safety–**O. SNYDER, JR.**, Hospitality Institute of Technology and Management, St. Paul, MN

2:30 ISO 9000/HACCP/Food Hygiene Practices: Food Safety and Quality for the Food and Beverage Industry–**R. DOUGHERTY**, NSF International, Ann Arbor, MI

2:45 Food Safety Education for Teens–**M. LEE** and B. Lacroix, Ryerson Polytechnic University, Toronto, Ontario, Canada

Technical Session–Sanitation

1:30 A Novel Enzyme-Linked Antibiotic Assay for Rapid Detection of Gram-Negative Bacteria–**V. LEWANDOWSKI**, T. Bridgeman, E. Zottola, and A. Olstein, University of Minnesota, St. Paul, MN

1:45 Quenching and Enhancement Effect on the ATP Bioluminescence Signal Using Different ATP Extractans and Sanitizers–**M. VELAZQUEZ**, H. Chan, A. Kirumira, and J. Feirtag, University of Minnesota, St. Paul, MN

2:00 Characterization of *Alicyclobacillus* Species Isolated from Fruit Juices and Canned Tomatoes–**I. WALLS**, V. Scott, and J. Webster, National Food Processors Association, Washington, D.C.

2:15 Chemical, Microbiological, and Physical Quality of Packaged Ice in Florida–**R. SCHMIDT** and G. Rodrick, University of Florida, Gainesville, FL

2:30 Assessment of the Microbiological Quality of Ready-to-Use Vegetables for Healthcare Food Service in Ontario, Canada–**J. Odumeru**, S. Mitchell, D. Alves, J. Lynch, A. Yee, S. Wang, S. Styliadis, and J. Farber, Ontario Ministry of Agriculture, Guelph, Ontario, Canada

2:45 The Effect of Lactic Acid Sanitizer Treatment on *Listeria monocytogenes* L-Forms Biofilms on Food and Clinical Contact Surfaces–**S. JASSIM**, A. Hibma, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

Technical Session—Meat & Poultry Safety

1:30 Ecology of *Salmonella*, *Campylobacter* and *Listeria* in Chicken Production—**S. BAILEY**, N. Stern, and N. Cox, USDA-ARS-RRC-PMSRU, Athens, GA

1:45 Evaluation of a Steam Pasteurization Process in a Commercial Beef Processing Facility—**A. NUTSCH**, R. Phebus, D. Schafer, M. Riemann, R. Wilson, and J. Leising, Kansas State University, Manhattan, KS

2:00 Characterization of *Lactococcus* spp. Isolated from Cooked Modified Atmosphere Packaged Poultry Meat—**R. BARAKAT** and L. Harris, University of Guelph, Guelph, Ontario, Canada

2:15 The Optimization of a Lactic Acid Treatment for the Improvement of the Microbiological Quality and Safety of Poultry Carcasses—**D. BAUTISTA**, N. Sylvester, S. Barbut, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

2:30 Level of *Campylobacter* on the Farm Associated with Levels on Processed Carcassess—**N. STERN**, USDA-ARS-RRC-PMSRU, Athens, GA

2:45 An Effective Procedure for the Detection of *Campylobacter* spp. on Broiler Carcasses by Rinsing Directly with Enrichment Broth—**M. MUSGROVE**, N. Stern, and R. Johnson, USDA-ARS-RRC-PMSRU, Athens, GA

3:00 Break

3:20 Comparison of *In Ovo* Treatments for Reduction of *Salmonella* Colonization in Broiler Chickens—**J. LINE**, N. Stern, S. Bailey, and N. Cox, USDA-ARS-RRC-PMSRU, Athens, GA

3:35 Immobilization of Nisin in an Edible Gel for Reducing Bacteria on the Surface of Beef and in Ground Beef—**C. NETTLES-CUTTER** and G. Siragusa, USDA-ARS, Clay Center, NE

3:50 Statistical Evaluation of a Poultry Process for the Determination of Overall Quality Using Conventional Microbiology and ATP Bioluminescence—**D. BAUTISTA**, S. Barbut, J. Vaillancourt, L. Harris, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

4:05 Environmental Analysis Methods Utilized to Determine the Contamination Source in a Sausage Processing Plant—**S. SHUMAKER** and J. Feirtag, University of Minnesota, St. Paul, MN

4:20 Comparison of F+RNA Coliphage and Coliform Levels as Fecal Contamination Indicators in a Pork Slaughterhouse Environment—**A. MILLER** and B. Eblen, USDA, ARS, ERRC, Philadelphia, PA

4:35 Quantity and Distribution of Airborne Microorganisms in Poultry Processing Environments—**R. LINTON**, K. Lutgring, M. Peugh, A. Heber, and N. Zimmerman, Purdue University, West Lafayette, IN

Sensory Attributes of Dairy Foods

1:30 Introduction to Sensory Principles—**J. BRUHN**, University of California-Davis, Davis, CA

1:50 Milk Sensory Attributes—**S. BARNARD**, Penn State University, University Park, PA; **E. SPEAR**, Dairy & Food Industry Consultant, Corpus Christie, TX; **M. SMUKOWSKI**, University of Wisconsin, Madison, WI

2:05 Cheddar Cheese Sensory Attributes—**M. BATES**, Washington State University, Pullman, WA; **T. LENSMIRE**, LOL, Lake to Lake, Denmark, WI; **T. DULMAGE**, University of Wisconsin, Madison, WI

2:20 Yogurt Sensory Attributes—**P. JELEN**, University of Alberta, Edmonton, Alberta, Canada

2:35 Ice Cream Sensory Attributes—**R. MARSHALL**, University of Missouri, Columbia, MO; **T. GOTTEMOLLER**, Archer Daniel Midland, Decatur, IL

2:50 Cottage Cheese Sensory Attributes—**R. BRADLEY**, University of Wisconsin, Madison, WI; **T. GRUETZMACHER**, Dean Foods Co., Rockford, IL

3:05 Break

3:25 Sensory Evaluation of the Products

4:50 Open Discussion

Controlling *Escherichia coli* O157:H7and Friends in Meat

1:30 Industrial Perspective—**J. WILLIAMS**, American Meat Institute, Arlington, VA

2:00 Farm Prevalence of EHEC and Production Intervention Strategies—**R. JOHNSON**, Agriculture Canada

2:30 Effect of Carcass Decontamination Procedures on Microflora—**W. DORSA**, USDA, ARS, Clay Center, NE

3:00 Break

3:20 Intervention Strategies in Primary Processing—New Zealand Experience—**R. COOK**, Ministry of Agriculture, New Zealand

3:50 Physiological Control of EHEC—**T. ROSS**, University of Tasmania, Australia

4:20 Control of *Escherichia coli* O157:H7 in Dry, Fermented Sausage—**J. LUCHANSKY**, Food Research Laboratory, Madison, WI

Posters—Methods/Sanitation

- Assessing Microbial Hazards from Chilled/Frozen Foods Exposed to Refrigeration Failure—**R. LACHICA** and R. Worfel, U.S. Army, Natick, MA

- Microbial Quality of Vacuum Packaged Cook/Chill Foods Prepared in a Hospital–**B. LANGLOIS**, K. Akers, S. Bastin, and J. O'Leary, University of Kentucky, Lexington, KY
- Automated Ribotyping-Based Assessment of Diversity in Bovine Mastitis-Causing Microorganisms–**J. BRUCE**, A. Rivas, C. Batt, M. Wiedmann, C. McDowell, R. Gonzalez, and E. Cole, DuPont Experimental Station, Wilmington, DE
- A Comparison of Various Phenotypic and Genotypic Methods for Typing *Enterobacter sakazakii*–**M. NAZAROWEC-WHITE** and J. Farber, Health Canada, Ottawa, Ontario, Canada
- Comparative Recovery of Coliforms from Meat and Milk Using m-ColiBlue24 and Direct Plating–**J. DICKSON**, J. Erdmann, and M. Grant, Iowa State University, Ames, IA
- Rapid Coliform Counts of Raw Milk–**P. TUITEMWONG** and K. Tuitemwong, KMIT Thonburi, Thailand
- Microbiological and Sensory Quality of Milk–**C. HACKNEY**, S. Duncan, H. Williams, and W. Hartman, Virginia Polytechnic Institute and State University, Blacksburg, VA
- Fermented Milk Containing *Bifidobacterium longum* Potentiates Immune Respose of the Host–**C. FERREIRA**, M. Moulin, and J. Mezencio, Universidade Federal de Vicosa, Vicosa, Brazil
- Survival and Growth of *Aeromonas hydrophila* and *Listeria monocytogenes* on Raw Cabbage and Celery–**R. DIAZ**, R. Raybaudi, and A. Martinez, Universidad Central de Venezuela, Caracas, Venezuela
- Isolation and Characterization of Lactic Acid Bacteria from Bean Sprouts which Inhibit *Listeria monocytogenes*–**J. FARBER**, Y. Cai, and L. Ng, Health Canada, Ottawa, Ontario Canada
- Occurrence of *Listeria monocytogenes*, *Salmonella* spp., *Escherichia coli* and *Escherichia coli* O157:H7 in Vegetable Salads–**C. LIN**, S. Fernando, T. Huang, and C. Wei, University of Florida, Gainesville, FL
- Growth of *Listeria monocytogenes* on Minimally Processed Broccoli with Antimicrobial Treatment–**R. SMILEY**, D. Grindstead, J. Mount and A. Draughon, University of Tennessee, Knoxville, TN
- Application of ATP-Bioluminescence for Cleaning Validation of Food Processing Equipment–**E. EHRENFELD**, J. Scheld, S. Miller, and C. Carpenter, IDEXX Laboratories, Westbrook, ME
- Application of a Rapid ATP-Bioluminescence Method for Assessing Cleanliness of Milking Equipment–**K. STRUTZ**, C. Fong, and P. Vasavada, University of Wisconsin-River Falls, River Falls, WI
- Monitoring Cleanliness of Food Contact Surfaces Using Rapid ATP-Bioluminescence Method–**C. FOONG** and P. Vasavada, University of Wisconsin-River Falls, River Falls, WI
- A New Medium for the Quantification of Bacteria in Food After 24 Hours–**D. TOWNSEND**, A. Croteau, and A. Naqui, IDEXX Laboratories, Westbrook, ME
- Real Time Monitoring of Lactic Fermentations Using Impedance Microbiology–**J. COOMBS**, A. Marshall, A. Pridmore, and P. Silley, Bioscience International Inc., Rockville, MD
- The Efficacy of Washing and Sanitizing Animal Hauling Trucks–**K. RAJKOWSKI**, USDA, ARS, ERRC, Philadelphia, PA
- Enhanced Detection of Pathogens in Meat Products Using Automated Malthus Conductance Assays–**D. GIBSON**, BIODON, Aberdeen, United Kingdom
- Genetic Characterization and Identification of Lactic Acid Bacteria Important to the Food Industry Using Automated Ribotyping–**A. MCCARDELL**, J. Bruce, E. Cole, and M. Corby, DuPont Experimental Station, Wilmington, DE
- Biopreservation of Vacuum Packaged Coarse Ground Beef by *Leuconostoc gelidum* UAL 187–**R. WOROBO**, G. Greer, M. Stiles, and L. McMullen, University of Alberta, Edmonton, Alberta, Canada
- Oregon Consumers' Use of U.S.D.A. Safe Handling Instructions Label on Meats and Poultry and Their Knowledge of Foodborne Illness Risks–**M. WOODBURN** and C. Raab, Oregon State University, Corvallis, OR
- An Evaluation of the Efficacy of Two Beef Carcass Decontamination Methods–**S. KOCHEVAR**, J. Sofos, and G. Smith, Colorado State University, Fort Collins, CO
- Isolation of *Hafnia alvei* from Commercially-Prepared, Chub-Packed Ground Beef, and Its Importance in Meat Spoilage–**S. GAMAGE**, S. Ingham, and J. Luchansky, Food Research Institute, Madison, WI
- Microbiology of Aquacultured Striped Bass Grown in Earthen Ponds, Flow-Through Tanks, and Recirculating Tanks–**P. NEDOLUHA** and D. Westhoff, University of Maryland, College Park, MD
- Growth of Psychrotrophic Pathogens on Refrigerated Aquacultured Rainbow Trout and Channel Catfish Filets–**C. FERNANDES**, T. Thomas, and G. Flick, Virginia Polytechnic Institute and State University, Blacksburg, VA
- Effect of Organic Acids on the Microflora of Channel Catfish (*Ictalurus punctatus*)–**C. FERNANDES**, J. Cohen, T. Thomas, and G. Flick, Virginia Polytechnic Institute and State University, Blacksburg, VA
- Comparison of Quality in Aquacultured Fresh Catfish Filets II: Pathogens *Escherichia coli* O157:H7, *Campylobacter*, *Vibrio*, *Plesiomonas* and *Klebsiella*–**C. FERNANDES**, G. Flick, J. Silva, and T. McCaskey, Virginia Polytechnic Institute and State University, Blacksburg, VA

- Microbial Evaluation of Salmon Roe Processed in Alaska–**B. HIMELBLOOM** and C. Crapo, University of Alaska, Kodiak, AK
- Biogenic Amines in Fish Sauces–**Y. HUANG**, M. Zheng, H. Amos, K. Gates, and M. Froetschel, University of Georgia, Athens, GA
- Quality of Surimi Made from Tilapia and Carp–**Y. HUANG**, H. Abdel-Aal, and A. Awad, University of Georgia, Athens, GA

Tuesday Morning–July 2, 1996

Use of Indicator Microorganisms in Food Safety

8:30 Microbial Indicators: Purposes and Uses –**L. JAYKUS**, North Carolina State University, Raleigh, NC

8:55 Use of Microbial Indicators–Regulatory Perspective–

9:20 Use of Microbial Indicators–Industry Perspective–**D. ZINK**, Nestle USA, Inc., Glendale, CA

9:45 Value of Microbial Indicators in Environmental Monitoring–**J. FRANK**, University of Georgia, Athens, GA

10:10 Break

10:30 Microbial Indicators and Foodborne Pathogens–*Salmonella*–**S. BAILEY**, USDA-ARS-RRC, Athens, GA

10:55 Microbial Indicators and Foodborne Pathogens–*Escherichia coli* O157:H7 –**R. NICKELSON**, Silliker Laboratories Group, Homewood, IL

11:20 Bacteriophage Indicators of Enteric Pathogens in Food–**M. SOBSEY**, University of North Carolina at Chapel Hill, Chapel Hill, NC

Technical Session–*Escherichia coli/Listeria*

8:30 Acid and Heat Tolerance of Acid Habituated *Escherichia coli* O157:H7–**H. THIPPAREDDI**, D. Retzlaff, R. Phebus, and D. Fung, Kansas State University, Manhattan, KS

8:45 Changes in Heat-Resistance of *Escherichia coli* O157:H7 Following Heat Shock and Acid-Shock–**N. WILLIAMS** and S. Ingham, University of Wisconsin-Madison, Madison, WI

9:00 Influence of a_w and Temperature on Viability of Unheated and Heat-Stressed *Escherichia coli* O157:H7 in Salami–**R. CLAVERO** and L. Beuchat, University of Georgia, Griffin, GA

9:15 Isolation and Characterization of Substances Inhibitory to *Escherichia coli* O157:H7 and *Listeria monocytogenes*–**T. BRIDGEMAN** and E. Zottola, University of Minnesota, St. Paul, MN

9:30 Outer Membrane Proteins and Adherence of Iron-Stressed Enterohemorrhagic *Escherichia coli* to HEp-2 Cells–**T. SCHWACH** and E. Zottola, University of Minnesota, St. Paul, MN

9:45 Survival of *Escherichia coli* O157:H7 during Fermentation of Apple Cider–**J. SEMANCHEK** and D. Golden, University of Tennessee, Knoxville, TN

10:00 Break

10:20 Sensitivity of *Escherichia coli* O157:H7 Isolates to Ionizing Radiation–**A. CHAN**, J. Dickson, and D. Olson, Iowa State University, Ames, IA

10:35 Application of a Fluorogenic 5' Nuclease PCR Assay for Detection of *Listeria monocytogenes* in Raw Milk–**C. BATT**, D. Norton, B. Miller, R. Behari, S. Flood, V. Lunge, and P. Witham, Cornell University, Ithaca, NY

10:50 Development of a Bacteriophage–Mediated ATP Bioluminescent Detection System for *Listeria monocytogenes*–**L. MCINTYRE**, S. Jassim, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

11:05 Use of Nisin to Control *Listeria monocytogenes* in Queso Fresco Cheese–**A. DEGNAN**, N. Farkye, M. Johnson, and J. Luchansky, Food Research Institute, Madison, WI

11:20 Response of *Escherichia coli* O157:H7 in the Presence of Sodium Lactate during Refrigerated Storage with and without Temperature Abuse–**D. CONNER** and O. Oyarzabal, Auburn University, Auburn, AL

Increasing Dairy Product Shelf Life

8:30 Computerization in Pasteurization Controls–**R. COFFMAN**, Masterleo and Associates, Worthington, OH

9:00 Round Table Discussion on Increasing Shelf-Life from 16 to 21 Days–**J. DELANEY**, Prairie Farms Dairy Inc., Carlinville, IL; **R. FUQUA**, Quality Chekd Dairy Products Association, Naperville, IL; **T. BOUFFORD**, Ecolab Research Center, St. Paul, MN; **V. MILLS**, Evergreen Packaging, Cedar Rapids, IA

10:00 Break

10:20 Plant Design and Equipment for Aseptic and Near Aseptic Processing of Milk–**D. HENYON**, Elopak Inc., New Hudson, MI; **C. REINHART**, Waukesha Cherry Burrell, Louisville, KY; **R. SIMPSON**, APV Crepaco, Rosemont, IL

11:20 Regulatory Concerns of Aseptic Processing–**S. SIMS**, Food and Drug Administration, Washington, D.C.

Emerging Issues in Communicating Food Safety Risks

8:30 Consumer Perceptions of Food Safety Issues: What do We Know and How are We Using That Information in Developing Risk Communication Strategies?–**R. GRAVANI**, Cornell University, Ithaca, NY

9:00 Changing Newspaper Coverage of Microbial Food Safety Risks in North America and Implications for Risk Communication–**D. POWELL**, University of Guelph, Guelph, Ontario, Canada

9:30 Effect of Professional and Media Warnings about the Hazards of *Escherichia coli* O157:H7 Prior to and After the 1993 Jack-in-the-Box Outbreak–**L. HARRIS**, University of California at Davis, Davis, CA

10:00 Break

10:20 Communicating to the Public About New Technologies–**C. BRUHN**, University of California-Davis, Davis, CA

10:50 Overview of Existing Food Safety Communication and Education Programs–**C. ROBERTS**, U.S. Department of Agriculture/Food & Drug Administration, Beltsville, MD

11:20 Designing Food Safety and Nutrition Information, Educational Materials and Campaigns: A Comparative Review of Four Campaigns–**C. SCHIFFMAN**, Food and Drug Administration, Washington, D.C.

Posters–Escherichia coli/Listeria

- A Definitive and Rapid Method for Identifying Atypical *Salmonella* from Selective Agar Plate–**E. COLE**, S. Tseng, M. Barbour, D. Macool, L. Ecret, C. McDowell, H. White, and B. Kriegar, DuPont Experimental Station, Wilmington, DE
- Control of Enteric Pathogenic Bacteria on Fresh Produce–**D. PETERS**, S. Sumner, J. Albrecht, and L. Bullerman, University of Nebraska, Lincoln, NE
- Evaluation of the Salmonella BAX™ System A Rapid PCR Based Method for the Analysis of Foods for Foodborne *Salmonella*–**C. SOBITIES**, A. Bennett, D. Greenwood, R. Betts, and J. Banks, DuPont Experimental Station, Wilmington, DE
- Establishing Baseline Risk for *Salmonella enteritidis* in Shell Eggs–**R. MORALES**, L. Jaykus, and P. Cowen, North Carolina State University, Raleigh, NC
- Elimination of *Salmonella* and *Staphylococcus aureus* from Bison, Ostrich, Alligator, and Caiman Meat by Gamma Irradiation–**D. THAYER** and G. Boyd, USDA, ARS, ERRC, Philadelphia, PA
- Detection of *Salmonella* in Food Using a Novel PCR-Based Fluorogenic 5' Nuclease Assay–**C. YAMASHIRO**, R. Behari, S. Flood, C. Thio, P. Witham, D. Norton, S. Kawasaki, B. Kimura, T. Fujii, and C. Paszko-Kolva, Perkin-Elmer, Foster City, CA
- Rapid Molecular Method for the Detection of Human Enteric Viruses in Clams–**A. DIX** and L. Jaykus, North Carolina State University, Raleigh, NC
- The Effects of Some Extrusion and Canning Processes on Deoxynivalenol–**C. WOLF-HALL**, L. Bullerman, and M. Hanna, University of Nebraska, Lincoln, NE
- Electron Microscopy of Fungal Spores Produced under Reduced Water Activity–**M. BLASZYK** and G. Blank, University of Manitoba, Winnipeg, Manitoba, Canada
- Stability of Fumonisin B_1 (FB_1) during Extrusion Cooking–**S. KATTA**, M. Castelo, S. Sumner, M. Hanna, and L. Bullerman, University of Nebraska, Lincoln, NE
- Inhibition of Growth and Mycotoxin Production of Penicillium by Lactobacillus Species–**H. GOURAMA**, Penn State, Reading, PA
- An Easy Screening Test for Detecting Yeast Contamination in Rinse Water Samples–**C. CHEN**, K. Doherty, and A. Naqui, IDEXX Laboratories, Inc., Westbrook, ME
- Fumonisin Concentrations in Commercial Corn-Based Food Products–**M. CASTELO**, S. Sumner, and L. Bullerman, University of Nebraska, Lincoln, NE
- Retention of Acid Tolerance and Acid Shock Responses in *Escherichia coli* O157:H7–**D. GARREN**, M. Harrison, and S. Russell, University of Georgia, Athens, GA
- A Model for the Interactions of Temperature pH, Lactate, Salt and Nitrite on the Survival of *Escherichia coli* O157:H7–**R. WHITING** and M. Golden, USDA, ARS, ERRC, Philadelphia, PA
- Effectiveness of Sanitizers vs. *Escherichia coli* O157:H7–**Z. WANG** and M. Banner, Diversey Corporation, Plymouth, MI
- Heat Shock Response Protects *Escherichia coli* O157:H7 Against Lethal Acidity–**G. WANG** and M. Doyle, University of Georgia, Griffin, GA
- Survival of *Escherichia coli* O157:H7 in Drinking and Recreational Water–**G. WANG** and M. Doyle, University of Georgia, Griffin, GA
- Heat Inactivation and Injury of *Escherichia coli* O157:H7 Cultured at 10 and 37°C–**J. SEMANCHEK** and D. Golden, University of Tennessee, Knoxville, TN
- Studies on the Survival of *Escherichia coli* O157:H7 in Fermented Meat Products–**D. RIORDAN**, G. Duffy, J. Sheridan, R. Whiting, B. Eblen, D. McDowell, and I. Blair, The National Food Centre Dunsinea, Castleknock, Ireland
- Evaluation of an ELISA System for Detecting Verotoxin Produced by Enterohemorrhagic *Escherichia coli* (EHEC)–**W. TSAI**, C. Miller, and E. Richter, Silliker Laboratories of Ohio, Inc., Columbus, OH
- A Multiplex PCR Assay for Detecting Verotoxin-Producing *Escherichia coli* O157:H7–**J. MENG**, S. Zhao, and M. Doyle, University of Georgia, Griffin, GA
- The Behavior of *Escherichia coli* O157:H7 in Fermentation Systems with Thermophilic and Mesophilic Dairy Starter Cultures–**J. SOUDAH**, and K. Boor, Cornell University, Ithaca, NY

- Thermal Inactivation of *Escherichia coli* O157:H7 in Meat–**O. SNYDER, JR.**, V. Juneja, and B. Marmer, Hospitality Institute of Technology & Management, St. Paul, MN
- Validation of Pepperoni Processes for Control of *Escherichia coli* O157:H7–**N. FAITH**, J. Hinkens, T. Lorang, P. Bailey, D. Buege, J. Luchansky, and C. Kaspar, University of Wisconsin, Madison, WI
- Survival of *Escherichia coli* O157:H7, *Listeria monocytogenes*, and *Salmonella typhimurium* in Ground Beef Jerky–**J. HARRISON** and M. Harrison, University of Georgia, Athens, GA
- Acid Stress and Death in Pathogenic *Escherichia coli*–**A. CASTILLO**, E. Cabrera-Diaz, and M. Rodriguez-Garcia, Texas A & M University, College Station, TX
- Effect of *Escherichia coli* O157:H7 Growth in the Presence or Absence of Glucose on Its Acid Tolerance–**R. BUCHANAN** and S. Edelson, USDA, ARS, ERRC, Philadelphia, PA
- Prevalence of *Escherichia coli* O157:H7 in Lebanon–**W. BIRBARI**, M. Jurdi, G. Araj, and M. Mikati, American University of Beirut, Beirut, Lebanon
- A PCR-Based Method for the Detection of *Escherichia coli* O157:H7 from Ground Beef–**W. BARBOUR**, L. Ecret, C. Sobities, S. Fritschel, DuPont Experimental Station, Wilmington, DE

Tuesday Afternoon–July 2, 1996

General Session–Ensuring a Safe Global Food Supply (Sponsored by ILSI)

1:30 A Global Perspective of Foodborne Disease–**S. NOTERMANS**, National Institute of Public Health, Bilthoven, The Netherlands

2:00 Microbial Food Safety Issues and Concerns in International Trade–**M. VAN SCHOTHORST**, Nestec Ltd., Vevey, Switzerland

2:30 Microbial Hazards and Emerging Issues Associated with Produce–**K. WACHSMUTH**, U.S. Food and Drug Administration, Washington, D.C.

3:00 Microbial Hazards and Emerging Issues Associated with Seafood–**E. GARRETT**, National Marine Fishery Service, Pascagoula, MS

3:30 Break

3:50 IAMFES Annual Business Meeting

Wednesday Morning–July 3, 1996

Microbiological Issues in Seafood

8:30 Parasites in Seafoods–**A. ADAMS**, U.S. Food and Drug Administration, Bothell, WA

9:00 Marine Toxins–**R. MANGER**, U.S. Food and Drug Administration, Bothell, WA

9:30 Control of Bacterial Pathogens in Seafood –**M. EKLUND**, NMFS, Seattle, WA

10:00 Break

10:20 Risk Assessment of Seafood in Canada–Initial Stages–**E. TODD**, Health Canada, Ottawa, Ontario, Canada

10:50 Epidemiology and Detection of Human Enteric Viruses in Seafood–**L. JAYKUS**, North Carolina State University, Raleigh, NC

11:20 Aquaculture–**M. WEKELL**, U.S. Food and Drug Administration, Bothell, WA

Microbiology of Wine

8:30 Quality Control Aspects in Winemaking–**A. KARUMANCHIRI**, Liquor Control Board of Ontario, Toronto, Ontario, Canada

9:00 Influence of Yeast Strains on Wine Quality–**G. CONE**, Lallemand Ltd., Montreal, Quebec, Canada

9:30 Yeast Enumeration and Identification–**L. BEUCHAT**, University of Georgia, Griffin, GA

10:00 Break

10:20 Interaction Between Yeasts and Malo-lactic Bacteria–**C. EDWARDS**, Washington State University, Pullman, WA

10:50 Physiology of the Malo-lactic Bacteria–**E. OLSEN**, Chateau Ste Michelle, Woodinville, WA

11:20 Wine Spoilage Microorganisms and Their Control–**D. SPLITTSTOESSER**, Cornell University, Geneva, NY

Dairy Foods Safety and Quality–Dairy Foods Research Centers

8:30 The Development and Use of Bacteriocin-Containing Dairy Ingredients to Control Unwanted Microorganisms in Formulated Foods–**E. ZOTTOLA**, University of Minnesota, St. Paul, MN

9:00 Survival of *Escherichia coli* O157:H7 in Fermented Dairy Foods–**K. BOOR**, Cornell University, Ithaca, NY

9:30 Mastitis Pathogens of Public Health Concerns–**J. CULLOR**, University of California-Davis, Davis, CA

10:00 Break

10:20 Microbiological Safety and Quality of Reduced-Fat Cheddar Cheese–**E. JOHNSON**, University of Wisconsin, Madison, WI

10:50 HACCP Model Programs for the Dairy Industry–**R. BISHOP**, University of Wisconsin, Madison, WI

Framework for Accessing the Risk of Microbial Contamination (Sponsored by ILSI)

8:30 The Role of Risk Assessment in Microbial Food/Water Safety Regulatory Issues–**D. VOSE**, DVRAS, Wincanton, United Kingdom

9:00 Risk Assessment Principles Document of the U.S. National Advisory Committee on Microbial Criteria for Foods–**R. BUCHANAN**, U.S. Department of Agriculture, Philadelphia, PA

9:30 Overview of Microbial Risk Assessment in the Agri-Food Industry: Approaches to Identifying Intervention Strategies for Risk Reduction–**A. LAMMERDING**, Agriculture and Agri-Food Canada, Guelph, Ontario, Canada

10:00 Break

10:20 Conceptual Framework for Microbial Water Safety Risk Assessment: Report of the ILSI Risk Science Institute Working Group on Microbial Risk Assessment–**J. SEED**, ILSI Risk Science Institute, Washington, D.C.

10:50 Development of Risk Assessment Guidelines for Foods of Animal Origin in International Trade–**S. HATHAWAY**, Ministry of Agriculture and Fisheries Regulatory Authority, Gisborne, New Zealand

11:20 Practical Approaches to Risk Assessment: European Perspectives–**M. VAN SCHOTHORST**, NESTEC, Ltd., Vevey, Switzerland

Wednesday Afternoon–July 3, 1996

Surveillance of Foodborne and Waterborne Disease

1:30 *Salmonella enteritidis* Surveillance in New York State–**J. GUZEWICH**, New York Department of Health, Albany, NY

2:00 *Escherichia coli* O157:H7 Outbreaks in the Northeast United States–**B. BARTLESON**, Washington State Department of Health, Olympia, WA

2:30 Foodborne Disease Surveillance–A National Perspective–**E. TODD**, Health Canada, Ottawa, Ontario, Canada

3:00 Break

3:20 Foodborne Disease Surveillance in Latin America and the Caribbean–An International Perspective–**P. ARAMBULO**, Pan American Health Organization, Washington, D.C.

3:50 On Sites Investigation of Waterborne Disease–**K. FOX**, Environmental Protection Agency, Cincinnati, OH

4:20 Procedures to Investigate Waterborne Illness–**F. BRYAN**, Food Safety Consultant, Lithonia, GA

Current Methods and Future Prospects for the Control of Foodborne Pathogen Colonization in the Gastrointestinal Tract

1:30 Historical, Current, and Future Prospects for Probiotic Research–International Perspectives–**S. STAVRIC**, Bureau of Microbial Hazards, Ottawa, Ontario, Canada

1:50 Strategies for Controlling *Salmonella enteritidis* in Egg-Laying Chickens–**R. GAST**, USDA-ARS, Athens, GA

2:10 Ecological Concepts for Developing Continuous-Flow Competitive Exclusion Cultures for Food Animals–**D. NISBET**, USDA-ARS, College Station, TX

2:30 Virulence Mechanisms of Bacterial Pathogens and the Effect of Human Biota Interactions in the Gut–**K. WILSON**, Duke University Medical Center, Durham, NC

2:50 Break

3:10 Research Strategies for Understanding Foodborne Pathogen Competiveness under Strict Anaerobic and Gastrointestinal Conditions–**S. RICKE**, Texas A & M University, College Station, TX

3:30 Immuno-Based Methodology for Detection of Competitive Exclusion Cultures–**L. STANKER**, USDA-ARS, College Station, TX

3:50 The Utility of Molecular Assays for Understanding Microbial Gene Expression in Gastrointestinal Tracts–**S. PILLAI**, Texas A & M University, El Paso, TX

Emerging Issues in Food Mycology

1:30 Detection, Control and Toxicity of Fumonisns and Other Fusarium Toxins–**L. BULLERMAN**, University of Nebraska, Lincoln, NE

2:00 Alternative Methods for Isolation, Culture and Identification of Fungi in Foods–**L. BEUCHAT**, University of Georgia, Griffin, GA

2:30 Immunological and Genetic Methods to Rapidly Detect Fungi in Foods–**M. COUSIN**, Purdue University, West Lafayette, IN

3:00 Break

3:20 Biocontrol of Mold Growth and Mycotoxin Production–**H. GOURAMA**, Penn State University, Reading, PA

3:50 Heat Resistant Molds and Preservative Resistant Yeasts–**A. KING**, USDA, Alban, CA

Intervention Strategies for Safe Meats: Production to Consumers

1:30 Probiotics–**N. COX**, USDA, ARS, Athens, GA

1:55 Slaughter–**J. REIMANN**, Excel Corporation, Wichita, KS

2:20 Chemical Treatments/Bacteriocins–**B. SHELTON**, North Carolina State, Raleigh, NC

2:45 Irradiation–**J. DICKSON**, Iowa State University, Ames, IA

3:10 Break

3:30 Restaurants–**D. THENO**, Foodmaker Inc., San Diego, CA

3:55 Retail–**G. PRINCE**, The Kroger Company, Cincinnati, OH

83rd IAMFES Annual Meeting

Special Events

Opening Session

Ivan Parkin Lectureship
Sunday, June 30, 1996 — 7:00 p.m.

Lecture: Sense, Nonsense, and Science presented by: Joseph A. Schwarcz, Ph.D., Professor of Chemistry, Vanier College; Senior Adjunct Professor of McGill University; Science Editor of CJAD Radio; TV Columnist on The Discovery Channel.

Cheese and Wine Reception Held in the Exhibit Hall

Sunday, June 30, 1996 — 8:00 p.m. — 10.00 p.m.

The traditional opening of the Educational Exhibits and an opportunity to learn about the latest industry advancements as well as greet old friends and make new friends.

Monday Night Gala
Evening at the Museum of Flight

Monday, July 1, 1996 — 6:00 p.m. — 9:00 p.m.
Registration: $45 (Late $50)

Enjoy dinner at Seattle's most spectacular attraction: Boeing Museum of Flight. In the steel and glass Great Gallery, the history of aviation soars past, with more than 20 full-sized aircraft flying in formation six stories above. Dinner will be in the Musuem's Side Gallery overlooking the colorful displays.

After dinner feel free to tour the facility. Visit the "Red Barn", the birthplace of Boeing. See the world's only remaining M/D-21 Blackbird, a rare World War II FG-1D Corsair fighter, the sole remaining 1929 Boeing 80A Trimotor, and dozens of other vintage aircraft and spacecrafts.

Exhibit Schedule

Monday, July 1, 1996

9:30 a.m. - 4:00 p.m. Exhibits Open
Complimentary Coffee and Donuts in Exhibit Hall
(9:30 a.m. – 11:00 a.m.)

Tuesday, July 2, 1996

9:30 a.m. - 4:00 p.m. Exhibits Open
Complimentary Lunch in Exhibit Hall
(12:00 p.m. – 1:30 p.m.)

IAMFES Annual Awards Banquet and Reception

Wednesday, July 3, 1996
Reception: 6:00 p.m. — Banquet: 7:00 p.m.
Registration: $35 ($40 Late)
Included in Full Registration

IAMFES Kids' Pizza Banquet

Wednesday, July 3, 1996 — 6:30 p.m. — 9:30 p.m.
Registration: $15 ($20 Late)

Adult supervised for children ages 4 and up. Pizza, pop and activities provided.

IAMFES Kids' Room

Monday — Wednesday, July 1, 1996 — July 3, 1996
9 a.m. — 12 noon and 1:30 p.m. — 4:30 p.m.
No registration required, please check in.

Adult supervised child care for children ages 4 and up.

Attention Annual Meeting Attendees!

Our Monday Evening Gala has been changed. In the February issue of *DFES* the Gala was listed as an "Evening at Redhook" which has now been changed to an "Evening at the Museum of Flight." Although the location has changed for the Gala, the ticket prices are the same. Please read the new listing above for a description of the event.

Spouse/Companion Tours

Sample Seattle — A Deluxe City Tour

Sunday, June 30 — 10:00 a.m. — 3:00 p.m.
Registration: $30 (Late $35) Lunch on your own

Come sample Seattle – This tour provides an overview of the many attractions Seattle offers its visitors. You'll enjoy a drive along the waterfront with its import shops and fresh seafood restaurants. Then you'll drive into Pioneer Square, the city's oldest area rich with early 1900's architecture, much of which has been renovated into art galleries and specialty shops. Next is the International District in which evidence of the Pacific Rim cultural influences abound. The tour continues along Lake Washington into the Arboretum and on to the University of Washington campus. The Hiram Chittenden Locks and salmon ladders will be the first stop. The locks connect the Puget Sound with freshwater Lake Union and the salmon ladders feature seasonal migration of salmon returning to parent streams to spawn. Next you will travel to Magnolia Bluff for a breathtaking view of the Sound. Then back to the city and the world famous Pike Place Market for shopping. The day will be capped off with a visit to the Space Needle observation deck.

The Museum of Doll Art, Bellevue Art Museum and Shopping at Bellevue Square

Monday, July 1, 1996 — 9:00 a.m. — 3:00 p.m.
Registration: $30 (Late $35), Lunch on your own

You will visit an extraordinary museum dedicated to the preservation and exhibition of dolls as an art form. The nostalgia of Rosalie Whyel's Museum of Doll Art will fill you with memories of days gone by. Here you will witness one of the world's fine collections of dolls, teddy bears, toys and miniatures. Over 700 dolls ranging from rare porcelain pieces from the 18th century to Barbie and GI Joe are on display. After you experience the charm of the museum and its eloquent Victorian Gardens you will depart for Bellevue Square with over 200 shops and restaurants. Time will be provided for shopping. If shopping is not your forte, visit the Bellevue Art Museum on the third floor where contemporary Northwest art is on display. Then relax while sipping a cappuccino at Seattle's Best Coffee, or savor a warm cinnamon roll at Cinnabon.

Country Sampler

Tuesday, July 2, 1996 — 9:00 a.m. — 3:30 p.m.
Registration: $30 (Late $35), Lunch on your own

This favorite outing begins with a scenic ride through the foothills of the Cascade Mountains to breathtaking Snoqualmie Falls. Once worshipped by Native American Indians as a place for the gods, these falls are actually 97 feet higher than Niagara! Next you're off to Gilman Village in Issaquah. The homes are historic and provide a unique setting for shops which include hand-crafted jewelry, clothing, home accessories and freshly baked goods. You will have time to explore. The last stop will be Chateau Ste. Michelle, Washington's premier winery. Nestled on 87 acres of rolling grounds, the original manor house was built in 1912 and is surrounded by formal gardens, a trout pond, and hundreds of lush shrubs and flowers. During your private guided tour, you will witness the marvel of wine-making and learn the "sniff, swirl, and slurp" method of wine tasting as you sample world famous wines.

Historic Seattle

Wednesday, July 3, 1996 — 9:00 a.m. — 3:30 p.m.
Registration: $30 (Late $35), Lunch on your own

Discover the intrigue of Seattle's history and its fascinating architecture on this informative tour. You will break into smaller groups and begin your tour with a short walk to the Fifth Avenue Theater, a national historical landmark, where you will hear about the theater's latest production and enjoy the dramatic interior. Next is a short walk to Seattle's most recent architectural feat, the Underground Metro Bus Tunnel. You'll experience an incredibly clean, beautiful marbled tunnel on your trip down to Pioneer Square. The history of Seattle will unfold before you and come to life as you are guided through the streets on a walking tour of the district. During your tour you will visit the Klondike Museum and Seattle's Underground where you will see "old Seattle." During the afternoon you will have time to enjoy the area. The tour ends with a bus trip back to your hotel.

83rd IAMFES Annual Meeting Registration Form

Sheraton Seattle Hotel & Towers — Seattle, WA — June 30 - July 3, 1996

(Use photocopies for extra registrations)

FOR OFFICE USE
Date Rec'd. _____ First initial _____ Last name
Registration # _____

First Name (will appear on badge) (please print) Last Name

Title Employer

Mailing Address (Please specify: Home or Work)

City State/Province Country Postal/Zip Code

Telephone # Fax #

Please check where applicable:

___ IAMFES Member
___ Non-Member
___ Local Arrangements
___ 30 Yr. Member
___ 50 Yr. Member
___ Past President
___ Executive Board
___ Speaker
___ Honorary Life Member
___ Exhibitor
___ IAMFES Sustaining Member
___ IAMFES Program Advisory Committee

Credit Card payments may be sent via Fax today!
515-276-8655

Sign up to become a NEW member
and take advantage of the member discount.

***REGISTER BY MAY 31, 1996 TO AVOID LATE REGISTRATION FEES**

REGISTRATION:	MEMBERS	NON-MEMBERS	AMOUNT
Registration (Banquet included)	$195 ($240 late)*	$275 ($320 late)*	
Student Member	$ 25 ($ 35 late)*	Not Available	
One Day Registration (Circle: Mon/Tues/Wed)	$100 ($120 late)*	$130 ($150 late)*	
Spouse/Companion (Name): _____	$ 25 ($ 25 late)*	$ 25 ($ 25 late)*	
Children (14 & Under), Names: _____	FREE	FREE	

NEW MEMBERSHIP FEES:		
Membership with *Dairy, Food & Environmental Sanitation*	$ 70	
Membership with *Dairy, Food & Env. Sanitation & Journal of Food Protection*	$110	
**Student Membership ❒ *Dairy, Food & Env. San.* or ❒ *Journal of Food Protection*	$ 35	
**Student Membership with *Dairy, Food & Env. San. & Journal of Food Protection*	$ 55	
***Full-time student verification required.*		
SHIPPING CHARGES: OUTSIDE THE U.S. - SURFACE RATE	$ 22.50 per journal	
AIRMAIL	$ 95.00 per journal	

OTHER FEES:	PER PERSON	# OF TICKETS	
Cheese and Wine Reception (Sun., 6/30)	FREE		
An Evening at the Museum of Flight (Mon., 7/1)	$ 45 ($ 50 late)*		
IAMFES Awards Banquet (Wed., 7/3)	$ 35 ($ 40 late)*		
Kids' Banquet (Wed., 7/3)	$ 15 ($ 20 late)*		

SPOUSE/COMPANION EVENTS:	PER PERSON		
Sample Seattle — A Deluxe City Tour (Sun., 6/30)	$ 30 ($ 35 late)*		
The Museum of Doll Art, Bellevue Art Museum and Bellevue Square (Mon., 7/1)	$ 30 ($ 35 late)*		
Country Sampler (Tues., 7/2)	$ 30 ($ 35 late)*		
Historic Seattle (Wed., 7/3)	$ 30 ($ 35 late)*		

❒ Please indicate here if you have a disability requiring special accommodations.

Credit Card Payments: Please Circle: VISA/MASTERCARD/AMERICAN EXPRESS

Card # _____ Exp. Date _____

Name on Card _____ Signature _____

Total Amount Enclosed $_____
U.S. FUNDS DRAWN ON U.S. BANK

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, 1996. Registration post-marked after May 31, 1996 will be charged the late registration fee. For additional information contact Julie Cattanach at 1-800-369-6337.

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 14, 1996. No refunds will be made for cancellations post-marked after June 14, 1996, however, the registration may be transferred to a colleague with written notification to IAMFES.

Budget Rental Car Information

For information on special rental car rates from Budget call 1-800-866-6137. Please mention Rate Code: V9Y and BCD #: U009666.

Guest Room Commitment
GOOD UNTIL MAY 29, 1996
Make Your Reservation Now

HOTEL RESERVATIONS
IAMFES

83rd Annual Meeting
June 30 – July 3, 1996
Sheraton Seattle Hotel & Towers
Seattle, WA

Please check accommodation requested:
❑ Single (1 person)
❑ Double (2 persons)

Bed type:
❑ King Bed
❑ 2 Double Beds

Special Requests _____

❑ Please indicate here if you have a disability requiring special accommodations.
All room rates are subject to prevailing taxes.
Reservations must be received by hotel prior to arrival.

NAME _____

SHARING WITH (Name) _____

COMPANY NAME _____

ADDRESS _____

_____ CITY _____

STATE/PROVINCE _____ COUNTRY _____ ZIP _____

TELEPHONE _____

ARRIVAL DATE _____ (Check-In Time is after 3 p.m.) DEPARTURE DATE _____ (Check-out Time is 12 p.m.)

SPECIAL REQUESTS _____

After May 29, 1996 reservations will be accepted on a space and rate available basis. Reservations will be held until 6:00 p.m. on the date of arrival, unless guaranteed by a one night advance deposit, payable by certified check or a major credit card.

CREDIT CARD # _____ CREDIT CARD _____

EXPIRATION DATE _____

CARD HOLDERS SIGNATURE _____

SPECIAL ROOM RATES for this convention:
$109 per night, plus tax

For Reservations Call: (206)621-9000
Or FAX: (206)621-8441

IAMFES

83rd

Annual Meeting

Seattle, Washington
June 30 – July 3

MAIL DIRECTLY TO:

SHERATON SEATTLE HOTEL AND TOWERS
C/O RESERVATIONS
1400 SIXTH AVENUE
SEATTLE, WA 98101

The Workshops

Workshop 1—New Methods to Study Old and New Pathogens

Workshop Agenda

Saturday, June 29, 1996
8:00 a.m. – 5:00 p.m.

Fees:
Member: $220; After May 31, 1996: $270
Non-Member: $295; After May 31, 1996: $345

Workshop Instructor:
Charles Kasper

The detection and typing of foodborne pathogens is a continually evolving aspect of food safety and an area where training must be constantly updated. This workshop is designed to fill this training need.

Participants will receive the latest information on the characteristics, ecology, and epidemiology of familiar foodborne pathogens. Another area to be presented will involve video demonstrations and literature on commercially available detection/ typing systems including immunological and nucleic acid detection. Workshop facilitators are experts in each of these areas.

Workshop 2—Eat, Drink, and be Wary: Risk Communication

Workshop Agenda

Saturday, June 29, 1996
8:00 a.m. – 5:00 p.m.

Fees:
Member: $225; After May 31, 1996: $275
Non-Member: $300; After May 31, 1996: $350

Workshop Instructor:
Douglas Powell

While there has been strong focus on risk assessment, little attention has been paid to risk communication and microbial food safety. Yet food scientists and managers are increasingly called upon by clients, regulators, and the public to enter into value-laden conflicts involving technological risk, such as lethal bacteria in ground meat. But the mysterious language of probabilities and technology proficiency lends itself poorly to the general public; facts alone are never enough. Established risk communication theory offers a framework to study the most effective way for food professionals to communicate about specific risk.

This workshop will introduce the basic concepts of risk communication and use applied research, case studies, and role playing to substantiate the crucial role of risk communication as a bridge between food science and the consuming public. The following topics will be covered in this day-long workshop:

- Communication basics
- Public perceptions of microbial food safety
- Outrage factor
- Media coverage and consumer effect
- Techniques for gathering information
- Using electronic information to support risk communication activities
- Preparing for interviews/public meetings/consultations
- How to answer tough questions
- Good and bad examples of risk communication
- Communicating with different audiences
- Building trust and alliances
- Is it possible to separate risk assessment from risk management and communication?
- Integrating public and scientific judgements to manage food-related risks

About the Instructor:

Douglas Powell at the University of Guelph, Department of Food Science applys risk communication theory to issues of food safety and food biotechnology. Specifically, working with studying public perceptions of agricultural biotechnology and microbial aspects of food safety in North America; and the broader public discussions involving technology and society, which shape public attitudes and policy decisions. He completed a BS (honors) in molecular biology and genetics at the University of Guelph in 1985. After two years of work he entered journalism through the student press. He has been the editor of several community newspapers, has written for a diverse range of magazines, and managed communications at a university-based computer research center. He also is a freelance journalist, reporting on Canadian news for the Washington based journal, *Science*, and contributing regularly to the *Toronto Globe and Mail*.

1996 IAMFES Workshops
· Registration Form ·

First Name (will appear on badge) PLEASE PRINT Last Name

Title Employer

City State/Province ZIP/Postal Code

Area Code & Telephone # FAX #

Charge Card Payments: VISA • MASTERCARD • AMERICAN EXPRESS

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Signature: _____

For further information, please contact IAMFES at (800) 369-6337 (U.S. and Canada), (515) 276-3344, FAX (515) 276-8655.

· WORKSHOPS ·

❑ **WORKSHOP 1: New Methods to Study Old and New Pathogens**
Sheraton Seattle Hotel & Towers, Seattle, WA — Saturday, June 29, 1996

	Before 5/31/96	After 5/31/96
IAMFES Member	$220	$270
Non-Member	$295	$345

❑ **WORKSHOP 2: Eat, Drink, and be Wary: Risk Communication**
Sheraton Seattle Hotel & Towers, Seattle, WA — Saturday, June 29, 1996

	Before 5/31/96	After 5/31/96
IAMFES Member	$225	$275
Non-Member	$300	$350

TOTAL AMOUNT ENCLOSED: $_____
(U.S. Funds on U.S. Bank)

NOTE: IAMFES reserves the right to cancel workshops if minimum enrollment is not met by **May 31, 1996.**

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 May 31, 1996. **No refunds will be made for cancellations post-marked after June 14, 1996,** however, the registration may be transferred to a colleague with written notification to IAMFES.

Would You Like to Learn How to Do Sensory Evaluations of Dairy Products?

Then make plans to attend the 1996 IAMFES Annual Meeting in Seattle June 30th – July 3rd. Sensory Evaluations will be done on Monday afternoon. See the Annual Meeting Preliminary Program in this issue for a description of the symposium and times.

Be sure to use the enclosed registration forms to register today!

Food Safety at Temporary Food Events Pamphlet Available

Published for local health officials and others who are educating personnel about Food Safety for Temporary Food Events.

The 8 page pamphlet developed by the IAMFES Food Sanitation Professional Development Group outlines 14 steps to safe and sanitary food service events.

To receive a reproducible copy of the pamphlet, contact:

Karla Jordan, IAMFES
(800) 369-6337 • (515) 276-3344
Fax (515) 276-8655

Reward Industry Excellence

Nominate Now!

The 1996 IAMFES Black Pearl Award

Nominate a company superior in food quality and safety for the Black Pearl Award presented annually at the IAMFES Annual Meeting.

The Black Pearl Award, sponsored by Wilbur Feagan and F&H Food Equipment Company, was first presented in 1994. The Black Pearl Award was established to recognize a company for its outstanding commitment to and achievement in corporate excellence in food safety and quality. For more information and to receive nomination criteria and forms, contact the IAMFES office at 1-800-369-6337.

Advertising Index

83rd IAMFES Annual Meeting Exhibitors

Companies scheduled to Exhibit as of February 15, 1996

3-A Sanitary Standards Symbol Administrative Council
3020 Bluff Road
Columbia, SC 29209
Phone: (803) 783-9258 Fax (803) 783-9265

3M Microbiology Products
3M Center Bldg. 275-4E-01
St. Paul, MN 55144-1000
Phone: (612) 733-0942; Fax (612) 737-7678

Advanced Instruments, Inc.
Two Technology Way
Norwood, MA 02062
Phone (617) 320-9000; Fax (617) 320-8181

Applied Research Institute
29 Platts Hill Road
Newtown, CT 06470
Phone (800) 410-1988; Fax (800) 366-1688

Aquionics, Inc.
P.O. Box 18395
Erlanger, KY 41018
Phone (606) 341-0710; Fax (606) 341-2302

BioControl Systems, Inc.
19805 North Creek Parkway
Bothell, WA 98011
Phone (206) 487-2055; Fax (206) 487-1476

bioMérieux Vitek
595 Anglum Drive
Hazelwood, MO 63042-2395
Phone (800) 638-4835; Fax (314) 731-8627

Charles Felix Associates
P.O. Box 1581
Leesburg VA 22075
Phone (703) 777-7448; Fax (703) 777-4453

Copesan Services, Inc.
3490 N. 127th Street
Brookfield, WI 53005
Phone (800) 267-3726; Fax (414) 783-6267

Decagon Devices, Inc.
P.O. Box 835
Pullman, WA 99163
Phone (509) 332-2756; Fax (509) 332-5158

DFL Laboratories
3401 Crow Canyon Road, Suite 110
San Ramon, CA 94583
Phone (510) 830-0350; Fax (510) 830-0379

Difco Laboratories, Inc.
P.O. Box 331058
Detroit, MI 48232-7058
Phone (313) 462-8505; (800) 521-0851
Fax (313) 462-8517

DQCI Services, Inc.
5205 Quincy Street
Mounds View, MN 55112
Phone (612) 785-0484; Fax (612) 785-0584

Dupont FQMS
P.O. Box 80357
Wilmington, DE 19880-0357
Phone (302) 695-2356; Fax (302) 695-9027

Dynal, Inc.
5 Delaware Drive
Lake Success, NY 11042
Phone (516) 326-3270; (800) 638-9416
Fax (516) 326-3298

Ecolab, Inc.
Food And Beverage Division
370 Wabasha Street
N. St. Paul, MN 55102
Phone(612) 293-2549; Fax (612) 293-2260

Ecolab, Inc.
Pest Elimination Division
370 Wabasha Street North
St. Paul, MN 55102
Phone (612) 293-2549; Fax (612) 293-2260

Food Processors Institute
1401 New York Avenue NW, Suite 400
Washington, D.C. 20005
Phone (202) 393-0890; Fax (202) 637-8068

Foss Food Technology Corporation
10355 West 70th Street
Eden Prairie, MN 55344
Phone (612) 941-8870; Fax (612) 941-6533

GENE-TRAK Systems
94 South Street
Hopkinton, MA 01748
Phone (508) 435-7400; Fax (508) 435-0025

Gist-brocades
N93 W14560 Whittaker Way
Menomonee Falls, WI 53051
Phone (414) 255-7955; (800) 423-7906
Fax (414) 255-7732

GloGerm Company
1120 South Main
Moab, UT 84532
Phone (801) 259-5931; Fax (801) 259-5930

Idetek, Inc.
1245 Reamwood Avenue
Sunnyvale, CA 94089
Phone (408) 745-0544; Fax (408) 745-0243

IDEXX Laboratories, Inc.
One IDEXX Drive
Westbrook, ME 04092
Phone (207) 856-0300; (800) 321-0207
Fax (207) 856-0630

International BioProducts, Inc.
14780 NE 95th Street
Redmond, WA 98052
Phone (206) 883-1349; Fax (206) 881-6880

Meritech, Inc.
8250 S. Akron Street, # 201
Englewood, CO 80112
Phone (303) 790-4670; Fax (303) 790-4859

Michelson Laboratories, Inc.
6280 Chalet Drive
Commerce, CA 90040
Phone (310) 928-0553; Fax (310) 927-6625

Nasco International
4825 Stoddard Road
Modesto, CA 95356
Phone (209) 545-1600; Fax (209) 545-1669

The National Food Laboratory
6363 Clark Avenue
Dublin, CA 94568
Phone (510) 828-1440; Fax (510) 833-8795

Nelson-Jameson, Inc.
2400 E. 5th Street
Marshfield, WI 54449
Phone (715) 387-1151; Fax (715) 387-8746

Organon Teknika
100 Akzo Avenue
Durham, NC 27712
Phone (919) 620-2315; Fax (919) 620-2107

Perstorp Analytical, Inc.
12101 Tech Road
Silver Spring, MD 20904
Phone (301) 680-7248; (301) 680-0001
Fax (301) 989-1485

PRISM
8300 NW 53rd Street, Suite 400
Miami, FL 33166
Phone (305) 592-6312; (800) 677-7476
Fax (305) 594-9280

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