

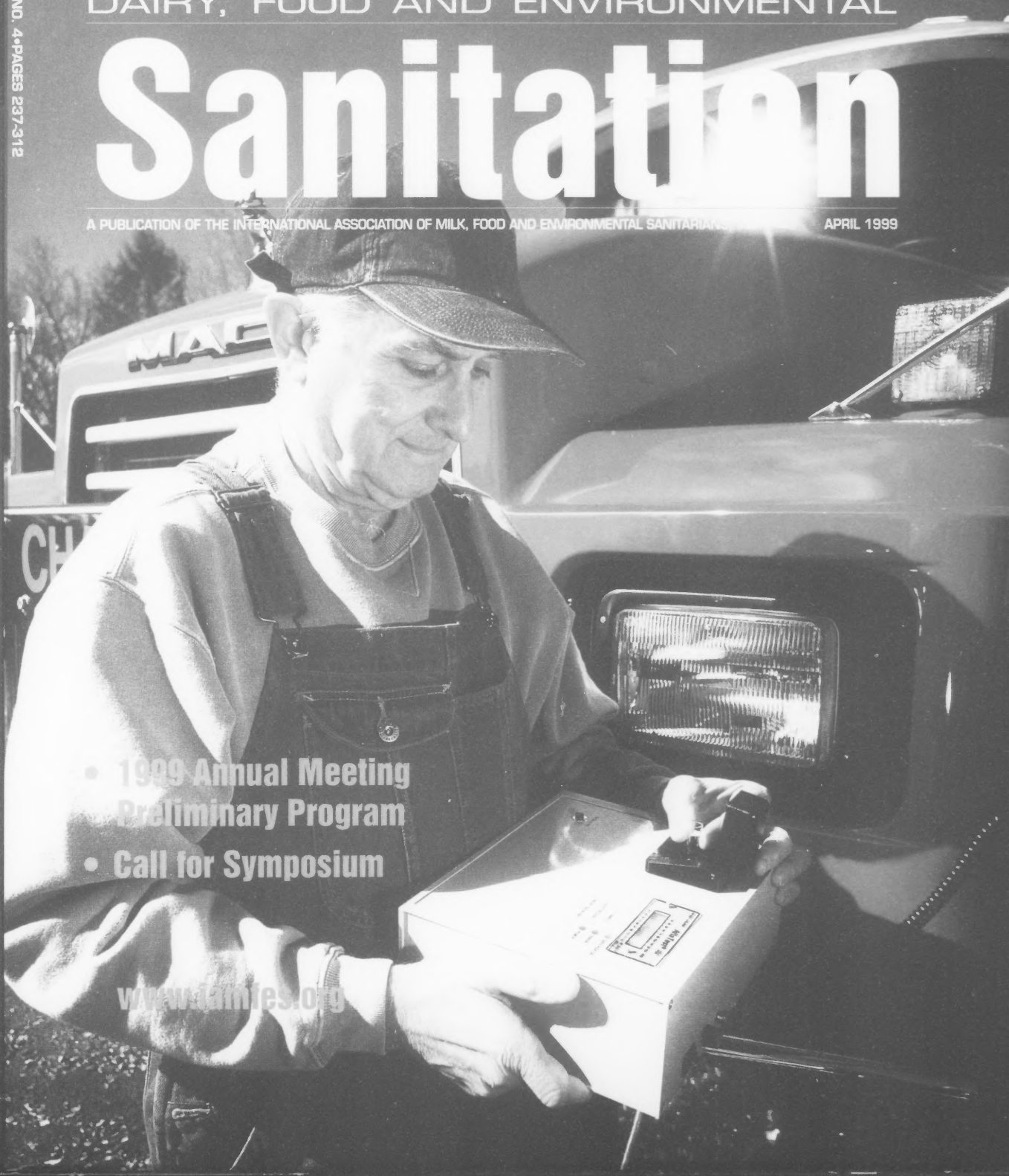
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Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS APRIL 1999

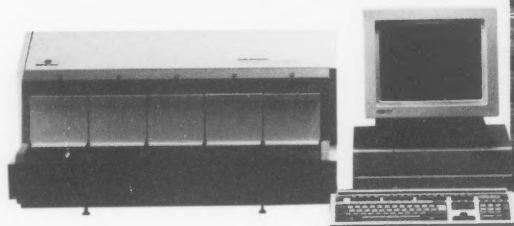
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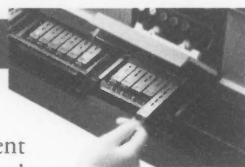


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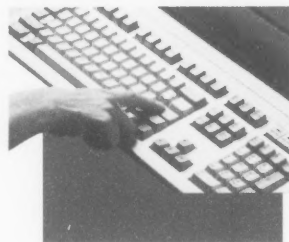


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Photo from VICAM. The photo shows the company's MF-2000 Fluorometer being used in the field.

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Editor's Note:

It has been brought to our attention The Canadian Institute of Health Inspectors Educational Conference is scheduled for April 8-12, 2000, not 1999 as was listed in previous issues of *DFES*.

Our apologies for this error.

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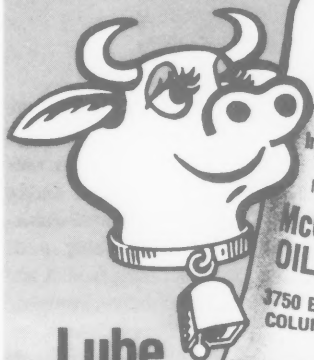
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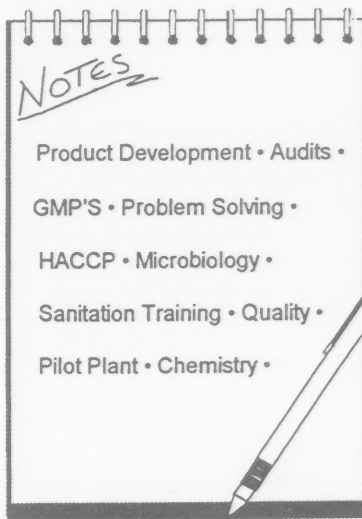
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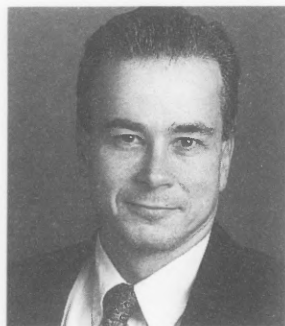
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FROM YOUR PRESIDENT



By ROBERT E. BRACKETT
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“Conformity and innovation”

An interesting paradox exists in many societies, but is particularly obvious in Western cultures. That is, individuals are often encouraged to be creative and innovative in their thinking and approach toward solving problems, but at the same time maintaining conformity with the group.

There are many issues in science where it is necessary to both conform AND be innovative. One good example is with analytical methods. For results to be meaningful and useful to others, it is necessary that analysts use the same methods (i.e., conform). However, were it not for innovative thinking, new techniques would never be developed and laboratories would still be using tedious or less sensitive methods developed decades ago. So how is this prob-

lem resolved? First, various analysts and researchers discuss the various techniques available and come to some kind of consensus as to which method(s) will be adopted as the “standard” by which all others will be compared. These standard methods are then published in reference books or journals (much in the same way 3-A standards are published in *Dairy, Food and Environmental Sanitation*). Note that the standard method is not necessarily the BEST method nor does it always receive unanimous support. It is simply a compromise that analysts agree to use. How then are new methods adopted? New techniques or opinions are published in various journals for scientific and professional scrutiny. As more people agree that the new ideas are better, they become accepted and chosen as the “standard,” and the process starts all over again. This process does move slowly but allows for both conformity and innovation. What does all this have to do with IAMFES? We also must maintain some conformity while promoting innovation. A prime example is with how IAMFES deals with the Hazard Analysis Critical Control Points (HACCP) philosophy.

In my opinion, HACCP is one of the most revolutionary concepts to affect food safety. The HACCP system radically changed the philosophy of promoting food safety from one of end product testing for harmful organisms or substances to one in which one controls the process so that the necessity for end product testing is minimized. While the vast majority of food safety experts agree that HACCP improves the safety of foods, they do not all agree on the intricacies of HACCP. For example, they may disagree on how many

“principles” constitute HACCP, what constitutes a “critical control point,” or even what, if any, prerequisite programs are required for HACCP to function optimally. Just a casual review of the literature will provide ample evidence that many different “flavors” of HACCP are being promoted as “the best!” One would hope that all this variety would ultimately benefit food safety. In the short run, however, it often leads to confusion for those who must implement a HACCP program. As in the case of analytical methods, a “standard” unified HACCP system brings order out of this confusion.

IAMFES has traditionally been, and will continue to be, at the forefront of food safety and sanitation issues. For example, IAMFES, through the work of its Committee on Communicable Diseases Affecting Man, was among the first to publish a “how to” manual, *Procedures to Implement the Hazard Analysis Critical Control Point (HACCP) System*. IAMFES will continue to be involved in the promotion of HACCP through its publications, oral presentations, and workshops in the future. Several Professional Development Groups (PDGs) and Committees have expressed interest and commitment to writing more HACCP information. However, even within IAMFES there are differing opinions as to what variation in HACCP should be promoted. Your Executive Board extensively discussed this issue and arrived at several decisions expressing our position. The intent of these decisions is to minimize confusion on HACCP related issues and materials distributed by IAMFES.

The first decision made by your Executive Board was to adopt a “standard” HACCP model system

for use in all IAMFES publications and workshops. After much discussion, it was decided that the HACCP model adopted by the National Advisory Committee on the Microbiological Criteria for Foods (NACMCF) and the CODEX Alimentarius Commission would also be the standard for IAMFES. The reasons for choosing this standard were two-fold. First, the HACCP model adopted by these groups was based on consensus opinions of HACCP experts from academia, government, and the food industry (including IAMFES Members!). Hence, the NACMCF and CODEX HACCP models have already undergone extensive scrutiny and revision. Secondly, basing all IAMFES materials on the NACMCF and CODEX models for IAMFES would mean that IAMFES documents would be more likely to be in compliance with future domestic and international regulations related to HACCP.

The second decision made by your Executive Board was to establish a "HACCP Task Force" to review all materials and courses/workshops produced by IAMFES for conformity to NACMCF and CODEX HACCP models. Individuals asked to serve on the HACCP Task Force include members from academia, government and industry that possess experience or expertise in HACCP. It is your Executive Board's desire that this Task Force will ensure that only materials of the highest quality and value to food safety professionals worldwide will be published, presented or promoted as IAMFES documents and courses or workshops. In this way, users of our materials can be better assured that by following them they will be in compliance with regulatory requirements and current scientific consensus.

Again, this leads to the question of innovation. Do these decisions mean that IAMFES discourages innovative thinking with regards to

HACCP? The answer is a definite NO. They simply mean that your Executive Board has decided that official IAMFES documents or presentations are not appropriate forums for non-conformity. Remember that IAMFES also publishes two outstanding journals, *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection*, whose goal is specifically to publish innovative ideas! Not only are these journals the appropriate forums for new or controversial ideas, Members should be encouraged to publish innovative thoughts in them for the benefit of others. In addition, we also hold the Annual Meeting as a forum for individuals to present new ideas and to question existing approaches.

A healthy and vibrant organization recognizes and appreciates differing views on issues. It is my wish that IAMFES continues to provide outlets for these various views without sacrificing scientific discipline, professional integrity, and order.

Vote

As you may know, IAMFES will present a proposal to the Membership to change the name of the Association. Listed below is a general timeline for input and approval regarding this proposal.

March 1999 Complete review and revision of the Constitution and Bylaws in preparation for the August Membership vote

Spring 1999 Publish in *Dairy, Food and Environmental Sanitation*, an official notice to amend the IAMFES Constitution and Bylaws

August 1999 Vote at the IAMFES Annual Business Meeting to amend the IAMFES Constitution and Bylaws and change the Association name to "International Association for Food Protection"

September 1999 Mail ballot to entire Membership or vote to amend the IAMFES Constitution and Bylaws and change the Association name to "International Association for Food Protection"

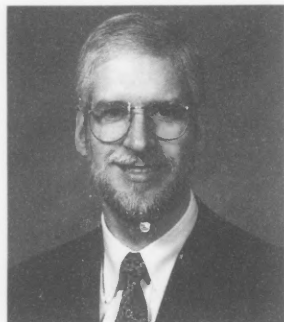
Fall 1999 Tabulate votes and announce results in *Dairy, Food and Environmental Sanitation*

January 2000 After Membership approval, begin using the new name: "International Association for Food Protection"

Input to this process is always welcome. Any questions or comments regarding the name change should be forwarded to Bob Brackett, IAMFES President or David Tharp, IAMFES Executive Director (contact information listed on page 242).

COMMENTARY

FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP
IAMFES Executive Director

“Advancing food safety worldwide”

“Advancing Food Safety Worldwide.” That slogan was put in use about two years ago with the approval of the Executive Board. One of the reasons behind its development was to create an identity for IAMFES Members and other food safety professionals to easily recognize the Association and link “IAMFES” to “Advancing Food

Safety Worldwide.” It was felt this was the focus of all IAMFES Members – to expend their efforts to advance food safety worldwide!

The slogan and our mission, “to provide food safety professionals with a forum to exchange information on protecting the food supply,” go hand-in-hand and serve as a description of IAMFES and its Members. We feel that the IAMFES mission is accomplished in many ways such as the exchange of information through our journals (*Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection*) and from presentations at the IAMFES Annual Meeting. In addition, we have excellent resources available to our Members like the Audiovisual Library of videotapes and a series of Investigation Manuals. I should note here that the fifth edition of the *Procedures to Investigate Foodborne Illness* is now available by calling our office or completing the order form on page 311.

IAMFES is fortunate to have many Members who willingly give their time to the Association for the benefit of all. There are more than 250 people serving in various capacities on over 20 Committees, Professional Development Groups (PDG) and Task Forces. This is another example of how we fulfill the IAMFES mission. These groups are a vital part of IAMFES and they provide guidance, leadership and input to the Association’s operations and programs. To become involved with any of these groups, review the list in your Membership Directory or on the IAMFES Web

site, then contact the Chairperson of the group(s) of interest. You may obtain additional details from the Chairpersons or contact our office.

I’m certain that by now you have learned about the proposal to change the name of IAMFES to the “International Association for Food Protection.” Soon, all Members will receive an official notification giving the time and place where the vote will be taken. It will, of course, be taken at the Annual Business Meeting on August 3, 1999 at the Hyatt Regency Dearborn Hotel. Additional details will be included with the official notice. The Constitution & Bylaws Task Force spent many hours reviewing and revising our existing Constitution & Bylaws and the review continues at the present time by our Committee, PDG and Task Force Chairpersons. Once this review is completed, it will again be presented to the Executive Board for their review. Our thanks to Michael Brodsky and the Constitution & Bylaws Task Force for their service to IAMFES.

So many people are coming together to rally behind the new Association name! It is great to see support building as we approach the Annual Meeting and the vote date. With your support, IAMFES will become the International Association for Food Protection and will retain the mission “to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply.” The International Association for Food Protection will also continue to “Advance Food Safety Worldwide!”



The Workshops

Friday & Saturday July 30-31, 1999

Hyatt Regency Dearborn – Dearborn, Michigan

WORKSHOP I

Procedures to Investigate Foodborne Illness

HOURS

Registration - 1:00 p.m.

Friday, July 30, 1999 - 1:30 p.m. - 5:00 p.m.

Saturday, July 31, 1999

Continental Breakfast

Workshop - 8:30 a.m. - Noon • 1:30 p.m. - 5:00 p.m.

Lunch Provided

WORKSHOP II

An Insider's Look at Microbial Risk Assessment

HOURS

Registration - 1:00 p.m.

Friday, July 30, 1999 - 1:30 p.m. - 5:00 p.m.

Saturday, July 31, 1999

Continental Breakfast

Workshop - 8:30 a.m. - Noon • 1:30 p.m. - 5:00 p.m.

Lunch Provided

Workshop Presenter: Frank L. Bryan, Ph.D., M.P.H., Food Safety Consultant

What You Will Learn: Participants will conduct a simulated outbreak investigation using the forms, tables and keys in the 1999 5th edition, *Procedures to Investigate Foodborne Illness*. This workshop will teach interviewing techniques, procedures for determining responsible foods, calculation of epidemic curves and attack rates, field investigation methods to determine source and mode of contamination and other factors that contribute to the cause of the outbreak.

Who Should Attend: Food protection professionals from city, county, state, and federal health agencies that investigate outbreaks; sanitarians; veterinarians; epidemiologists; administrators; disease surveillance personnel; educators; and food industry and regulatory personnel.

Workshop Moderator and Facilitator: Don Schaffner, Ph.D.

Workshop Presenters: Robert McDowell, Risk Analysis Systems; Greg Paoli, Decisionalysis Risk Consultants, Inc.; William H. Ross, Ph.D., Bureau of Biostatistics and Computing Applications; Ewen C.D. Todd, Ph.D., Health Protection Branch, Health Canada; and Richard C. Whiting, Ph.D., Food and Drug Administration

What You Will Learn: This workshop will compare and contrast two risk assessments conducted to address the risk of *Salmonella* Enteritidis in shell eggs to illustrate how different data and assumptions can impact the resulting risk estimate. The workshop will also demonstrate how distributions are derived for data, how they are input into commercial risk assessment software, and how the software can be used to look at "What if?" scenarios.

Who Should Attend: Food industry microbiologists, HACCP coordinators, government food microbiologists, food microbiology researchers, microbial modelers and anyone else interested in an in-depth look at microbial risk assessment.



Workshop I - Procedures to Investigate Foodborne Illness

Workshop II - An Insider's Look at Microbial Risk Assessment

	Before 7/1/99	After 7/1/99
IAMFES Member	\$220	\$270
Non Member	\$315	\$365

	Before 7/1/99	After 7/1/99
IAMFES Member	\$310	\$360
Non Member	\$405	\$455

First Name _____ M.I. _____ Last Name _____

Company _____ Job Title _____

Address _____ City _____

State or Province _____ Country _____ Postal Code/Zip + 4 _____

Telephone # _____ Fax # _____

E-mail _____

To register, Phone: 800.369.6337; 515.276.3344;

Fax: 515.276.8655; or contact Julie Cattanaach

at E-mail: jcattanaach@iamfes.org.



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Total Amount Enclosed \$ _____ **(U.S. Funds on U.S. Bank)** _____ Signature _____ Exp. date _____

Designing Dairy Products to Meet the Needs of Older Women

Katherine T. Eddy,¹ Denise Brochetti,^{2*} Susan E. Duncan,³ and Leslie F. Hagy⁴

SUMMARY

Focus groups were conducted with 24 older women, ages 65 to 89 years, to identify dairy product characteristics important to them. The women were independently living and recruited from retirement communities in urban and rural areas of Virginia. All were white, not of Hispanic origin; all had at least a high school education. Focus group discussions were audiotaped, and written transcripts were prepared for use in qualitative data analysis in which key product characteristics were identified. Key characteristics included sensory characteristics, nutrients, packaging, cost, and labeling. Women's feelings about those characteristics pertained to their health concerns, physical limitations, fixed incomes, and small households. Most women thought dairy products, particularly cheese and ice cream, were high in fat, and most expressed dissatisfaction with the taste of lower fat products. Women felt that product containers were too large and difficult to open. Many were concerned with the cost of nutritionally modified products and of products packaged in small containers. Women read nutrition information on product labels but thought "use by" and "sell by" dates were difficult to locate and understand.

INTRODUCTION

The way food products are designed and marketed to the American consumer is changing. Barkema (5) reported that consumers are increasingly challenging the food industry to design products that meet specific needs, thereby creating many market niches. Kinsey and Senauer (18) reported that the most successful new products are those that respond directly to consumer needs.

The US population is aging, and this creates the need for products designed for older adults (12). Sloan (27) reported that food manufacturers already are eager to market products to consumers age 50 and over because this population segment currently represents a \$900 billion market. Furthermore adults ages 65 years and over constitute one of the fastest growing population segments in the United States. Between 2010 and 2030, this segment will grow at an annual rate of 2.8% as adults in the "baby boom" generation (individuals born between 1946 and 1964) turn age 65 (1). By the year 2050, approximately one in five Americans will be elderly.

In 1995, there were almost 20 million older women ages 65 and over in the United States, and this number is increasing rapidly; by 2025, there will be an estimated 33.5 million older women (1). An increase in life expectancy has contributed to this growth. Since the turn of the century, the life expectancy of women has increased from 48 years to 79 years, yet as women live longer their risks of disease and disability increase (13).

National reports indicate that many older women tend to consume less than the recommended 2 to 3 servings of dairy products per day and have suboptimal calcium intakes (4, 14, 15). Research indicates that a diet low in calcium increases the risk of osteoporosis. Of the 25 million Americans who have osteoporosis, 80% are women, with elderly Caucasian and Asian women being at high risk (13). More recent research indicates that calcium intake also might be associated with hypertension and colon cancer risks (22, 23).

To increase calcium intake of Americans, the National Institutes of Health Panel on Optimal Calcium Intake (23) recommended a unified public health strategy with implications for both the public and private sectors. The Panel recommended that food manufacturers develop a variety of calcium-rich products that meet the needs and preferences of the diverse American population. The panel also recommended that food retailers increase accessibility and visibility of those products. Berner and Lofgren (6) identified areas the dairy industry should address to develop and market dairy products. The following were among those identified: (1) to understand consumer perceptions of dairy products in light of current diet and health concerns and (2) to market products that meet the needs of the changing American population.

To develop and market dairy products that meet the needs of older women, an understanding of what motivates this market segment to purchase and consume dairy products is needed. Many factors can

influence older adults' food choices; these factors include income, household composition, education, food preferences, culture, and health (7). In 1995, the US Bureau of the Census (3) reported that 40.2% of the population of older women lived alone, that 37.6% had high school diplomas, and that only 9.4% had undergraduate degrees. However, the education level of older adults is expected to increase when "baby boomers" begin reaching age 65 because they are well educated, with approximately 90% having completed high school (21). Research indicates that education influences food choices of older adults in that educated adults are more likely to eat a wide variety of foods (7).

In the food industry, focus groups are used to gain insight into factors that motivate consumers to purchase or consume food products. The focus group technique is a qualitative research method that involves carefully planned discussions to explore individuals' perceptions, feelings, and thoughts (19). In product development and marketing, focus groups are used in a variety of ways, such as to help identify new product concepts and to assess key characteristics that affect product acceptability. Results are used to help design questionnaires for quantitative surveys of target markets (10). Brug et al. (8) used focus groups to explore consumer beliefs concerning consumption of fruits and vegetables, Hashim et al. (16) used focus groups to explore consumer attitudes, opinions, and concerns toward irradiated poultry, and Bruhn et al. (9) used focus groups to identify pesticide risk information that consumers find useful.

In this study, focus groups were conducted with educated, older women to explore their perceptions of dairy products. A sample of non-Hispanic white women, 65 years of age or over, was studied because non-Hispanic white women are at high risk for osteoporosis. Women were non-institutionalized and resided in retirement communities in Virginia. In this article, the women's

thoughts and feelings toward key characteristics of dairy products are reported along with how this information might be used to help design products that meet the needs of this particular market segment.

MATERIALS AND METHODS

Focus group discussions

Three focus groups were conducted with elderly non-Hispanic white women. Criteria for recruiting women to participate in the groups were: (1) 65 years of age and over; (2) minimum of an 8th grade education; and (3) capable of purchasing and preparing food. Women were recruited from three retirement communities in urban and rural areas of Virginia; one focus group was held at each community. Women were invited to participate in a group via letters, flyers, and personal contacts from activity directors at the communities.

Procedures described by Krueger (19) were used to conduct the focus groups. Group discussions lasted from 45 minutes to 1 hour; audio recordings were made of all discussions. During the discussions, women were asked a series of open-ended questions designed to obtain information on preferences for dairy products, advantages and disadvantages of dairy products, factors influencing dairy product choices, and ideas for product improvements. Prior to the focus groups, pilot testing was done with eight women to help develop questions used in the discussions. Discussions began with women generating lists of dairy products to help focus them on a variety of products. At the end of each discussion, women completed a brief socio-demographic questionnaire. The primary author served as moderator of each discussion; an assistant moderator was present to take notes, observe group dynamics, and operate an audio-cassette recorder. The research team met after each discussion to note impressions and emerging themes; the moderator then wrote summaries of this information to use later in data analysis.

Data analysis

Procedures for qualitative data analysis described by Krueger (19) were used. First, the moderator prepared written transcripts of women's responses for each discussion from the audiotapes. Next, codes were developed to represent themes that occurred in the discussions. These codes were developed based on discussion summaries, study objectives, and food choice models (26). A word processing program was used to code and sort responses from the transcripts into the themes. This systematic analysis was conducted independently by an assistant analyst to minimize bias in data analysis. After both analyses were completed, the research team met to discuss discrepancies in coding and sorting in the analyses until consensus was reached on final codes representing the themes (19).

RESULTS

A total of 24 non-Hispanic white women participated in the focus groups. Results of the socio-demographic questionnaire indicated that all women were between the ages of 65 and 89 years. Women were highly educated; all had at least a high school diploma, 3 had undergraduate degrees, and 3 had graduate degrees. All of the women were capable of purchasing and preparing food; 19 of the 24 lived alone. Ten followed a diet recommended by a physician, and these diets included low-fat, low-cholesterol, low-sodium, and/or low-calorie.

Analysis of focus group data revealed that the following characteristics of dairy products were important to the women: sensory characteristics, nutrients, packaging, cost, and labeling. Reported here are results pertaining to the women's perceptions of those characteristics. Specifically, the women's thoughts and feelings towards each of the characteristics are discussed. Some responses from the women also are given in quotes to help illustrate the women's thoughts and feeling. Because focus group data are qualitative, adjective

phrases, such as "most women" or "few women," are used in reporting results (19). Results are reported collectively for all focus groups because researchers were interested in the thoughts and feelings that were common to this sample of women.

Sensory characteristics of dairy products

Overall, the women reported that they liked many different dairy products, but sometimes they did not mention specific sensory characteristics as the reason. For example, one woman remarked, "...and I eat Swiss cheese right much because it's good with ham, it's good with tomatoes..." and another stated, "I would love to have some whipped cream! It's so good." Some women described frozen chocolate yogurt as "delicious", and others described chocolate milk as "very satisfying." A few women in the groups reported a dislike for milk and either did not drink it or used it only in small quantities. This is illustrated in the following remark from one woman: "I have never liked milk. I use it on cereal and that is about the extent of my milk use."

Women in the groups mentioned specific sensory characteristics most often when discussing low-fat and fat-free dairy products. Most women mentioned that they consumed skim milk, low-fat ice cream, and low-fat frozen yogurt, but many mentioned that they disliked reduced-fat cheeses. Some described those products as "awful" and "oh it's terrible." For example, one woman had the following to say about cream cheese: "The one that has no fat, you can...agghh! I can't take it with no fat. I took it, I threw the whole thing out. I don't like the taste." Women seemed to be very aware of the taste of foods in general and seemed to know that the senses of taste and smell declined with age. One woman explained, "Really and truly your taste buds do get dull, and your sense of smell gets dull, and it's the two things together that make food taste good." Another woman stated, "A partial (dentures) or a plate will decrease the sense of taste, thus we are looking at taste

more than you are." Sensory characteristics of food products play an important role in acceptance. Research indicates that taste and smell are important to food choices of older adults because acuteness of these senses decreases with age (7, 29).

When the women generated lists of dairy products at the beginning of the focus group discussions, one woman in each group mentioned eggs. It is obvious that most women did not share this misconception, because others in the groups corrected this. The women did not offer explanations as to why they thought "eggs" were a dairy product. Researchers, however, suspect that this might be due to the fact that eggs are often located in the dairy section of grocery stores, as this occurred when the women were asked to generate lists of dairy products.

Nutrients in dairy products

Most women mentioned fat content as a reason for avoiding some dairy products. Frequently, women discussed the need to limit their fat intake, as illustrated in the following, "...right, everything needs to have no fat." Women discussed lowering their fat intake in relation to dairy foods, as evident in the following responses, "...in cheese of course the less fat involved the better for us..." and "I don't eat ice cream. I had open heart surgery and I'm suppose to stay away from fat." As previously noted, 10 of the 24 women were on diets recommended by a physician, and those dietary restrictions seemed to influence their dairy food choices. Chronic diseases that impose dietary restrictions are prevalent among older adults. The Administration on Aging (2) reported that 4 out of 5 older adults suffer from diabetes, hypertension, arthritis, and/or heart disease.

Krummel and Kris-Etherton (20) reported that the proportion of women consuming lower fat milk increases with age. Therefore, it is not surprising that women in the focus groups frequently mentioned using skim milk, 1/2% milk, and 1% milk

as alternatives to whole milk. One woman explained, "Nobody drinks whole milk anymore except for children." Women also mentioned using frozen yogurt, low-fat ice cream, and low-fat cheeses. For example, one woman remarked, "...Swiss cheese (specific brand mentioned), I buy that because of the low fat content..." and another stated, "...ice cream (specific brand mentioned), no sugar, no fat, and it tastes wonderful."

In the Georgia Centenarian Study, Fischer et al. (14) found that ice cream and whole milk consumption was low among older adults who were avoiding high cholesterol foods. Some women in the focus groups explained that they avoided certain dairy foods because of cholesterol, but this issue was discussed less extensively than fat. In particular, those women mentioned avoiding cheeses because of cholesterol, which is illustrated in the following remark: "Well, I eat spaghetti, but you see, I'm not suppose to have cheese because of high cholesterol." Some women also mentioned avoiding cheeses because of sodium, as noted in the following remark from one woman: "The trouble with most of the cheeses though is that they have so much salt content, and a lot of us have to restrict our salt."

Women's remarks concerning fat and cholesterol seem consistent with recent trends in sales and consumption of dairy products. Trends indicate that consumption of lower-fat dairy products has increased as that of whole-fat products has declined. In particular, low-fat milk consumption has increased substantially over the past three decades, and sales of skim milk continue to increase (20, 24). Consumption of frozen dairy desserts also has increased, and reports indicate that approximately 98% of American households consume some ice cream (28). In a study of snacking habits of older adults, Cross et al. (11) found that ice cream was a common evening snack for older adults.

Women were aware that dairy products are a good source of calcium, and several women said they

ate dairy products with this in mind. For example, one woman remarked, "...then after retiring, sensing a need for calcium, have gone back to it (drinking milk), and like her I find I am shrinking." As indicated in that response, the women were aware of osteoporosis, but many mentioned using calcium supplements to meet their calcium needs. This is evident in the following remark from one woman: "...drinking milk, I just take pills there."

One woman in each focus group mentioned that she was either lactose intolerant or allergic to milk. These women originally said they were allergic to milk but then discussed a specific brand of lactose-reduced milk, indicating confusion about lactose intolerance. It was expected that few women in the groups would be concerned with lactose intolerance because lactose intolerance is uncommon in this population segment. Rorick and Scrimshaw (25) reported only a 12% incidence of lactose intolerance in older adults of European descent.

Packaging of dairy products

In all of the focus groups, women frequently reported that some dairy products were not available in small enough containers; many explained that large containers were a waste of money because they lived alone and could not use all of the product before it spoiled. As noted previously, 19 of the 24 women in the focus groups lived alone. The following remark from one woman illustrates the women's concern with size of containers: "You waste a lot of money and you waste a lot of food. I think that's one of the main objections that people who live alone would like the industry to know, that we could use smaller containers."

In particular, women complained about the size of low-fat cottage cheese containers. One woman made the following statement, "There are about six servings, I would say, in one of those smaller containers of cottage cheese, and you don't want it six times in a row." Many specifically mentioned that they would buy

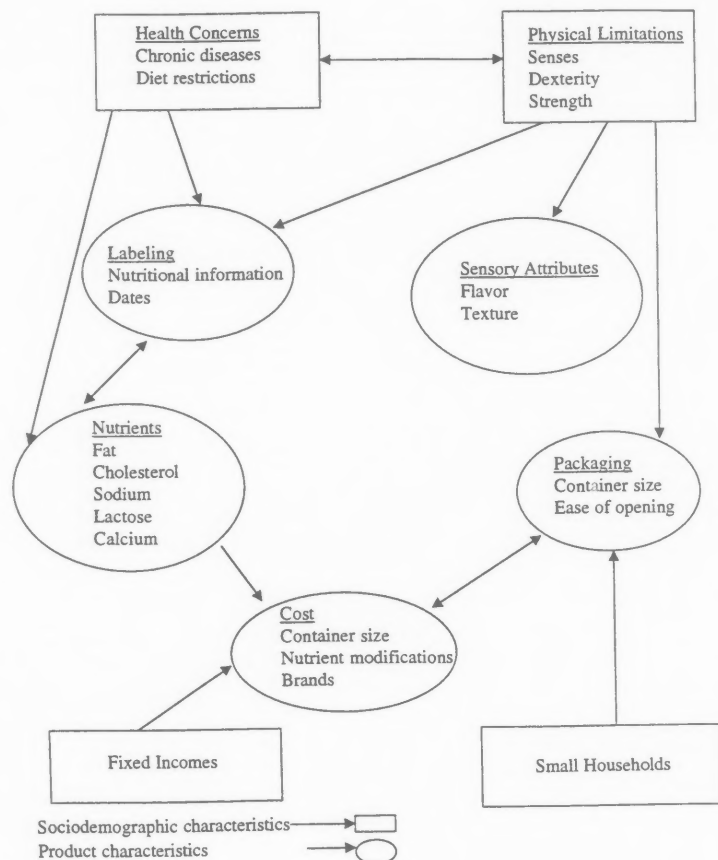
this product if it were available in smaller sizes. One woman pointed out that it should not be difficult to market cottage cheese in smaller containers because, "...after all, they did that with yogurt." Women in only one focus group mentioned that they could buy smaller containers of cottage cheese in stores in their area; women in the other groups mentioned that they could not. A few women complained about the package size of other types of cheeses, as the following illustrates, "When they have these long bars of cheese, if you don't eat a lot, you'd like to have half of it." Women also complained about the size of lower-fat ice cream and frozen yogurt containers; many felt that only the more expensive brands were available in smaller containers.

Women reported having difficulty opening packages of some dairy products, particularly milk cartons, cheese packages, and foil-wrapped cream cheeses. Many attributed this to "old hands" and poor eyesight. The following comment from one woman illustrates the women's frustration with opening milk cartons: "You've got those plastic bottles and you're suppose to take a piece of plastic and pull it off from around there. Sometimes I, once or twice I've gotten the pliers out so I can get hold of it." One woman wanted screw top lids on paperboard cartons of milk similar to those on orange juice cartons. Poor eyesight seemed to make it difficult for some women to open packages of cheese, as one stated, "...they put a little tiny black mark where you're suppose to open, but you can't see it!" Another woman in the group responded, "We need a big black mark!"

Cost of dairy products

Cost of food, including dairy products, was important to most of the women in the focus groups. Although the women did not have low incomes, they were retired and had fixed incomes. The following comment from one woman illustrates the concern with cost: "We live on fixed incomes you know. I don't

Figure 1. Factors important to dairy product choices of older women participating in focus groups



mean any of us are poor or lacking or whatever, but people have to remember that people on fixed incomes are not getting raises."

The women's concern with cost pertained to container size, nutritionally modified products, and brand names. As discussed previously, women wanted products in smaller containers because they lived alone and could not use all of the product in larger containers before it spoiled. Although this represented a waste of food and money to them, women also mentioned that sometimes products cost more when sold in smaller containers. Women felt that nutritionally modified products were expensive, as evident in the following remark, "...if it's salt free, or this free, or that...fat free, it's more expen-

sive." Again, some of the women in the groups had dietary restrictions and needed to purchase nutritionally modified products, so concern with cost of these products could be expected. Women also reported that they changed brands to reduce cost. One woman explained, "You've always bought brands and now you get the other...", and another commented, "Well, I buy the store brands of milk, instead of uh, you know, some of the better labels."

Labeling of dairy products

In all of the focus groups, women discussed food labels, particularly nutrition labeling and open dating of dairy products. When discussing low-fat and fat-free products, one woman remarked, "...labeling is important to

us now...", and another stated, "...I think most of us check those Nutrition Facts." Comments such as these indicate that the women were interested in nutrition information on dairy products and that they read label information. As previously noted, this was a sample of educated women, so label reading was expected. Additionally, some of the women needed to check the nutrients in products because they had dietary restrictions.

Many women reported that dates on dairy product labels were difficult to locate and to understand. One woman made the following comment about cream cheese: "Oh, they've been dating it for a long time. It's just hard to find the date on some of these things." One woman who was confused about "use by" and "sell by" dates mentioned that she had asked for help while shopping, but as she explained, "...even the grocery store people don't know." As discussed previously, women often had to buy large containers of dairy products because smaller sizes were not available; these women need to use dates on labels, as they are concerned about spoilage. Spoilage and food safety are important concerns for older women, because they are a group at high risk for foodborne illness. Although women in the groups did not discuss food safety, age, chronic diseases, and use of medications in this population affect the immune system so as to make older women more susceptible to foodborne illness (17).

DISCUSSION

Food choice behavior of consumers is complex, and research indicates that many factors motivate consumers to choose specific foods (5, 7, 26). Thus, it is not surprising that many factors seemed to influence dairy product choices of the women in the focus groups. However, results of this study need to be interpreted within its limitations. The study included a small sample (n=24) of educated, non-Hispanic white women residing in retirement communities in Virginia; therefore, results cannot be generalized to other groups of older women. Nonetheless, the focus groups do provide some insight

regarding older women's dairy product choices, and this can be helpful in designing products to meet the needs of this market segment.

Shown in Figure 1 are factors important to dairy product choices of the older women in this study. As illustrated in that figure, factors included not only key characteristics of products but also socio-demographic characteristics of the women. Key product characteristics were sensory characteristics, nutrients, packaging, cost, and labeling; however, the women's thoughts and feelings toward those characteristics seemed to relate to their health concerns, physical limitations, small households, and fixed incomes.

Many of the women had dietary restrictions, and most mentioned the need to limit intakes of fat, cholesterol, and/or sodium. Consequently, the women were concerned with the nutrients in dairy products. Women read nutrition information on labels of product packages, and used lower fat alternatives. However, women expressed dissatisfaction with some of these products, often citing sensory characteristics as the reason. Sensory characteristics were important to the women, and the women seemed to know that the senses of taste and smell decline with age. Women used nutritionally modified dairy products because of dietary concerns but wanted these products at prices comparable to the original versions. Women were retired and lived on fixed incomes; consequently, they expressed concerns about the cost of dairy products. These concerns pertained not only to nutritionally modified products but also to package size. Women wanted smaller containers of dairy products because they felt large containers were a waste of money; most of the women lived alone and therefore could not use all of the product in larger containers before it spoiled. Because women were concerned with product spoilage, they used dates on labels of dairy products, but many thought dates were difficult to locate and to understand. Women reported that they

needed easy-to-open packages with easy-to-read labels because of "old hands" and poor eyesight.

Interrelationships among product and socio-demographic characteristics suggest that many factors must be considered when designing products for this market segment. For example, if products such as cottage cheese are packaged in smaller containers, these containers also need to be easy to open and to have easy-to-read instructions printed on the labels. When nutritionally modified products such as fat-free yogurt and ice cream are developed for this market, these products should be packaged in smaller containers and sold at prices affordable by those living on fixed incomes. Additionally, the flavor of these products might be enhanced to compensate for the decreased taste acuity associated with aging.

CONCLUSIONS

To design dairy products to meet the needs of older women, an understanding of what motivates them to choose dairy products is needed. Results of this study provide insight regarding educated older women's thoughts and feelings toward a variety of dairy products, and this information should be helpful in designing products to meet the needs of this market segment. The descriptive information obtained from the focus groups could not have been obtained from studies employing quantitative techniques such as questionnaires; however, quantitative research should be done to examine dairy product choices of a larger sample of older women and to quantify the prevalence of the problems identified in the focus groups.

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A Case Study of a School Foodservice Cook-Chill Operation to Develop a Hazard Analysis Critical Control Point Program

Karen M. Blakeslee and Karen P. Penner*

SUMMARY

A case study was conducted of a school foodservice cook-chill operation to establish a Hazard Analysis Critical Control Point (HACCP) program for four ground beef entrees. Focus groups assessed employee knowledge and attitudes about cook-chill production, food safety, and HACCP. Managers were knowledgeable about food safety but cited lack of time as an impediment to implementation. Time and temperature measurements documented cooking, chilling, reheating, and serving functions. Product internal temperatures reached $184.5 \pm 5.9^\circ\text{F}$ prior to chilling. Blast chilling cooled products to 40°F within 2.0 ± 0.8 h. On reheating, product temperature reached $184.9 \pm 10.6^\circ\text{F}$ in 40.0 ± 17.9 min. A holding temperature of $>140^\circ\text{F}$ was sustained for 71.4 ± 4.5 min.

Environmental sanitation was analyzed using adenosine triphosphate bioluminescence. Inconsistencies signified the need to establish standard sanitation practices. Microbiological tests included aerobic plate count (APC), total coliforms, *Escherichia coli* spp., *E. coli* O157:H7, *Salmonella* spp., *Staphylococcus aureus*, and *Clostridium perfringens*. All tests were negative for *E. coli* O157:H7. Raw ground beef contained *Salmonella* spp., *S. aureus*, *C. perfringens*, an APC of $2.4 \times 10^5 \pm 4.3 \times 10^5$ CFU/g, a total coliform count of $3.6 \times 10^2 \pm 5.3 \times 10^2$ CFU/g, and an *E. coli* count of $3.3 \times 10^2 \pm 6.9 \times 10^2$ CFU/g. Cooking reduced the APC by 3 to 4 log cycles and eliminated total coliforms and *E. coli*. *Salmonella* spp., however, survived processing or reappeared through recontamination.

INTRODUCTION

In 1995, Unified School District (USD) 383 in Manhattan, KS, broke ground to build a new central kitchen to service 6,274 students in 15 schools (11 elementary, 2 middle, and 2 high) serving 3,200 lunches and 700 breakfasts each day. The kitchen also services HeadStart, summer feeding, and a day-care center. The central kitchen replaced base kitchens that prepared hot meals that were transported to the remaining schools on the same day. One of the base kitchens, which was only 4 years old, produced 2,500 meals in a facility designed to produce 2,000 meals. With the addition of two new middle schools, another base kitchen would have been needed. Based on the advice of consultants, the central kitchen was identified as the best option to replace the four base kitchens and save money as well as increasing product quality, product safety, and customer service (12). The design of the central and satellite kitchens included a cook-chill production system to prepare products, chill them rapidly, transport them to the schools, reheat them, and serve them to the students. A decision was made to incorporate a Hazard Analysis Critical Control Point (HACCP) plan to ensure the safety of the food prepared at the central kitchen and schools. This project was a case study to design a HACCP program for USD 383, using four ground beef products, and to incorporate the HACCP procedures into the recipes being produced in the central kitchen cook-chill facility and served at the schools. This article focuses on the cook-chill operation, microbiological analysis, and the effectiveness of cleaning and sanitation.

MATERIALS AND METHODS

Procedures were performed in the central kitchen cook-chill operation and one elementary school. Focus groups were conducted with all school managers and central kitchen managers to determine attitudes and knowledge about HACCP, food safety, and the cook-chill sys-

tem. We assumed that the data gathered at the school are representative of all schools, so that general recommendations can be made. For the initial HACCP study, four products were chosen: spaghetti sauce, taco meat, chili, and sloppy joe meat. These products all contain ground beef, which has been the source of several outbreaks of foodborne illness. Ground beef products were evaluated at these points: raw meat prior to cooking, preparation, chilling, reheating, and service. Variables measured were time, temperature, microbiological growth in the products, and environmental sanitation effectiveness. All numerical data were analyzed with SPSS 7.5 for Windows® Student Version.

Focus groups

Two focus group sessions were conducted, the first of which was prior to the opening of the central kitchen. The purpose of this session was to determine perceptions of the central kitchen managers and satellite kitchen managers about food safety, HACCP, and the new cook-chill system following methods outlined by RIVA Market Research, Inc. (9). A moderator's guide, developed in consultation with two faculty members, served as a script. The session was recorded on tape to obtain an accurate record of the discussion.

At the beginning of the focus group session, each participant responded to a questionnaire on knowledge of food safety and HACCP. They evaluated themselves on their use and frequency of some basic food safety practices, using a Likert scale (8) of 1 to 5 (1 = never; 5 = always). Participants also rated their level of knowledge of microorganisms and potential hazards in school foodservice on a Likert scale of 1 to 5 (1 = no knowledge; 5 = complete knowledge). They also provided demographic data and information about their foodservice experience and training in HACCP.

A second focus group was conducted to determine the managers' knowledge, practices and attitudes about food safety, HACCP, and the

cook-chill system after 7 months experience with the new system. The same questionnaire was used to determine whether any self-reported change had occurred in food handling practices and knowledge about food safety and HACCP.

Cook-chill

Ground beef was received frozen in boxes of 5-pound chubs from a local meat wholesaler before the start of the school year. It was stored at the central kitchen in a freezer (0 to 10°F). Canned products were purchased in cases of six #10 cans. These and all dry ingredients were kept in dry storage.

Based on the menu, schools placed food orders 2 weeks in advance of scheduled service. From these orders, production was scheduled to make the product 2 days in advance of serving. Two days prior to production, ground beef was taken from the freezer to the thawing cooler (33 to 39°F), removed from boxes and placed in a single layer on trays on a rolling cart. One day prior to production, dry ingredients were measured and canned items were removed from storage.

On the day of production, the kettle and pump-fill station (Groen CAPKOLD®, Elk Grove Village, IL) were sanitized with a solution of 8 fluid ounces of 5.25% sodium hypochlorite chlorine solution (Nugget® Brand Bleach, Stockton, CA) in 60 gallons of 140°F water for approximately 30 min and then pumped out. The steam in the kettle jacket kept the sanitizing solution at the proper temperature. The ground beef was precooked in tilting fry pans (Groen, Elk Grove Village, IL). The amount of ground beef used varied depending on production needs. When the meat was cooked to at least 165°F, the grease was removed by straining the meat through a hand strainer. The meat was then transferred to a 100-gallon cooking kettle and heated with agitation to ensure that all pieces of meat were cooked thoroughly. The dry and liquid ingredients were added. The entire mixture was agitated and heated to an

internal temperature of 180°F for 15 s, using the thermometer located inside the shaft of the kettle agitator. The product temperature was recorded on a continuous circular recording chart (Honeywell, York, PA). The quantities prepared varied.

The product was pumped through a 4-inch transfer hose from the bottom of the kettle to the pump-fill station. The pump-fill station was programmed to pump 1-gallon quantities. Plastic bags sealed with a metal clip on one end were held up to the filler head. Each bag was filled with 1 gallon of product. As much air as possible was removed from the bag, and the bag was sealed with a metal clip. The bag was tagged with the product name and Julian date of production. The bags, designed especially for cook-chill operations, are made from a multi-layered, coextruded material combining nylon and linear low-density polyethylene (LLDPE) with a thickness of 4.5 ml. They can withstand temperatures up to 250°F, are highly durable, and provide extended shelf life for several weeks (C & K Mfg, West Lake, OH).

The filled bags were placed in single layers no more than 2 inches thick on rolling wire racks. When filled, the rack was rolled into a blast chiller (Cross-Cool™ by OmniTemp, Downey, CA). A Dickson Data Logger was used to monitor the time and temperature required to chill the bagged product from 180°F to below 40°F in the blast chiller. The temperature probe was placed so that the bagged product surrounded the probe but maintained the same thickness as other bagged product. The chiller was turned on and the starting time and temperature were recorded. When the product reached a minimum chill temperature of 40°F, the rack was rolled into refrigerated storage units (Kolpak, Parsons, TN). This product was ready to be trucked to satellite schools on the following day.

Two transportation routes were used for delivering food. The bags of product were transported in insulated food carts (Food Warming Equip-

ment, Crystal Lake, IL), one cart per school with the number of bags per cart varying depending on the quantity ordered. The carts which were not refrigerated during delivery were loaded by central kitchen employees early in the morning and kept in refrigerated storage until time to load the truck. At the school, the product was removed from the cart by the driver and placed into the refrigerator at 28 to 32°F (Beverage-Air®, Spartanburg, SC). The Dickson Data Logger was used on one occasion to record product temperature during transport from the central kitchen to the satellite schools, beginning when the cart was loaded and ending at the final delivery stop. The two-channel logger recorded ambient air temperature and product temperature.

Heating

On the day of service at the satellite school, the bags to be reheated were removed from the refrigerator, an average of 2.5 h prior to service. Several methods were utilized to heat the product to determine the best method for the school. One method consisted of removing the cold product from the bags, placing it into a 4 inch-deep pan, and heating it in a convection oven (Blodgett, Burlington, VT) at 350°F for 1 to 2 hours. In another method, bags were placed in a 4 inch-deep pan with water surrounding and covering the bag. Two pans of product were placed in a HyPerSteam Atmospheric steamer Model HY-3E (Groen, Elk Grove Village, IL) and heated for 30 min, after which the temperature of the product was verified by wrapping the bag around a Taylor Type K model 9800 thermocouple digital thermometer. This thermometer has a temperature range of -40°F to 500°F, with accuracy of ± 1.6°F. If the temperature did not reach 180°F, the product was returned to the steamer to continue heating. When at 180°F, the pan of bagged product was placed into the convection oven at 250°F to keep warm. After all bagged product had been heated, it was poured from the bags into 4 inch-deep counter pans, covered with foil, and placed into a

preheated hot cart (Precision Industries Inc., USA).

At the time of service, one pan at a time was removed from the hot cart and placed in the hot food serving station (Seco®, Washington, VT). The temperature was verified to ensure that it was above 140°F. During service, the temperature was verified again. Lunch service lasted for 1 h and 10 min. Any product to be kept for the next day was covered with foil and placed in the refrigerator to cool (28 to 32°F).

Microbial analysis

Samples were obtained for microbiological testing before, during, and after processing at the central kitchen and at the school. Five different food samples were taken for microbial testing. For each of four different products (spaghetti sauce, taco meat, chili, and sloppy joe meat), samples for microbial analyses included raw ground beef, cooked product after blast chilling, reheated product at the time of serving at school, and cooked product after 5 and 10 days of storage. The 5- and 10-day samples were taken to determine shelf-life stability. The product samples, except for the sample obtained after serving, were bagged product. From the entire amount of ground beef used for each product, portions of raw ground beef were randomly collected, using aseptic techniques and placed in sterile bags. The raw portions were commingled to get a uniform sample for analysis. The school sample was taken by use of the serving spoon and was transferred to a sterile bag. All samples were transferred and kept at 28 to 32°F and analyzed on the day of sampling.

For each of the five samples, aerobic plate count (APC), coliforms/*Escherichia coli* count, *E. coli* O157:H7, *Salmonella* spp., *Staphylococcus aureus*, and *Clostridium perfringens* were determined. Environmental samples taken with sterile swabs from the drains in the central kitchen were analyzed for *Listeria monocytogenes*.

All tests were conducted following the FDA Bacteriological Analyti-

cal Manual (3) and the Compendium of Methods for the Microbiological Examination of Foods (11). Rapid methods for microbial analysis were used when possible. These included 3M Petrifilm™ APC and coliform/*E. coli* plates (3M Petrifilm™, St. Paul, MN); Remel RIM *E. coli* O157:H7 latex test (Remel, Lenexa, KS) for presumptive identification of *E. coli* serogroup O157:H7; and Fung's double tube system for recovery and enumeration of *Clostridium perfringens* (1).

The counts for APC, total coliforms, and *E. coli* were determined in duplicate with 3M Petrifilm Plates (3M Petrifilm™, St. Paul, MN). A 50 g subsample was taken from the commingled sample, placed in a filtered stomacher bag with 450 ml of 1% sterile peptone water, and stomached for 2 min. Serial dilutions were made for each sample. Coliform/*E. coli* plates were incubated at 32°C for 24 h and APC plates at 37°C for 48 h.

Fung's double tube method was used to detect *C. perfringens* (1). A 25 g sample was placed in a stomacher bag along with 75 ml sterile 1% peptone dilution water. The sample was stomached for 2 min, and serial dilutions were made. A 1 ml sample was transferred to 22.5 ml of Shahidi Ferguson perfringens agar with 0.1 ml of D-cycloserine in a large tube. An inner tube was inserted, and the tube system was capped and incubated at 37°C for 48 h. Black colonies were picked up with a needle and stabbed into motility test medium and lactose-gelatin media, which were incubated at 37°C for 24 h. Gelatin samples that changed color from red to yellow were chilled for 1 h at 5°C, and any sample that gelled was incubated for another 24 h at 37°C. Motility-negative samples and liquefied gelatin in 48 h were considered presumptive positive for *C. perfringens* (3).

To determine the presence of *E. coli* O157:H7, a 25 g sample was placed in modified EC broth with novobiocin, stomached 2 min, and incubated at 37°C for 24 h. Serial dilutions were made and streaked on MacConkey sorbitol agar plates,

which were incubated at 42°C overnight (11). Sorbitol negative colonies (white) were tested using the Remel RIM *E. coli* O157:H7 latex test.

To determine *Staphylococcus aureus* count, a 25 g sample was placed in 75 ml sterile 1% peptone and stomached for 2 min. Serial dilutions were made and a 1 ml sample was transferred to 3 plates of Baird-Parker agar at 0.4 ml, 0.3 ml, and 0.3 ml per plate. Plates were incubated at 37°C for 48 h. Typical colonies were transferred to small tubes containing 0.3 ml brain heart infusion broth and 0.5 ml reconstituted coagulase plasma. Firmly clotted tubes were considered positive for *S. aureus* (3).

Salmonella spp. were detected by placing a 25 g sample in 225 ml lactose broth and incubating at 37°C for 24 h. One ml aliquots were transferred to sterile selenite cystine broth and tetrathionate broth, and broths were incubated at 37°C for 24 h. After enrichment, a sample from each broth was streaked onto bismuth sulfite agar, xylose lysine desoxycholate agar, and hektoen enteric agar. All plates were incubated at 37°C for 24 h. Suspected colonies of *Salmonella* were inoculated in triple sugar iron slants and lysine iron agar slants. All slants were incubated at 37°C for 24 h. Suspected cultures of *Salmonella* were tested serologically with somatic (O) test and biochemically with phenol red lactose broth, MR-VP broth, urease, and Simmons citrate agar (3).

Listeria monocytogenes was analyzed by swabbing the drain with a sterile swab moistened in *Listeria* enrichment broth (LEB). The swab was placed in 100 ml LEB broth and incubated at 30°C for 48 h. The broth was streaked onto modified oxford medium plates with a sterile cotton swab and incubated at 35°C for 24 to 48 h (11). Because no typical colonies developed, no further tests were conducted.

Adenosine triphosphate bioluminescence

Equipment sanitation was monitored using the adenosine triphosphate (ATP) bioluminescence assay

technique. This assay measures the total residue, including microbes and food, that contains ATP. Assays were performed using the UNI-LITE® XCEL monitoring kit and single-shot hygiene swabs from Biotrace™ Inc. (Biotrace™, Inc., Plainsboro, NJ). Results were given in relative light units (RLU). The sample points were primarily food-contact surfaces and utensils that affected the four products being monitored. Samples also were taken from the drains. These assays were conducted at the central kitchen and at the school. Sample area size was 4 in² where possible. Swabs were taken using standard microbial swabbing technique. A total of 11 samples was taken at the central kitchen prior to beginning production; sample areas were the 100 gallon kettle, kettle beaters, kettle air valve, transfer hose, pump-fill rotors, pump-fill filler head, tilting fry pan, floor drain, can opener, cutting board, and hand stirring paddle. A total of 5 samples was taken at the school; sample areas were the preparation table, floor drain, 4-inch counter pan, serving ladle, and lid. An RLU reading of ≤ 100 indicated clean, 101 to 299 indicated the need for caution, and ≥ 300 indicated contamination. The ATP method is a proactive technique in that the assays can be performed on site. If results showed contamination, immediate corrective action could be taken.

Food safety checklist

A Food Safety Checklist for Foodservice Operations developed by KSU Cooperative Extension Specialists utilizing HACCP principles (2) was used four times in the central kitchen and twice in the school to audit employee practices. The areas observed were receiving, storage, employee preparation, preparation (thawing) and preparation, serving and reusing prepared foods, cleaning, and sanitizing. The information obtained was used in taking corrective action and to improve practices.

TABLE 1. Self-reported food handling practices and knowledge level of food-service managers (N = 14)

Variable	Pretest mean (Std Dev)	Post-test mean (Std Dev)	t value	P value
Frequency of practice^a				
Use of thermometer	4.39 (0.70)	4.64 (0.63)	1.472	0.165
Employees wash hands	4.83 (0.38)	4.86 (0.36)	0.563	0.583
Keep PHF ^c out of TDZ ^d	4.67 (0.77)	4.79 (0.58)	1.38	50.189
Check sanitizers	4.50 (0.51)	4.21 (0.80)	1.000	0.336
Level of knowledge^b				
Microorganisms that cause foodborne illness	3.33 (0.69)	3.64 (0.63)	1.587	0.136
Conditions that affect microbial growth	3.21 (0.65)	3.71 (0.47)	2.876	0.013*
Potential hazards in school foodservice	3.56 (0.70)	4.00 (0.39)	3.606	0.003**

^a1 = Never, 5 = Always

^b1 = NO knowledge, 5 = COMPLETE knowledge

^cPHF = Potentially Hazardous Foods

^dTDZ = Temperature Danger Zone

* $P \leq 0.05$

** $P \leq 0.01$

RESULTS

Focus group

The participants, 16 women and two men, included three central kitchen managers and 15 school kitchen managers of USD 383. The average age of the employees was 45 years. The average length of employment with USD 383 was 10.25 years. Formal education levels included at least a high school education for 61.1% and some vocational training

for 22.2%. Over half (55.7%) had been employed in school foodservice for at least 10 years. Many had held other positions in school foodservice. One-third (33.3%) had been general foodservice workers, 27.8% had been cashiers, and 22.2% had worked primarily in the main-dish department. Other types of foodservice employment included positions in family style restaurants (44.4%) and hospitals (22.2%). Some (27.8%) had not worked in any other foodservice es-

tablishment. Primary sources for food safety advice and food safety training cited by 83.3% were the county health inspector and school foodservice management. Most of the participants (72.2%) had received food sanitation training on the job, and some (55.6%) had training in HACCP.

Practices and knowledge. For all questions on safe food handling practices, no significant differences in responses occurred between the first and second sessions (Table 1). Significant differences between the first and second evaluations were noted ($P \leq 0.05$) for knowledge about conditions that affect microbial growth. Significant differences also were noted ($P \leq 0.01$) for knowledge about potential hazards in school foodservice. In both cases, knowledge increased from the first session to the second session (Table 1). Although mean scores for food safety practices ranged from 3 (half the time) to 5 (always), observation by the researcher in the elementary school indicated that these practices were not always followed.

Focus group discussion. In the first focus group session, employees identified as common the following practices: washing hands, checking temperatures of products, proper dishwashing temperatures, wearing hair nets, and using plastic gloves. Participants indicated their belief that food safety education should be required for all new employees, and refresher courses should be offered for everyone more often; many even felt that lunch room supervisors should have a food safety education course. The primary impediment to following food safety procedures was lack of time to perform the procedures properly. Employees were aware of the types of foods considered potentially hazardous; examples cited were chicken, fish, dairy products, lunch meat, and various salad bar items. Controlling temperature was cited as the critical factor in preventing foodborne illness. Employees indicated that they kept equipment washed and sanitized and that they washed hands frequently.

Regarding knowledge of HACCP, some employees knew that it involved following a product from receiving of ingredients to serving of meals to students. Many were intimidated by the amount of paperwork potentially involved in tracking products. Temperatures of products were mentioned as primary critical control points.

All employees indicated that they were apprehensive, yet excited, about the cook-chill system and were afraid of the major changes that would occur. Initial concerns mentioned included the problems of inadequate equipment and insufficient help at the schools. Many employees were concerned that communication would diminish and that the numbers of employees would be reduced. Some school managers were adjusting from a full cooking kitchen to a satellite kitchen, which changed their responsibilities and routines. Expected advantages mentioned included less waste, fresher food, and improved quality of food.

All employees realized that mistakes were going to happen and that they would learn from the mistakes. School managers hoped administrators would come to the schools and observe how meals are prepared. Everyone agreed that they needed to work as a team to make the cook-chill system a success.

In the second focus group session, the primary concerns were: improperly functioning equipment, insufficient equipment to prepare meals efficiently, and lack of time to complete all responsibilities while at work. Employees noted that some equipment used for reheating and holding products did not function properly. Many school managers performed more functions in preparing meals and also were required to do more paperwork. They noted that food safety practices, such as taking temperatures, were being performed but they indicated that temperatures were not always recorded. Employees felt transportation and delivery of food were critical points in the operation. Because the transport carts were not refrigerated, managers perceived a potential for temperature abuse. The

timing of delivery of food was not always convenient for employees to receive and store food properly. Many times, deliveries occurred during lunch service. The truck driver emptied the cart and left all products at room temperature, which created the potential for temperature abuse.

Overall, employees believed the cook-chill production system was improving. Central kitchen managers noted that a change to use of larger bags for cook-chill products had decreased the time required to chill the product efficiently. The central kitchen had requested feedback from schools by use of critique sheets for various products. School managers liked the cook-chill products because of the greater control over the amount of product that needed to be heated. Managers of some satellite schools expressed concern about their personal safety in handling the hot bagged product. In some schools, managers did not heat the product in the bag. How products were heated depended on the menu each day and on the number of different items to be heated. Heating equipment was a limiting factor. The central kitchen managers felt less pressure to get product to the schools with the new system. Any rush deliveries could be made in adequate time prior to service at the schools.

Although many school managers indicated that they felt busier than before, all said they would not return to the previous production system. They also realized that many functions need improvement and would change over time.

Food safety checklist for foodservice operations

Central Kitchen. The Food Safety Checklist was administered four times in the central kitchen. Product receiving was not observed, because a majority of products were received at the beginning of the school year. We observed during preparation, however, that some canned products were slightly too severely dented, but had been accepted anyway at the central receiving center. The severely dented cans were discarded at the

preparation site, resulting in loss of product. Upon receipt, boxes should be opened randomly to check for damaged cans and products should be rejected if not acceptable.

Storage practices were excellent. All items put in storage were labeled with dates and rotated using first in-first out (FIFO) procedures. Storage temperatures, for all conditions (dry storage, refrigerated storage, and frozen storage) were monitored daily and recorded. All chemicals were kept in their original containers and stored away from food.

Employee preparation practices were satisfactory overall. Employees were conscientious about washing their hands before beginning work, during work as needed, and after any possible contamination. At one observation, an employee sneezed, covered her mouth and nose with her hand, and did not wash her hands before handling product. Lack of hand washing can lead to the spread of many infections, viral as well as bacterial, such as staphylococcal infections, and the nose is a source of *Staphylococcus aureus* (6). Another time, an employee who was ill refused to go home although encouraged to do so; such employees may contaminate food and infect other employees. Ready-to-eat foods were handled safely, but plastic gloves needed to be utilized more often in handling food that was to have no further preparation before being served (4).

Thawing and preparation practices were excellent. All frozen raw meat was thawed appropriately in the refrigerator. Meat was placed in pans on rolling carts, reducing the potential for cross contamination with any cooked products in the refrigerator. The meat was cooked to an internal temperature of at least 155°F for 15 s, meeting established standards set by the 1995 FDA Food Code (4).

Cleaning and sanitizing procedures were inconsistent over the four observations. After each use, all equipment was washed with a mild detergent (Old Faithful, Meyer Laboratory, Blue Springs, MO), rinsed, and sanitized with an aqueous 5.25% sodium hypochlorite solution (Nugget® Brand Bleach, Stockton, CA).

TABLE 2. ATP bioluminescence results for cook-chill and preparation equipment at the central kitchen and serving equipment at the school

Data Point	Valid N	Missing N	RLU ^a			
			Mean ^b	Standard Deviation	Min	Max
Kettle						
100 gal kettle	11	1	401.0	794.6	1.0	2734.0
Kettle beaters	11	1	559.0	794.0	13.0	2049.0
Kettle air valve	11	1	370.0	381.0	11.0	1139.0
Transfer hose	11	1	935.0	2872.1	13.0	9593.0
Pump-fill rotor	11	1	1134.0	3576.8	11.0	11918.0
Pump-fill filler head	11	1	418.0	1104.2	19.0	3741.0
Drain	11	1	4345.0	7648.5	10.0	21330.0
Preparation						
Can opener	10	2	1417.0	1903.1	63.0	5633.0
Tilting fry pan	11	1	182.0	410.6	13.0	1414.0
Cutting board	10	2	247.0	348.2	53.0	1218.0
Hand stirring paddle	10	2	963.0	2849.0	18.0	9069.0
Serving						
Pan	11	1	121.3	138.1	17.0	443.0
Lid	11	1	166.6	290.6	17.0	1013.0
Spoon	11	1	1238.1	2016.8	73.0	6744.0
Table	10	2	219.5	478.7	22.0	1577.0
Drain	10	2	1975.8	3963.1	65.0	12932.0

^aRLU = Relative Light Units

^b= 0-99 = clean, 100-299 = caution, ≥ 300 = contaminated

Concentration of the sanitizing agent was not verified, however. At the first observation, sanitizing of cook-chill equipment after washing did not occur, although results of ATP bioluminescence tests showed that sanitizing was a necessary step. All fixed equipment with removable parts was dis-

mantled after each use, and all parts and equipment were washed in the mild detergent, rinsed manually, and sanitized by immersing in the 5.25% sodium hypochlorite sanitizing solution. This concentration was not measured or verified. Table 2 shows results from ATP bioluminescence

assays, which reflect wide variations in effectiveness of cleaning and sanitation.

Satellite school. The Food Safety Check list (2) was administered twice in the satellite school. Deliveries from the central kitchen to the elementary school arrived during lunch service.

TABLE 3. Presence of indicator organisms including aerobic plate count (APC), total coliforms, and *E. coli* for all products

Sample	APC	Total Coliform	<i>E. coli</i>
	(CFU/g) Mean (Std Dev)	(CFU/g) Mean (Std Dev)	(CFU/g) Mean (Std Dev)
Raw ground meat	2.4×10^5 4.3×10^5	3.6×10^2 5.3×10^2	3.3×10^2 6.9×10^2
After blast chill	3.5×10^2 5.2×10^2	<10 <10	<10 <10
Serving	2.0×10^1 3.0×10^1	<10 <10	<10 <10
5 days after production	1.9×10^2 1.8×10^2	<10 <10	<10 <10
10 days after production	6.3×10^2 1.6×10^3	<10 <10	<10 <10

This was a poor delivery time for kitchen employees who could not stop serving lunch to check and receive deliveries. Thus, the preferred delivery and receiving procedures were not maintained. Potentially hazardous foods were not checked for temperature abuse during delivery. Products were not always marked to show delivery date.

Employee preparation practices were acceptable most of the time. At times, an employee handled ready-to-eat foods without using plastic gloves during preparation, although gloves were used during service.

ATP bioluminescence results in the school identify inconsistencies in the effectiveness of cleaning and sanitizing procedures of some equipment (Table 2). Sanitizer concentrations were not verified during these observation periods.

Other functions, including preparation and serving, were performed according to acceptable standards defined by the Food Safety Checklist for Foodservice Operations (2). Employees were conscientious and worked hard to serve a safe, healthy meal and maintain a clean kitchen and clean equipment.

Cooking, blast chilling, heating, and holding

The meat was cooked to an average temperature of $199.7 \pm 12.7^\circ\text{F}$ for 15 s, well above the recommended standard of 155°F for 15 s for ground beef. The high cooking temperature was because employees were responsible for other duties and thus let the meat cook for longer than necessary because they could not attend to it.

After cooked meat was transferred to the kettle, the mean starting cooking temperature was $117.6 \pm 33.6^\circ\text{F}$. The kettle temperature was set to reach 180°F , a standard recommended by the Groen company, manufacturer of the kettle. Cooking and agitation continued until internal product temperature reached 180°F , which was maintained for 15 s to pasteurize the product. This cooking process was completed in a mean time of 61.3 ± 23.4 min, but varied from 51.3 ± 13.8 min to 78.3 ± 25.2 min. The variation was due to other responsibilities of the cooks that took them away from their primary job, as well as to differences in batch size.

The mean product temperature was $131.3 \pm 19.4^\circ\text{F}$ prior to blast chilling and at the end of blast chilling was $40.3 \pm 10.3^\circ\text{F}$. The mean time to reach 45°F for all 12 samples was 2.6 ± 1.7 h, and the mean time to reach 40°F was 3.2 ± 2.9 h. These two mean times include data on two samples that took an unusually long time to complete the cooling process. With cooling parameters corrected, the mean chilling time to 45°F was 1.9 ± 0.8 h and the mean chilling time to 40°F was 2.0 ± 0.8 h. A reduction in chilling time greatly increases the shelf life of the product.

Figure 1 shows the temperature data obtained every 30-min for all products except the two aforementioned cases. Temperature was reduced by 38.9°F in the first 30-min of cooling. Temperature reduction slowed in each subsequent 30 min time interval. Figure 2 shows temperature data for the two cases (spaghetti and taco) with extremely long cooling times. Prior to heating, which took place at the satellite school, the mean product temperature was $46.3 \pm 18.6^\circ\text{F}$, (one sample had a temperature of 99°F ; the cook had preheated the product to remove it from the bag prior to getting an initial temperature reading). After heating, final mean product temperature was $184.9 \pm 10.6^\circ\text{F}$; recommended final temperature to repasteurize the product was 180°F . The mean time required to reach the final temperature was 40.0 ± 17.9 min. All heated product was kept hot in the oven or in the hot cart until service.

Lunch was served during an interval of 1 h and 10 min. The heated product was served from the hot serving line. The mean temperature at the beginning of service was $165.9 \pm 15.3^\circ\text{F}$. The mean temperature during service, taken at an average of 29.5 ± 8.2 min into service was $160.8 \pm 16.3^\circ\text{F}$. The mean temperature at the end of service was $153.2 \pm 19.5^\circ\text{F}$. All temperatures, except for sloppy joes during service, are well above state and FDA regulations of temperatures at least 140°F for holding and serving hot food. The mean for this sample was $147.0 \pm 25.5^\circ\text{F}$, but the

Figure 1. Temperatures during blast chilling for all products except spaghetti 10/9/96 and taco 10/16/96

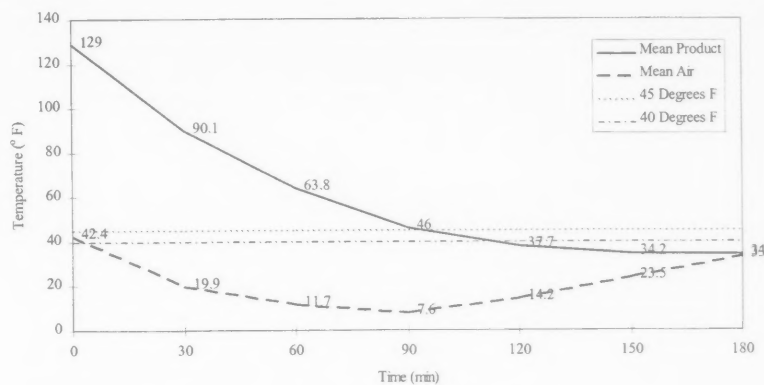
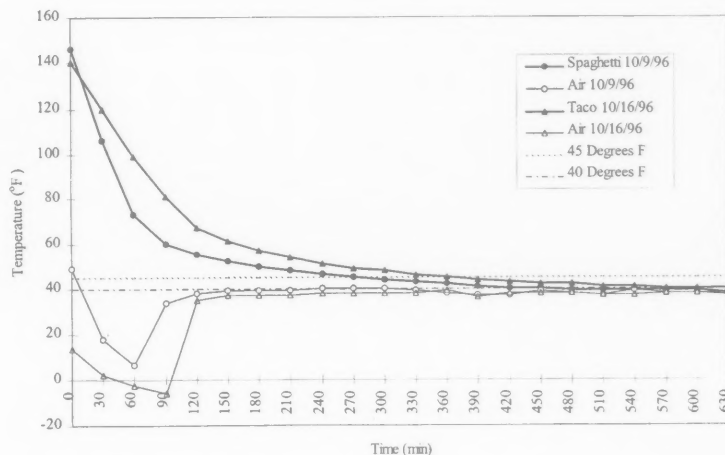


Figure 2. Temperatures during blast chilling for spaghetti 10/9/96 and taco 10/16/96



low temperature, 121.5°F, was not a safe serving temperature. The product should have been removed from the serving line and reheated to 165°F.

ATP bioluminescence

Means and standard deviations for ATP bioluminescence results were calculated on each sample point at the central kitchen and satellite school (Table 2). At the central kitchen, the means for two samples (tilting fry pan and cutting board) were below the 300 Relative Light Units (RLU) level that indicates contamination. Overall, readings deviated widely for all sample points,

some of which indicated effective and others of which indicated ineffective cleaning and sanitizing. This wide deviation can be attributed to inconsistencies in cleaning and sanitizing as identified when employee practices were observed with the Food Safety Checklist for Food Service Operations (2).

At the school, mean values for three sample points (the serving pan, the serving lid, and the preparation table) were below the 300 RLU level. The pan and lid were washed in the automatic dishwasher and air dried with minimal handling, and the table was washed frequently throughout

the day. In 5 out of 11 samples, the serving spoon was contaminated, which could be attributed to inadequate washing in the automatic dishwasher, handling of the spoon with contaminated hands, or contact with other contaminated utensils. In some cases, the high ATP values may have indicated the presence of *Salmonella* spp. in the product.

Microbial analysis

The effectiveness of the cooking, chilling, and serving processes and product shelf life were evaluated by analysis for APC, total coliform, and *E. coli* as indicator organisms (Table 3). Mean results for APC in the raw ground beef were $2.4 \times 10^5 \pm 4.3 \times 10^5$ CFU/g, which is classified as high. Following cooking, a 3 log reduction occurred in APC counts, to $3.5 \times 10^2 \pm 5.2 \times 10^2$ CFU/g, which is classified as low. The APC was further reduced following heating and serving, to $2.0 \times 10^1 \pm 3.0 \times 10^1$ CFU/g. Shelf-life analysis showed a 1 log mean increase. The total coliform and *E. coli* counts for the raw ground beef were $3.6 \times 10^2 \pm 5.3 \times 10^2$ CFU/g and $3.3 \times 10^2 \pm 6.9 \times 10^2$ CFU/g, respectively. These organisms were completely eliminated upon cooking and were not detected at any time in cooked products. These results indicate that the cook-chill process of heating the product to 180°F was effective in destroying indicator organisms.

Results of analyses for *E. coli* O157:H7, *Clostridium perfringens*, *Salmonella* spp. and *Staphylococcus aureus* are in Table 4. *E. coli* O157:H7 was not detected in any sample tested. *Clostridium perfringens* and *S. aureus* were found only in raw ground beef, in 41.7% and 33.3% of samples, respectively. *Salmonella* spp. found at each sample point, was detected in 41.7% of raw ground beef samples but in only 8.3% of blast chilled samples. Even though cooking caused a reduction, the product could not be considered safe. The presence of this bacterium increased following serving (33.3%) and in the samples after 5 and 10 days of storage (25.0% and 16.7%), respectively. Three samples taken from a drain below the kettle contained no *Listeria monocytogenes*.

TABLE 4. *E. coli* O157:H7, *C. perfringens*, *Salmonella* spp., and *S. aureus* in raw ground beef, after blast chilling the final product, after serving the product at the school, 5 days after production, and 10 days after production

Sample	<i>E. coli</i> O157:H7			<i>C. perfringens</i>			<i>Salmonella</i> spp.			<i>S. aureus</i>		
	N*	Pos N (%)	Neg N (%)	N*	Pos N (%)	Neg N (%)	N*	Pos N (%)	Neg N (%)	N*	Pos N (%)	Neg N (%)
Raw ground beef	12	0 (0)	12 (100)	12	5 (41.7)	7 (58.3)	12	5 (41.7)	7 (58.3)	12	4 (33.3)	8 (66.7)
After blast chill	12	0 (0)	11 (91.7)	12	0 (0)	11 (91.7)	12	1 (8.3)	10 (83.3)	12	0 (0)	11 (91.7)
Serving	12	0 (0)	12 (100)	12	0 (0)	12 (100)	12	4 (33.3)	8 (66.7)	12	0 (0)	12 (100)
5 days after production	12	0 (0)	8 (66.7)	12	0 (0)	8 (66.7)	12	3 (25.0)	5 (41.7)	12	0 (0)	8 (66.7)
10 days after production	12	0 (0)	11 (91.7)	12	0 (0)	11 (91.7)	12	2 (16.7)	9 (75.0)	12	0 (0)	11 (91.7)

*Total sample size is 12. Because sample values were missing, percentages will not always add to 100

DISCUSSION AND RECOMMENDATIONS

The Kansas Department of Health and Environment (KDHE) regulation for final product chill temperature is 45°F (7) and the 1995 FDA Food Code recommends 41°F (4). For a cook-chill system, the recommended final chill temperature is 40°F (5). Final temperatures recorded for two of the 12 products were above 45°F because the data logger probe was removed from the product too soon. These high values account for the large variation in final blast chilling temperature. One spaghetti sample and one taco sample took 5 h and 7 h, respectively, to reach the 45°F standard. An additional 3 h and 3 1/2 h, respectively, were required to reach the 40°F recommendation. In both cases, the extreme time requirement was due to improper chilling by the blast chiller and an ineffective method of placing the product into the blast chiller; the product had been placed in 2-inch pans, one bag per pan, and placed

on rolling racks, so that the pans placed an extra barrier between product and air, thus impeding the effectiveness of the blast chilling. This situation was corrected before the next product was prepared. *Salmonella* spp. found at several points in the process may have been due to postprocessing contamination or to initial high loads of bacteria on the raw product.

Implementation of HACCP into the cook-chill operation of USD 383 Manhattan school foodservice is an important addition to this new food production system. The cook-chill production system is effective for producing mass quantities of food while maintaining high quality of products. This system also increases the safety of the food, primarily by increasing control of time and temperature.

Commitment to a project must take place at all levels of the organization; when employees know that upper management supports a project, everyone works to achieve a common goal. This is a concept of

total quality management. The USD 383 management team members exhibited their commitment to employees, school board, and community by recognizing the need to improve the foodservice operation so as to meet the demands of a growing student population. This commitment was enhanced further by recognition of the importance and need to implement HACCP, even though it is only recommended, not required, by state regulations for any foodservice operation. To date, the United States Department of Agriculture (USDA) has established regulations for meat processing operations to reduce or eliminate the presence of foodborne pathogens in meat (10). HACCP is not mandated for foodservice operations by federal regulations. However, many commercial foodservice operations have instituted HACCP, and increasingly, non-commercial establishments such as schools are implementing HACCP on their own.

To accomplish microbial reduction or elimination, the cook-chill

system standards of cooking food to pasteurization temperatures and chilling as rapidly as possible were proven effective in this project, except for the survival of *Salmonella* spp. As with any new system, areas exist where trial and error will be necessary to find the best process or method. Areas where improvements can be made for USD 383 include the following:

1. Standardizing recipes to maintain consistency in quality.
2. Standardizing cleaning and sanitizing procedures for the cook-chill system to minimize microbial growth.
3. Purchasing a tumble chiller to achieve maximum chill in the least amount of time; thus extending shelf life.
4. Scheduling production based on the maximum capacity of specific equipment, in this case, the blast chiller, although this may not be feasible because of the amount of product.
5. Reducing the amount of raw ground beef cooked at one time in the tilting fry pans; which will help cook the meat properly and completely.
6. Turning on the recording thermometer chart of the cook-chill kettle at the beginning of the day and turning it off at the end of the day; using one chart per day and properly labeling the temperature peaks.
7. Purchasing appropriate equipment for satellite schools to improve reheating of product.
8. Sanitizing serving utensils prior to use to reduce the chance of microbial contamination.
9. Emphasizing the importance of using plastic gloves for handling ready-to-eat foods.
10. Calibrating thermometers regularly, such as once a week.
11. At the suggestion of the County Health Inspector, replacing bimetallic thermom-

eters with digital thermometers.

12. Purchasing a thermocouple to test accuracy of digital thermometers and to use in verification of the HACCP program.
13. Continuing to redistribute responsibilities of employees in the central kitchen to separate cooking functions from distribution functions, because requiring employees to perform both functions increases the chance of cross-contamination.
14. Obtaining samples once or twice a year from the central kitchen and schools for microbial analysis as a verification step in the HACCP program.
15. Continuing to request suggestions from all employees and consumers to improve products and functions, and working together to achieve high quality.
16. Establishing procedures to obtain temperatures of products upon delivery at satellite schools.
17. Working with suppliers to reduce the number of dented canned products, and rejecting unacceptable product.
18. Maintaining the level of product in the pan at 2 inches or less when cooling leftovers after serving.
19. Removing or venting the lid to allow heat and steam to escape from leftover products cooling in pans.
20. Maintaining good communication at all levels to establish uniform and consistent practices.
21. Limiting refrigerated storage of product to 5 to 10 days, based on microbiological data. The use of focus groups, evaluations of the production processes, and measurements of temperatures, microbial contamination, and sanitation provided data to identify needed improvements and to develop a model HACCP plan.

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Reader Service No. 105

Improving the Nation's Food Safety System

by Heinz Wilms, FDA, Center for Food Safety and Applied Nutrition, Food Safety Initiative

Officials from local, state and federal agencies are actively engaged in designing a new and coordinated approach to the nation's food safety system. Ninety representatives of local and state health and agriculture departments, the Food and Drug Administration, Centers for Disease Control and Prevention, the US Department of Agriculture and the Environmental Protection Agency are members of six work groups and a coordinating committee developing innovative ways to fully coordinate responses to foodborne disease outbreaks and to integrate food safety programs from farm to table.

In a bold initiative, hosted by the Food and Drug Administration and called "Meeting Challenges Together," local, state and federal officials met in Kansas City, MO in September, 1998. All 50 states, the District of Columbia and the Virgin Islands were represented. The theme of the meeting centered on the need to begin the process of a shared vision to make the US food supply safer than ever. This vision includes joint planning, sharing resources, data and communication systems, redeploing inspection efforts based on risk and science, adopting uniform standards for industry and government, enhancing the surveillance and detection of outbreaks from foodborne diseases, coordinating appropriate government response to outbreaks, and educating the public in safer food handling and preparation.

Developing and implementing a fully integrated food safety system will be a huge and complex effort. There are thousands of local agencies, hundreds of state agencies and more than a dozen major federal programs that have food safety responsibilities. Over 1.2 million domestic establishments are regulated and millions of food imports to the United States occur annually and have doubled in just 5 years. Because of shrinking federal resources, FDA has reduced domestic food inspections to only 25% of what they were in 1981. Clearly, new ways to utilize the considerable inspection work of local and state agencies with that done by federal agencies is necessary to strengthen the existing programs and to assure adequate consumer protection.

The first steps taken following the Kansas City meeting was to divide the monumental task of integrating the nation's food safety systems into six work groups of over 70 local, state and federal officials. The work groups are:

- Roles and Responsibilities—Capacity and Resources

- Coordinating Outbreak Responses and Investigations
- Information Sharing and Data Collection
- Communication
- Minimum Uniform Standards
- Laboratory Operations and Coordination

An 18 member coordinating committee also was formed of local, state and federal officials to coordinate the work groups. Chairs of the work groups, many of whom are state and local officials, and the coordinating committee were elected by the members.

Janice Oliver, FDA, who chairs the coordinating committee said that full implementation may take up to ten years because of the complexity and wide array of different priorities, practices, laws and regulations at all levels of government. "No longer can we afford to go our separate ways," Ms. Oliver stated, "New technologies, new science, and new challenges such as emerging pathogens like *E. coli* O157:H7 have forced us all to share our collective resources and our dedicated scientists, investigators and facilities to solve tomorrow's challenges today! This year will be spent developing plans and budgets to carry out the many projects and changes that will be needed in the years to come."

In December, 1998, the six work groups met in Baltimore, MD for the first time to begin to develop detailed plans for implementing the recommendations from the Kansas City meeting. They met with the members of the coordinating committee and continued discussions in January and February, 1999 to prepare short term and long term plans and resource needs. The committee will meet in early March, 1999 to synthesize the work group reports into a single comprehensive plan and make recommendations to the federal agencies. FDA, CDC, USDA and EPA will be using this plan to prepare future Food Safety Initiative budget requests.

These efforts are consistent with the goals of the President's Council on Food Safety and with the recommendations of the National Academy of Science and the Government Accounting Office reports of August, 1998 calling for a comprehensive and coordinated strategic plan for science-based, intergovernmental initiatives that will improve the current food safety system.

NewMembers

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Kelowna, British Columbia

Jim McCurley
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Mario Ouellon
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Hailu Kinde
University of California
San Bernardino

Jena Roberts
Silliker Laboratories
Modesto

Belinda L. Salazar
Golden State Foods
City of Industry

Robert Sprouse
Foster Farms Dairy
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Gary W. Hensley
Hillshire Farm and Kahn's
Alexandria

MARYLAND

Richard Kasputis
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Bloomfield College
Alpine

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UpDates

Alfa Laval Flow Inc. Names Customer Service Manager

Kathy Gibour, of Sussex, Wisconsin, has accepted a position with Alfa Laval Flow Inc. as Customer Service Manager for the G&H Division.

Gibour brings a strong background in training, development and sales to this newly created position. She will supervise the inside sales and pump departments in addition to the company's switchboard operations.

Osmonics Names Leaders of New Global Business Units

Osmonics has established five Global Business Units (GBU's) responsible for strategic leadership of related product lines. Previously, Osmonics was organized by strategic business-units located across the country, each of which managed marketing and manufacturing for its own individual products. The GBU's will all be based at Osmonics' Minnetonka headquarters and will manage related groups of products worldwide.

Five current Osmonics' executives have been named to head the new organization.

Troy Ethen is General Manager of the Crossflow Membrane and Elements GBU. He was previously general manager of the Syracuse, New York, manufacturing site. He began his career with Osmonics as an application engineer in 1988, after earning his bachelor's degree in chemistry from Carleton College in Northfield, MN.

Clifford "Bud" Frith, General Manager of the Normal Flow

Membrane, Filters, Lab Products and Instruments GBU, was general manager for the Bryan, TX, and Livermore and Upland, California, facilities. He came to Osmonics in 1996 following 30 years of experience in contamination analysis and ultrapure water with Millipore, Vaponics, and Anatel Corporation. Frith earned his bachelor's degree in chemistry from Virginia Military Institute, and completed graduate courses in engineering management and sanitary engineering at Northeastern University in Boston.

Roger Miller, recently promoted to Vice President Marketing and Strategy, will be acting General Manager for the Standard Equipment and Pumps GBU. He joined Osmonics in 1993 as a product manager for pumps, after holding key management positions with several privately held manufacturing concerns. Most recently he served as manager of marketing. Miller received his bachelor's degree in business management and industrial engineering from North Dakota State University.

John LaRocco, General Manager of the Fluid Controls and Valves GBU, joined Osmonics from General Electric in 1995. He was general manager of the Milwaukee, WI, facility, and in 1996 facilitated the development of Osmonics' Product Sales Group for standard products. LaRocco earned his bachelor's degree in material science and engineering from the University of Pennsylvania, and his MBA from Temple University.

Curt Weitnauer has been promoted to General Manager of the Custom Products, Systems and Service GBU, the one business unit that designs and manufactures custom products. Over the past

12 years at Osmonics, he has worked in every aspect of engineered products and systems, and with many of the company's major customers. He received his bachelor's degree in chemical engineering from the University of Minnesota.

Each GBU will be managed as a profit center responsible for strategic planning, product management, new product development, and applying technology to customer needs. Manufacturing locations will support the GBU's in a matrix relationship, and some GBU's will be responsible for products manufactured at numerous locations.

Fennema Appointed Scientific Editor of *Journal of Food Science*

Owen R. Fennema, Ph.D., Professor Emeritus in the Department of Food Science at the University of Wisconsin, was recently appointed Scientific Editor of the Institute of Food Technologists' (*IFT's*) *Journal of Food Science (JFS)*. He will continue to ensure the scientific quality and importance of articles that are published in the journal.

Fennema began working in food science as a researcher at the Pillsbury Co. Following, he launched into his lifelong career in academia as Assistant Professor in the Department of Food Science at the University of Wisconsin, where he remained for more than 30 years. During this time, Fennema moved up the academic ranks from Associate Professor to Professor of Food Chemistry

to Department Chairman. He received an Excellence in Teaching Award in 1977 from the College of Agriculture and Life Sciences. In 1996, he became Professor Emeritus.

Fennema received a master's degree in dairy science and a doctorate in food science and biochemistry from the University of Wisconsin. He also received an honorary Doctor of Agricultural and Environmental Sciences degree from Wageningen Agricultural University in The Netherlands in 1993. He is a member of Gamma Sigma Delta and Phi Tau Sigma, both honor societies for food science.

Jeffrey Bloom Joins Weber Scientific as Director of Technical Services

Weber Scientific is pleased to announce that Jeffrey Bloom has joined the firm as Director of Technical Services, a new position. Mr. Bloom has over 27 years of quality control expertise. For the past four years he was Regional Quality Assurance Manager for the Haagen-Dazs division of the Pillsbury Company. Previously, Mr. Bloom was Vice President, Food and Dairy Division, for Environmental Systems Service, Ltd., located in Virginia. Prior positions include Director, Corporate Quality Control, for Agri-Mark, Inc. and

Manager, Central Dairy Laboratory, for Dairylea Cooperative.

Mr. Bloom is currently President of the Metropolitan Association of Milk, Food and Environmental Sanitarians. From 1990 through 1996 he was director of the quality assurance task force of the Dairy Practices Council.

At Weber Scientific, Mr. Bloom joins the management team reporting directly to Fredric Weber, President. He will undertake diverse responsibilities, including management of all manufactured and own-brand products, product evaluation and development, oversight of regulatory affairs and technical consultation with key accounts.

FOOD MICRO '99

Ecology and physiology of food related microorganisms

Veldhoven, The Netherlands, 13 - 17 September, 1999

SCIENTIFIC PROGRAMME

General ecology and physiology

general physiology
stress responses and virulence
cleaning and disinfection
microbiology of food ecosystems
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physiology of spoilage organisms
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FOOD MICRO '99 is designed to be a meeting place for those working in food microbiological research and those who are studying food microbiology as well as for professionals responsible for the production of safe food and authorities involved in safe food regulations. Each session will be preceded by a keynote lecture.

For information, registration, etc. please contact Congress Service Brabant either by fax + 31 40 2546566 or E-mail: KSB@koningshof.nl. Information about Food Micro '99 is also available on internet: www.cbs.knaw.nl/foodmicro

Food Micro '99 is co-sponsored by the International Association of Milk, Food and Environmental Sanitarians.

FSIS/FDA Sign Memorandum of Understanding to Improve Public Health Protection

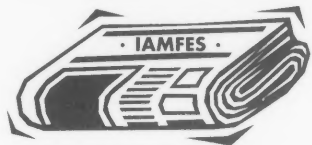
Working with the President's Food Safety Council, the Food Safety and Inspection Service (FSIS) and the Food and Drug Administration (FDA) have signed a Memorandum of Understanding (MOU) to facilitate the exchange of information at the field level about food establishments and operations that are subject to the jurisdiction of both agencies. District offices of each agency will notify their counterparts of food safety recalls, instances of product contamination and mislabeling, and conditions at facilities that could result in unsafe or unwholesome food.

"Exchanging information on food safety operations will permit more efficient use of both agencies' resources and will contribute to improved public health protection," said Thomas J. Billy, FSIS Administrator.

"Food safety challenges are becoming increasingly complex and frequently a problem involves both agencies. This MOU ensures that communication between the agencies remains open and that information flows without delays," said Dr. Jane E. Henney, FDA Commissioner.

The agencies determined that changes in inspection activities, available resources, and food safety hazards necessitated updating an agreement signed in 1983. FSIS and FDA will pursue, where feasible, joint enforcement activities, and work to develop a joint electronic communications system for field offices.

On August 25, President Clinton signed the order creating the President's Food Safety Council, which he charged with developing a comprehensive strategic plan for federal food safety activities and ensuring that federal agencies



NEWS

develop coordinated food safety budgets each year.

FSIS is responsible for implementing and enforcing the Federal Meat Inspection Act, the Poultry Products Inspection Act, and parts of the Egg Products Inspection Act. In carrying out its responsibilities under these acts, FSIS places inspectors in meat and poultry slaughterhouses and egg processing plants and inspects meat and poultry processing plants daily.

FSIS also has compliance officers visit warehouses, transporters, retail stores, restaurants, and other places where meat, poultry, and egg products are handled and stored. In addition, FSIS conducts voluntary inspections under the Agricultural Marketing Service. FSIS determines the inspection system equivalence of foreign countries and requires all eligible imports of meat, poultry, and egg products to be presented for reinspection by FSIS.

FDA is responsible for implementing and enforcing the Federal Food, Drug, and Cosmetic Act, the Public Health Service Act, the Fair Packaging and Labeling Act, and parts of the Egg Products Inspection Act which covers eggs in the shell. In carrying out its responsibilities under these acts, FDA

conducts inspections of establishments that manufacture, process, pack, or hold foods, including seafood, fruits, vegetables, and all other foods not regulated exclusively by FSIS. FDA also inspects vehicles and other conveyances, such as boats, trains, and airplanes, in which foods are transported or held in interstate commerce.

Three Washington Illnesses Linked to Oregon *Salmonella* Outbreak

State and federal agencies continue to work on the *Salmonella* outbreak linked earlier in February to contaminated alfalfa sprouts grown at Hydro Harvest, Ltd., a sprout producer in Brush Prairie, WA.

The same strain of *Salmonella* that sickened 18 people in Oregon now has been confirmed as the cause of illness for three Washington residents. Hydro Harvest, Ltd. voluntarily recalled its alfalfa sprout products Feb. 12.

The microbiology labs at the State Departments of Health and Agriculture announced that 10 of 11 alfalfa sprout samples and one alfalfa seed sample taken from Hydro Harvest, Ltd. have tested positive for *Salmonella*. Further tests are underway to confirm whether the sprout and seed samples contain the same *Salmonella* strain as the stool samples from patients.

Investigators from the State Department of Agriculture and the US Food and Drug Administration inspected Hydro Harvest, Ltd. Feb. 12 and 13. Contaminated alfalfa sprouts were discarded, and several corrections in three broad categories were recommended: decontaminate the facility and production equipment, increase the amount of chlorine used to disinfect seed, and set up procedures to prevent future contamination of sprouts.

FDA Warns Consumers about Frozen Mamey

The Food and Drug Administration is warning consumers not to eat El Sembrador brand frozen mamey from Guatemala or drinks made from El Sembrador brand frozen mamey due to reports of typhoid fever in South Florida. Mamey is a tropical fruit whose pulp is salmon pink to red, soft and smooth in texture. FDA is taking this precautionary step because of the serious nature of typhoid fever.

At this point, FDA knows that El Sembrador brand frozen mamey has been found in the freezers of the homes of the victims and in all the restaurants where some of the victims ate this product. FDA, the Florida Department of Agriculture and Consumer Services, and the Florida Department of Health have collected samples of frozen mamey for laboratory analysis; results are pending.

FDA's warning is based on epidemiological data in the South Florida cases that shows a strong link between eating frozen mamey and getting typhoid fever. The 13 reported illnesses to date all of which required hospitalization occurred between mid-December and early February; most of the cases occurred in Hispanic communities in South Florida. Because typhoid fever is a rare disease in the US, FDA is also calling these illnesses to the attention of health professionals and departments of health to alert them to look for typhoid symptoms.

Typhoid fever is a bacterial infection that causes persistent and high fever, abdominal cramps, loss of appetite, and fatigue. Any consumers who have eaten frozen mamey and have experienced these symptoms should consult their health care provider immediately.

FDA continues to investigate the extent of the distribution and the source of frozen mamey products linked to the illnesses.

The agency will provide more specific information as it becomes available. FDA and the Centers for Disease Control and Prevention are working closely with state and local health officials in Florida to identify other possible cases of typhoid fever associated with eating frozen mamey.

Typhoid fever in the United States is a rare illness most often acquired by traveling in developing countries. The illness is most often acquired by eating contaminated food or drinking contaminated water or beverages.

IGEN and USDA Announce Agreement on Development of *E. coli* O157:H7 and Other Food and Beverage Test

IGEN International, Inc. and the Agricultural Research Service of the USDA announced that they have signed a Cooperative Research and Development Agreement (CRADA) with the goal of adapting the ORIGIN-based *E. coli* O157:H7 test for meat to a commercialized product, as well as developing other important food and beverage pathogen tests. This *E. coli* O157:H7 test was developed by the USDA ARS based on IGEN's ORIGIN technology and has demonstrated in field studies the potential to offer a highly sensitive and fast test with capabilities to test samples more efficiently than existing dipstick methods.

USDA Scientist Jerry Crawford said, "We are pleased to be working with IGEN to expand the applicability and use of the *E. coli* O157:H7 test by moving it from a laboratory test to a commercial product. This test gives food producers and regulatory agencies another tool in our continuing effort to improve the safety of food products for the American consumer."

The CRADA calls for IGEN staff to work in ARS laboratories in Philadelphia under the joint direction of ARS and IGEN management. ARS' goal for the collaboration is to provide government regulatory agencies and commercial food processors with rapid methods to more accurately detect food and beverage pathogens.

IGEN President and Chief Operating Officer Dr. Richard Massey commented, "We are pleased to expand our relationship with the USDA with the goal of commercializing products based on ORIGIN technology that can contribute to the safety of the world food supply. The *E. coli* O157:H7 test developed by the USDA should offer food processors and analytical labs same-day results at sensitivity levels and automation that is not available."

Salmonella Serotype Bovismorbificans: Alberta

Twenty-five people attended a Christmas Eve party where home-smoked trout was served. Over the next five days eight people became ill; two were hospitalized and one person was treated as an outpatient. *Salmonella* Bovismorbificans was isolated in the stool of six people who were ill, as well as from the person who prepared the fish (who was asymptomatic) and from the fish itself. The trout was caught in August 1998 and subsequently filleted and frozen. In early December the fish were partially thawed, prepared with spices and flavoring and smoked in a home-made smoking oven. The oven maintained a temperature of 135°F for a period of six to eight hours. It is believed the fish were contaminated during preparation, and the temperature of the smoking process was insufficient to destroy the *Salmonella* bacteria.

FoodTec Consulting

Dr. Patrick Harewood, Consultant Food Scientist, announces the opening of FoodTec Consulting. The organization will provide consulting services to the food industry in the areas of safety, quality, sanitation and HACCP, including design, development, implementation, verification and auditing of HACCP plans. Each HACCP plan is designed and developed according to the specific requirements of each product and processing operation.

Services are provided to the meat, poultry, seafood, food service, retail, wholesale, refrigerated and frozen foods industries, both domestic and international. On site training in food safety/HACCP, SSOPs and GMPs is also provided.

For further information, contact P.O. Box 808, North Branford, CT, USA, 06471-0808; Phone and Fax. 203.483.0597; E-mail: PHarewood@compuserve.com; Web site: www.foodtecconsulting.com.

Outbreak Report: An Outbreak of *Salmonella* Enteritidis Infection Associated with Iced Cake

Several people developed severe symptoms of gastroenteritis after attending a first holy communion banquet in Benevento, a town of 60,000 inhabitants in southern Italy. About 60 people had attended the banquet, held on June 14, 1998, between 1400 and 1800 h. Public health authorities were notified of the outbreak by a general practitioner on June 16 and immediately began an investigation to identify the causative agent, the contaminated food, and possible mistakes in its preparation.

A list of the guests and the menu was obtained and some of the

ill guests were interviewed in order to formulate a case definition: a case was defined as a person who had attended the banquet and had developed diarrhea (three or more loose stools in 24 hours) or fever (38°C or higher) within 72 hours of the end of the banquet. A questionnaire was prepared to collect information about the onset of disease, symptoms, and the foods eaten. The questionnaires were self completed; children were helped by their parents. Stool specimens from two patients and from the food handlers were collected and cultured. No leftover food was found.

Attack rates and relative risks were calculated for each food item on the menu. The statistical associations were evaluated by the chi square method. Food preparation was evaluated according to the European standards of food hygiene (HACCP, Hazard Analysis Critical Control Point).

Thirty-six people out of a total of 58 guests who were interviewed felt ill: nine children and 27 adults. The median incubation period was 25 hours (range 12 to 72).

The main symptoms were high fever (34 cases), profuse diarrhea (27 cases), abdominal cramps (26 cases), and less frequently nausea, headache, and vomiting.

Considering the 27 different food items of the menu, a relative risk exceeding 6 (RR 6.4; P value 0.001) was associated with having eaten iced cake. For other items, relative risk ranged from 0.5 to 1.8 and no statistical significance was found. Of the 49 people who ate cake, 35 felt ill (attack rate 71%) and one case was found among those who did not eat it (attack rate 11%). *Salmonella* D colonies that grew on the stool cultures were later identified as *Salmonella* Enteritidis. The cultures of the food handlers' stool specimens were negative.

The cake was made from four intermediate products; the cake cooked in the oven at 160°C for 50

minutes, the syrup, the cottage cheese ricotta filling, and the icing. No hazard was found in the syrup components and its preparation; the eggs in the cake represented a potential source of contamination, eliminated by cooking in the oven. The typical preparation of ricotta (produced from whey at 80 to 100°C), used for the filling, should have rendered it free from contamination. The egg whites used for the icing were the only raw food without a control point.

The cake was stored in a refrigerator until the banquet guests arrived and was left at room temperature for four hours during the banquet.

The study of the layout and organization of the restaurant revealed that the kitchen was very small and that raw and cooked foods were poorly separated (creating the potential for cross contamination). The refrigerators had no temperature display; no cleaning or disinfecting plans were in use.

The vehicle of infection in this outbreak was established by epidemiological association, since there was no leftover cake available for testing. Given the strength of this association, however, it is highly probable that the cake was responsible.

The description of the preparation of the cake suggested that the source of contamination was the raw eggs used for the icing. This type of icing is a traditional element of Italian pastry. The correct and safe method of preparation does not include egg whites but only water, sugar and, sometimes, lemon. In home cooking, however, egg whites are sometimes used to help the icing to set. The likely introduction of *Salmonella* through raw eggs was therefore avoidable.

Keeping the cake at room temperature on a warm day probably favored the growth of *Salmonella*. Refrigeration might have reduced the level of contamination and possibly, thereby, the

attack rate. Thus the growth of *Salmonella* was probably preventable.

Salmonella are the most frequently isolated bacteria in outbreaks reported to the Ministry of Health in Italy, and *S. Enteritidis* is the most common serotype. Eggs are the most common sources of contamination. Typically, the implicated foods require raw eggs without an effective cooking step. The icing described in this paper is a new addition to this list.

Two interventions should be taken to avoid the spread of *Salmonella*. The first is to eradicate or control poultry sources of *Salmonella*. The second requires a set of post marketing strategies: use pasteurized eggs or, if not possible, use fresh or refrigerated eggs, wash the egg shells, and cook foods at an adequate temperature for a long enough period to kill *Salmonella*.

USDA Plans to Allow Irradiation of Meat to Help Improve Food Safety

Providing industry with another tool to improve food safety, Agriculture Secretary Dan Glickman announced Feb. 12 that USDA will allow the irradiation of raw meat and raw meat products.

"When it comes to food safety, there is no silver bullet," Glickman said. "But, used in conjunction with other science-based prevention efforts, irradiation can provide consumers with an added measure of protection."

Food irradiation uses radiant energy to reduce or eliminate potentially dangerous microorganisms on meat and poultry. The Food and Drug Administration determined in December 1997 that use of irradiation technology on raw meat is safe.

Irradiation is currently the only known method to eliminate completely the potentially deadly

E. coli O157:H7 bacteria in raw meat. The technology can also significantly reduce levels of *Listeria*, *Salmonella*, and *Campylobacter* on raw product.

Under USDA's proposed rule, which will be published in the Federal Register within 10 days, radiation would be permitted to treat refrigerated or frozen uncooked meat and some meat products. No plant would be required to use irradiation.

Ensuring consumer choice, the rule requires that irradiated meat and meat products bear the radura symbol and a statement indicating that the product was treated by irradiation. For unpackaged meat products, the statement and logo must be conspicuously displayed to purchasers.

The rule also simplifies poultry irradiation regulations, approved in 1992, making them as consistent as possible with the proposed regulations for the irradiation of raw meat and meat products. For example, currently, only packaged poultry can be irradiated. In a change, the department will now allow the irradiation of raw poultry product before packaging as well as chicken carcasses. Irradiated raw poultry and meat could be used to manufacture other products, like sausage or bologna.

Education and Intervention are Keys to Changes in Food Safety Behavior

A follow-up to the home food safety survey conducted last year by Audits International has shown that, while increased media coverage about food safety has increased general awareness, changes in food safety habits and practices are most likely to come from education and intervention.

The initial survey of food safety and sanitation practices in homes around the country (conducted in the fall of 1997) demonstrated that consumers didn't measure up to the standards that are adhered to by restaurants. In fact, respondents of the original survey met the Audits International criteria for proper food safety and sanitation practices in their kitchens during meal preparation less than one percent of the time.

According to Richard W. Daniels, President of Audits International, "It came as no surprise that homes fell short in the food safety arena. After all, the government regulates food safety procedures for restaurants and institutions and the industry places a heavy emphasis on training. However, there is no equivalent requirement in the home, and very little training through our regular educational system."

To obtain a barometer of the possible effect of increased awareness on individuals' food safety habits one year later, Audits International conducted a telephone survey with more than 100 participants. Thirty five respondents had participated in the original home food safety study and had received a thorough review of their unsafe food-handling practices with suggestions offered for improvement at the end of the inspection. Seventy six respondents had not participated in the original inspection and were selected to represent typical homemakers.

All participants agreed they had an increased awareness about food safety in general based on increased media attention. However, the participants in the 1997 survey who had received a thorough exit interview, cited significantly more overall improvement in their food safety habits than the uninspected norm.

Call for Symposium

2000 IAMFES Annual Meeting

August 6-9, 2000

Atlanta, Georgia

The Program Committee invites IAMFES Members and other interested individuals to submit a symposium proposal for presentation during the 2000 IAMFES Annual Meeting, August 6-9, 2000 in Atlanta, Georgia.

WHAT IS A SYMPOSIUM?

A symposium is an organized, half-day session emphasizing a central theme relating to food safety and usually consists of six 30-minute presentations by each presenter. It may be a discussion emphasizing a scientific aspect of a common food safety and quality topic, issues of general interest relating to food safety and quality, a report of recent developments, an update of state-of-the-art materials, or a discussion of results of basic research in a given area. The material covered should include current work and the newest findings. Symposia will be evaluated by the Program Committee for relevance to current science and to IAMFES Members.

SUBMISSION GUIDELINES

To submit a symposium, complete the Symposium Proposal form. The title of symposium; names, telephone numbers, fax numbers, and complete mailing addresses of the person(s) organizing the symposium and convenors of the session; topics for presentation, suggested presenters, affiliations; description of audience to which this topic would be of greatest interest; and signature of organizer. When submitting a proposal, the presenters do not need to be confirmed, only identified. Confirmation of presenters takes place after acceptance of your symposium.

SYMPOSIUM FORMAT

Symposium sessions are 3 and 1/2 hours in length including a 30-minute break. A typical format is six 30-minute presentations. However, variations are permitted as long as the changes fit within the allotted time frame. If varying from the standard format, be sure to indicate this on the Symposium Proposal form.

SYMPOSIUM PROPOSAL DEADLINE

Proposals may be submitted by mail to the IAMFES office for receipt no later than July 15, 1999 or by presenting the proposal to the Program Committee at its meeting on Sunday, August 1, 1999 in Dearborn, Michigan. Proposals may be prepared by individuals, committees, or professional development groups.

The Program Committee will review submitted symposium and organizers will be notified by October 1, 1999 as to the disposition of their proposal.

PRESENTERS WHO ARE NOT MEMBERS

IAMFES does not reimburse invited presenters for travel, hotel, or other expenses incurred during the Annual Meeting. However, invited presenters who are not IAMFES members will receive a complimentary registration. Presenters who are IAMFES Members are expected to pay normal registration fees.

IAMFES FOUNDATION SPONSORSHIP

The IAMFES Foundation has limited funds for travel sponsorship of presenters. Symposium organizers may make requests in writing to the Program Committee Chairperson. Requests are reviewed on an individual and first-come-first-served basis. The maximum funding grant will be \$500. Organizers are welcome to seek funding from other sources and IAMFES will provide recognition for these groups in our program materials. Organizers are asked to inform IAMFES if they obtain outside funding.

HAVE AN IDEA BUT YOU ARE UNABLE TO ORGANIZE IT?

Many IAMFES Members have excellent suggestions for symposium topics, but are unable to organize the session. Such ideas are extremely valuable and are welcome. If you have an idea for a symposium topic, please inform the Program Committee Chairperson as soon as possible. Symposium topics are among the most valuable contribution an IAMFES Member can make to assure the quality of our Annual Meeting.

WHO TO CONTACT:

David Golden, Program Committee Chairperson
University of Tennessee
Department of Food Science and Technology
2605 River Road, Knoxville, Tennessee 37901-1071
Phone: 423.974.7247; Fax: 423.974.2750;
E-mail: dgolden@utk.edu.

Symposium Proposal

2000 IAMFES Annual Meeting

August 6-9, 2000

Atlanta, Georgia

Title: _____

Organizer's Name: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

Topic – Suggested Presenter (**Affiliation**)

(Example: 1. HACCP Implementation, John Smith, University of Georgia)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Suggested Convenors:

Description of Audience: _____

Signature of Organizer: _____

Receipt by mail
by July 15, 1999 to:

IAMFES, Symposium Proposal
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863, USA

Submit in person
on August 1, 1999 to:

Program Committee
IAMFES 86th Annual Meeting
Dearborn, Michigan

or Contact:

David Golden, Program Committee Chairperson
University of Tennessee
Department of Food Science and Technology
2605 River Road, Knoxville, Tennessee 37901-1071
Phone: 423.974.7247; Fax: 423.974.2750;
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The Atkins Economy Thermocouple Thermometer along with the hypodermic needle probe, allows the user to take quick accurate readings of small food items. Big needle sensors inserted into small food items (like the strawberries) can cause big temperature errors. The temperature of the needle heats or cools the tiny food piece being measured. This Atkins thermocouple hypodermic needle is only 0.07" in diameter and 4" in length, and quickly measures the centers of deep-filled pans, free-standing meats, and hard-to-measure baked goods.

This thermocouple thermometer covers all food needs with a temperature range of -100°F to

+1,000°F (or ask for °C model). It accepts all K thermocouple probes, including the pictured hypodermic tip needle probe. Other probe tips are available to measure frozen foods, griddle surfaces, refrigerator and oven air, cooking oil, and more.

The thermocouple thermometer gives the user three major advantages: (1) A selection of interchangeable probes, (2) A fast response, as fine-wire thermocouples have less heat-mass than other sensors, and (3) The widest temperature range, which helps avoid probe damage caused by overheating of semiconductor sensors.

Also available for the economy thermocouple is the protective "boot." This protective boot, made of thermoset rubber, is customized to fit snugly around the thermocouple to help prevent damage caused by dropping the instrument. The boot, AQA 14313, comes with a lanyard for easy carrying and a slot to hold your probe. Ask specifically for AQA 50207K probe with AQA 31308KF (or KC) thermometer and the AQA 14057 carrying case.

All Quality Assurance Products, Inc., Gainesville, FL

Reader Service No. 254

International Diagnostic Systems (IDS) Introduces Aflatoxin M₁ Kit to Dairy Industry

International Diagnostic Systems Corp. (IDS) has introduced a new, rapid test kit for detection of

Aflatoxin M₁ in milk. The Afla-M₁ kit requires no equipment and takes only 20 minutes or less to run. Negative or suspect positive results are determined visually at the cut-off level of 0.5 ppb. Samples containing less than 0.5 ppb of Aflatoxin M₁ result in a blue color developing in the test wells; samples containing over 0.5 ppb of Aflatoxin M₁ will cause the wells to remain clear (colorless).

International Diagnostic Systems Corp., St. Joseph, MI

Reader Service No. 255

BioControl Steps Up Production to Meet Demand for Rapid *Listeria* Tests

In the past six months there have been numerous published recalls of food and animal feed products. The most serious of these cases have been linked to the foodborne bacteria *Listeria monocytogenes*. Traditional methods for the detection of *Listeria* require four to twenty-one days to achieve results. Often the food is consumed before a test result is available.

The VIP[®] for *Listeria* which uses a patented reagent system that allows for an entire assay procedure to be incorporated into a single test unit. It is simple to use and provides results in less than 10 minutes after enrichment. The VIP for *Listeria* has been validated and has earned AOAC Official Method status (997.03).

The publishers do not warrant, either expressly or by implication, the factual accuracy of the products or descriptions herein, nor do they so warrant any views or opinions offered by the manufacturer of said articles and products.

Assurance® *Listeria* EIA, an enzyme immunoassay in a 96 well microplate format. It is a cost effective and efficient method for analyzing multiple samples. Results are available in as little as 48 hours for processed foods. It has been validated and has earned AOAC Official Method status (996.14).

Probelia™ PCR System for *Listeria monocytogenes* which combines the accuracy and speed of PCR and the time-proven ease of microplate detection. Results from processed food samples can be read in as few as 24 hours. Probelia has been evaluated by a European food science institute and exhibited good specificity and sensitivity and correlated well to standard cultural methods.

In its fourteenth year of operations BioControl offers rapid diagnostic test kits for the detection of bacteria and foodborne pathogens including *Listeria monocytogenes*, *Salmonella* and *E. coli* O157:H7, total coliforms and general *E. coli*.

BioControl Systems, Inc.,
Bellevue, WA

Reader Service No. 256

Neogen Adds Most Advanced Sanitation Testing System

Neogen Corporation announced it has an agreement to distribute the most advanced rapid sanitation testing system available. The system, Uni-Lite XCEL made by Biotrace, complements Neogen's existing line of food safety test kits for the detection of foodborne pathogens, natural toxins and allergens.

Uni-Lite XCEL sets the standard in rapid sanitation testing. The system delivers a measurement of the cleanliness of a surface by quantifying the amount of living cells, both bacteria and food

matter, detected from a swab of the surface. Uni-Lite XCEL provides results in only seconds and is easy to use, yet offers advanced data logging and trend analysis capabilities. Existing Uni-Lite XCEL customers include 30 of the top 50 food and beverage companies in the United States and Canada.

"We feel that the addition of this ATP testing system is another significant step toward making Neogen a one-stop shop for food safety solutions," said James Herbert, Neogen's President. "We also feel very fortunate to be working with such a fine organization as Biotrace, and to have this distributor arrangement for its ATP test system."

The technology of Biotrace's Uni-Lite XCEL is based on the measurement of adenosine triphosphate (ATP), a chemical found in all living cells. When combined with luciferase, an enzyme found in fireflies, ATP emits light proportional to the amount of ATP present. Uni-Lite XCEL measures the light emitted, and in only seconds, provides a measure of just how clean a surface is.

A rapid and accurate measure of sanitation is especially critical as food industries seek solutions to comply with new FDA and USDA regulations required by the implementation of the government's food safety Hazard Analysis Critical Control Program (HACCP).

Neogen Corporation, Lansing, MI

Reader Service No. 257

Idexx Introduces New and Improved SimPlate™ Device

The IDEXX SimPlate™ patented plate design has been improved and modified to include a super-absorbent sponge to soak up excess

liquid, eliminating the previously required pour-off step.

The SimPlate product family is a group of easy-to-perform, easy-to-read tests for coliform/*E. coli*, yeast and mold, and total plate count. These tests eliminate media preparation and other time-consuming steps involved with current pour-plate methods, cutting time-to-results in half. SimPlate assays are performed by placing a sample and pre-measured media onto a SimPlate device and incubating for 24 hours for coliform/*E. coli* and total plate count tests and 48 hours for yeast and mold tests. The test results are then read by simply counting the number of fluorescent wells and referring to the MPN chart to determine total counts. Tedious colony counting is not required.

IDEXX Laboratories, Inc.,
Westbrook, ME

Reader Service No. 258

Promega Introduces Hygiene Monitoring Kit

Promega's ENLITEN® Total ATP Rapid Biocontamination Detection Kit is a cost-effective system that rapidly measures food and microbial contamination on production surfaces before manufacturing product.

As one of the first companies to apply bioluminescence to the field of hygiene monitoring, Promega incorporates recombinant technology to deliver superior consistency and reliability. Results can be achieved in less than 1 minute with a cost up to 40% less expensive than unitized swab assays.

Promega has increased user convenience, quality and dependability with an improved packaging design, which provides kit compo-

nents in 25-test quantities. In addition, flexibility is offered since this kit can utilize various luminometers.

Promega Corporation, Madison, WI

Reader Service No. 259



Lobconco Corporation

New Purifier® Total Exhaust Clean Bench Protects Work and User

Lobconco Corporation introduces the new Purifier Total Exhaust Clean Bench to protect work from ambient contamination and the user from chemical fumes. During operation, room air is drawn through a pre-filter in the top of the cabinet to trap large particles and continues through a 99.99% efficient HEPA filter, preventing particulate contaminants from entering the work area. The air is then projected vertically down to the work area. All contaminated air is exhausted to the outside through a hard-ducted exhaust system.

All components in the path of the HEPA-filtered air stream are non-metallic and acid resistant.

The operator is protected from material inside the enclosure by an inflow of air through the face of the clean bench. Key applications include trace metals analysis where a metal-free environment is required and critical environment work requiring Class 100 conditions.

Indicator lights monitor differential pressure across the HEPA filter: a green light indicates normal operation, an amber light alerts that service is required. The scratch-resistant front sash and side panels are made of laminated safety glass. The angled front sash tilts up for easy cleaning and pivots down to the operating position of nine inches. Glare-free, fluorescent lighting is located outside the contaminated work area. Light and blower switches are located on front of cabinet, within easy reach of the operator.

Labconco Corporation, Kansas City, MO

Reader Service No. 260

Low Cost, Low Maintenance End Use/Point-of-Use Filters

A comprehensive range of low maintenance End Use/Point-of-Use Balston® filters are now available from Whatman, Inc.

The filters remove 99.99% of oil, water, rust, and pipescale particles of 0.01 µm size and larger from compressed air and other gases. The filters are of the coalescing design whereby all liquid contaminants are continuously removed for an unlimited time without loss of efficiency or flow capacity.

The filters accommodate line sizes from 1/4" to 2" at flow capaci-

ties of up to 2,500 SCFM. They are constructed of anodized aluminum and stainless steel to ensure long term reliability and performance. Standard items include an automatic float drain and a differential pressure indicator. Balston® Filters require minimal maintenance, and most models can be serviced without the need of any tools.

Whatman also offers Mainline Filters to accommodate up to 10" lines.

Whatman Inc., Tewksbury, MA

Reader Service No. 261

Filler Area Hygiene Program

DiverseyLever's new Filler Area Hygiene program is designed to help beverage manufacturers reconcile the sometime conflicting demands of increased productivity, hygiene, and product integrity. The program is the result of DiverseyLever's global proven practices in hygiene, automation and chemical innovation. The Filler Area Hygiene program utilizes patented technology to affect automated exterior filler cleaning along with automated conveyor cleaning, track treatment and CIP. The modular approach to application and a Spoilage Analysis Critical Control Point (SACCP) philosophy allows for unified control of any filler configuration. DiverseyLever's Filler Areas Hygiene technology when compared to conventional systems, saves energy, water and have reduce cleaning times by as much as 75% while reducing the total cost clean.

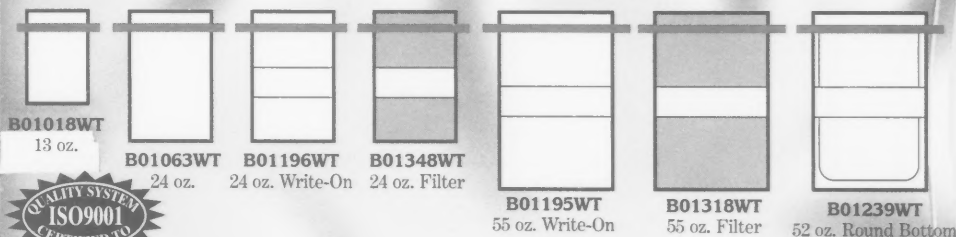
DiverseyLever, Cincinnati, OH

Reader Service No. 262

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WL904

Reader Service No. 111

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- Tuesday Exhibit Hall Break
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Lecturer: Dr. Fritz Käferstein, FDA/USDA, Joint Institute for Food Safety and Applied Nutrition at the University of Maryland, College Park, Maryland.

Ivan Parkin Lecture

Global Food Safety in the 21st Century

Sunday, August 1, 1999

Opening Session — 7:00 p.m.

In 1986, IAMFES established the Ivan Parkin Lecture to honor Ivan Parkin, a Dairy Extension Specialist at Pennsylvania State University. Dr. Parkin was IAMFES President from 1954 to 1955 and remained active in the association for many years following. He served as an example to others as a loyal Member, a professional, an educator dedicated to protecting the food supply, and is remembered by those who knew him as a kind and warm person.

The Ivan Parkin Lecture is to honor those individuals who have had a significant impact on the field of food safety. This year, Dr. Fritz Käferstein, FDA/USDA, Joint Institute for Food Safety and Applied Nutrition at the University of Maryland will deliver the lecture. Dr. Käferstein received his veterinary degree in 1962 from the University of Giessen, after studying at the veterinary schools in Giessen and Berlin (West), Germany. He obtained his doctorate of veterinary medicine in 1964 for a thesis on the identification and significance of the presence of antibiotic residues in meat. At that time he worked as Research Assistant at the Veterinary Faculty of the University of Giessen.

Dr. Käferstein worked for the New Zealand Department of Agriculture as a Supervising Veterinarian in the meat industry from 1968 to 1972. He joined the German Federal Health Office, first as Chief of the Food Safety Unit in the Robert-von-Ostertag-Institut and later as Director and Professor of the Center for Monitoring and Health Evaluation of Environmental Chemicals in Food. Dr. Käferstein also directed the WHO Collaborating Center for Food Contamination Monitoring and collaborated closely with various groups in WHO. In 1980, WHO established the Food Safety Program and he was appointed as the Program Manager. Dr. Käferstein retired as Director of the Program on Food Safety and Food Aid with WHO in July 1998. Dr. Käferstein began with the FDA/USDA on November 15, 1998 as Distinguished Visiting Scientist.

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Employment Opportunities



UNITED STATES FOOD AND DRUG ADMINISTRATION
CENTER FOR VETERINARY MEDICINE
RESEARCH MICROBIOLOGIST
OFFICE OF RESEARCH
LAUREL, MD

The Center for Veterinary Medicine (CVM) announces an opening for the position of Research Microbiologist, Division of Animal and Food Microbiology, Office of Research. Applications must be received by May 3, 1999.

The incumbent plans, coordinates, and conducts applied research in food and environmental microbiology to address problems associated with human food-borne pathogens in animal derived food as provided in the President's Food Safety Initiative (FSI). This research is designed to identify and investigate hazards affecting food safety which occur in the pre-harvest and processing phases of the production of animal products including meat, milk, and eggs. This research requires an environmental/ecological perspective on the part of the incumbent in order to design research which can describe the microbiology of the animal production environment, including factors such as antibiotic usage which may select for drug resistant human pathogens in animals. This research also involves the evaluation and development of various detection and enumeration methodologies which can be applied to research and regulatory requirements. The incumbent may serve as a Project Officer on extramural research projects which are directly related to the Center's intramural programs. The incumbent is also expected to provide in-depth scientific review and evaluation of technical data submitted by industry as part of a New Animal Drug Application.

Salary: This is an excepted service position in the Senior Biomedical Research Service (SBRS), with a salary range from \$110,351 to \$136,700.

Qualification Requirements: Applicants must have a doctorate in microbiology, medicine, veterinary medicine, biology, or closely related biological science; and demonstrated national and international recognition in food/environmental microbiology or closely related field of expertise compatible with the responsibilities defined above.

To Apply: Submit application material to :

John Anderson
Office of Human Resources and Management Services
Food and Drug Administration
Room 7B-32, HFA-408, Parklawn Building,
5600 Fishers Lane, Rockville, Maryland 20857

For further information contact Mr. Anderson by phone on 301-827-4179 or by fax on 301-443-6703.

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BusinessExchange

Employment Opportunities



WRIGHT BRAND FOODS, INC.
1306 Main Street ■ P.O. Box 1779
Vernon, Texas 76385-1779

Sanitation Supervisor

Wright Brand Foods, Inc., a further processor of quality bacon and ham products, is seeking to fill the position of Night Sanitation Supervisor. Preferred candidates will possess 3-4 years experience in sanitation or related area including supervisory skills and will be familiar with SSOP's, USDA, OSHA, EPA, and HACCP. Degree in related field not required, but a plus! Bilingual ability (English/Spanish) helpful. Responsibilities include directing and supervising all sanitation functions; preparing work schedules and employee assignments as required; evaluating, prioritizing and scheduling sanitation functions to insure timely completion of plant cleanup; and performing frequent on-the-job inspections. Wright Brand Foods employees enjoy an excellent compensation and benefit package, as well as great long-term career opportunities. If you share our commitment to excellence and appreciation for an open-door management style, please send your resume in confidence to:

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Reader Service No. 153

IAMFES Constitution and Bylaws

International Association of Milk,
Food and Environmental Sanitarians, Inc.

(As amended August 18, 1998)

CONSTITUTION

ARTICLE I.

ASSOCIATION

There is hereby created the International Association of Milk, Food and Environmental Sanitarians, Inc., not for pecuniary purposes, which shall hereinafter be referred to as IAMFES.

ARTICLE II.

OBJECTIVES

1. Provide a forum for professionals in the areas of milk, food and environmental safety and quality.
2. Improve the professional status of the members.
3. Assist members in their technical work and professional development.
4. Disseminate information regarding the protection of milk, food and the environment.
5. Develop, improve and promote sanitary methods and procedures for the development, production, processing, distribution, preparation and serving of milk and food.
6. Develop, improve and promote methods and procedures for supervision and inspection of the production, processing, distribution, preparation and serving of milk and food.
7. Develop and promote improved methods for the examination of milk, food and environmental samples.
8. Promote the development and adoption of uniform equipment and quality standards to improve the sanitary handling of milk and food.
9. Develop, improve and promote methods and procedures for protecting and improving the environment.
10. Cooperate with other professional groups in the improvement and promotion of milk, food and environmental sanitation.

ARTICLE III.

MEMBERSHIP

- Section 1.** The classes of membership in IAMFES shall be Regular, Student, Retired, Sustaining and Honorary Life Members.
- Section 2.** The qualifications of the several classes of members, the dues of each, the manner of their election to membership, and their respective rights and privileges shall be prescribed in the Bylaws, except as otherwise provided in this Constitution.

ARTICLE IV.

OFFICERS, EXECUTIVE BOARD, AND AFFILIATE COUNCIL

- Section 1.** The officers of IAMFES shall be President, President-Elect, Vice President and Secretary, who shall hold these offices for one year or until their successors are elected or appointed, as provided in the Bylaws.
- A. At the termination of each Annual Meeting, the President-Elect, Vice President, and Secretary shall automatically succeed to the offices of President, President-Elect and Vice President, respectively.
 - B. The Secretary will be nominated, on a rotating basis, from educational, government and industry members.
 1. The Secretary shall be elected by majority ballot of votes cast.
- Section 2.** The Executive Board shall consist of the Officers of IAMFES, the Immediate Past President, and the Chairperson of the Affiliate Council.
- Section 3.** The Executive Board must include, at all times, members officially connected with education, government, and industry.

There must be at least one representative from each of the three categories at all times.

- A. If the status of any member of the Executive Board changes after election, or during the term of that office, or after protem appointment as provided in the Bylaws, so that the composition of members officially connected, as stated herein, is not maintained in the Executive Board, then such member shall be deemed ineligible without prejudice and such office shall be declared vacant.
- B. The elective officer(s) will continue in their respective office(s) until their successor(s) are duly elected.

- Section 4.** An Affiliate Council shall be created, which shall consist of a duly authorized representative for each Affiliate Association, and the Immediate Past President of IAMFES.
- A. Each Affiliate Association shall have one vote.
 - B. The Affiliate Council parliamentary procedure shall be governed by 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.
 - C. The Affiliate Council shall, elect its Chairperson and other officer(s) as set forth in the Affiliate Council Operational Guidelines, shall keep a record of its proceedings and authorized representatives, and shall submit its recommendations to the Executive Board.
 - D. The Chairperson of the Affiliate Council shall represent the Affiliate Associations as a voting member of the IAMFES Executive Board.
 - E. It shall be the function of the Affiliate Council:
 - 1. To be an advisory body to the Executive Board;
 - 2. To represent the interests of the Affiliate Associations to the Executive Board and IAMFES members; and,

- 3. To serve as the means for the interchange of ideas and recommendations on programs, activities, awards and procedures among and between the Affiliate Associations and the Executive Board.

ARTICLE V.

AFFILIATE ASSOCIATIONS

- Section 1.** IAMFES members residing in the same geographical area, and, also, functioning organizations of milk, food and/or environmental sanitarians or closely related groups whose objectives are consistent with those of IAMFES, may apply for a Charter as an Affiliate Association, under conditions stipulated in the Bylaws.
- Section 2.** Each Affiliate Association shall have one representative on the Affiliate Council. The representative shall be a member of IAMFES.

ARTICLE VI.

MEETINGS

- Section 1.** Each year, IAMFES shall hold an Annual Business Meeting.
- A. A quorum, for any meeting to conduct business, shall consist of at least 50 voting members.
- Section 2.** Other meetings of IAMFES may be called by the Executive Board by duly announcing any called meeting in the official publication of IAMFES at least 60 days prior to the date of the meeting.
- Section 3.** In case there is no quorum present to transact necessary business, the Executive Board is authorized to act for the best interests of IAMFES.
- Section 4.** The Executive Board shall meet at each IAMFES Annual Business Meeting and at such other times as the President shall deem necessary.
- A. A quorum for Executive Board meetings shall consist of at least four members and decisions shall be by a majority vote of those present.
 - B. In the event of a tie vote, the presiding officer will be permitted to vote.

ARTICLE VII.

AMENDMENTS

- Section 1.** Any member may propose amendments to the Constitution by submitting them in writing to the Executive Director, at least 60 days before the date of the next announced Annual Meeting.
- A. The Executive Director shall notify all members, at least 30 days before the Annual Meeting that the proposed amendments will be open for discussion at that meeting.
 - B. Such proposed amendments, upon a majority affirmative vote of the members present shall, within 60 days, be submitted to the entire membership of IAMFES by the Executive Director.
 - C. All members voting on such amendments shall, within 45 days after issuance of such notification, register their vote in writing with the Executive Director, on ballots furnished by IAMFES.
 - D. These ballots shall be opened, recorded and filed, and the results shall be reported by the Executive Board to the IAMFES membership.
 - E. If the proposed amendments are passed by a two-thirds vote of those members who register their votes with the Executive Director, they shall become a part of the Constitution from the date of such report and notice by the Executive Board.

ARTICLE VIII.

BYLAWS

- Section 1.** The IAMFES parliamentary procedure shall be governed by Bylaws, adopted by majority vote of voting members in attendance at a duly called meeting.

BYLAWS

ARTICLE I.

MEMBERSHIP AND DUES

Section 1. Regular Members

- A. Regular members of IAMFES shall be those persons who are engaged in milk, food or environmental inspection, or the laboratory control of, or the

administration of such function, or engaged in research or education work relating to any aforesaid function or otherwise interested in the objectives of IAMFES.

- B. Regular members may attend meetings of IAMFES and shall be entitled to vote and hold office.

Section 2. Student Members

- A. Students pursuing undergraduate or graduate degrees in colleges or universities are entitled to membership in IAMFES at one-half (1/2) the dues of regular members.
- B. Student members may attend meetings of IAMFES, be accorded privilege of the floor, but shall not be entitled to vote.
- C. Student members may not hold office in IAMFES, but may serve on committees, as Affiliate representatives and as appointed representatives of IAMFES.

Section 3. Retired Members

- A. Retired members who are no longer receiving compensation for work relating to the objectives of IAMFES and who have been regular members for at least ten (10) years are entitled to membership at one-half (1/2) the dues of regular members.
- B. Retired members may attend meetings of IAMFES and shall be entitled to vote and hold office.

Section 4. Sustaining Members

- A. Sustaining members shall be organizations or persons who are interested in the objectives of IAMFES.
- B. Sustaining members are entitled to special services as determined by the Executive Board of IAMFES.
- C. Sustaining members shall be entitled to one (1) Regular membership in IAMFES for their representative at no additional cost.
 - 1. The name of the representative must be submitted to the Executive Director of IAMFES at the time of membership.
 - 2. Other persons associated with the Sustaining Member's organization are not members of IAMFES unless they have individual memberships.

Section 5. Honorary Life Members

- A. The Honorary life membership shall be composed of persons who, on account of their substantial contributions to the objectives of IAMFES, have been nominated by a member(s) and confirmed by the Executive Board.
- B. Honorary life members shall not be required to pay dues.
- C. Honorary life members may not hold office in IAMFES, but may serve on committees, as Affiliate representatives and as appointed representatives of IAMFES.
- D. Honorary life members may attend meetings of IAMFES, be accorded privilege of the floor, and shall be entitled to vote.

Section 6. Composition of Executive Board and Committees

- A. Any person serving as an officer of IAMFES must be a regular or retired member of IAMFES.
- B. Any person serving on IAMFES committees, as an Affiliate representative, or as an appointed representative of IAMFES, shall be a current regular, student, retired or honorary life member of IAMFES.

Section 7. Any person desiring membership in IAMFES shall submit an application to the Executive Director. It is the responsibility of the Executive Board to insure that applicants meet the eligibility requirements for membership.

Section 8. The Executive Board is authorized to set dues as may be necessary to achieve the objectives of IAMFES and shall notify the members of amount of dues.

Section 9. Any person, having once become a member, may continue membership in IAMFES so long as the annual membership dues are paid, except as provided in Article II, Section 5, Subsection F of these Bylaws.

- A. Any member who shall fail to pay annual dues by due date shall be placed in the inactive list.
 - 1. Members on the inactive list shall not receive publications of IAMFES.

- B. Such member(s) may be reinstated within 90 days thereafter, upon payment of dues.
- C. Any member who is delinquent in dues after 90 days will be dropped from the inactive list.
 - 1. Membership may be renewed by filing an application and payment of annual dues.

Section 10. Each paid-up member of IAMFES, in good standing, shall receive, at no extra cost, the regular issues of the Official Publication and such other publications as the Executive Board may direct, for the period in which the dues are paid.

Section 11. Collection of Dues:

- A. The Executive Director shall collect annual membership dues for each member paying directly to IAMFES.
- B. Affiliate Associations may authorize the Executive Director to bill their members for both Affiliate and IAMFES dues. In such case, the Executive Director will forward to the Affiliate, within 30 days of collection, the dues paid for Affiliate membership.
- C. Affiliate Associations may collect both the Affiliate and IAMFES dues. In such case, the Treasurer of the Affiliate will forward to IAMFES, within 30 days after collection, the dues paid for IAMFES membership.
- D. Members of IAMFES who pay local dues to more than one Affiliate Association will pay annual membership dues only once to IAMFES and shall receive only one annual subscription to the official publication of IAMFES.

ARTICLE II.

**DUTIES OF OFFICERS
AND THE EXECUTIVE BOARD**

Section 1. The President shall preside at all meetings of IAMFES and the Executive Board.

- A. The President shall appoint all Committees, unless otherwise directed by the Constitution and Bylaws.
- B. The President shall perform such other duties as they usually devolve upon the presiding officer or are required of this officer by the Constitution and Bylaws.

Section 2. The President-Elect shall perform the duties of the President, in the latter's absence, and shall succeed the President when the latter's term expires.

- A. The President-Elect shall coordinate the planning of the Annual Meeting.
- B. The President-Elect will also appoint the Teller's Committee and the Nominating Committee.

Section 3. The Vice President shall perform the duties of the President and President-Elect in their respective absences.

- A. The Vice President shall study the organization and operation of the committees of IAMFES and make recommendations to the Executive Board regarding said committees.

Section 4. The Secretary shall perform the duties of the President, President-Elect and the Vice President, in their respective absences.

- A. The Secretary shall be responsible for maintaining correspondence and minutes of IAMFES proceedings.
- B. The Secretary, with the assistance of the Executive Director and Staff, shall record and report all minutes of meetings of the Executive Board, including the Business Meeting at the Annual Meeting.

Section 5. The full management of the affairs of IAMFES shall be in the hands of the Executive Board as provided in the Constitution. The duties of the Executive Board shall be:

- A. To direct the administrative work of IAMFES, including all matters connected with its collaboration with other groups, institutions and its professional development;
- B. To act as trustee of IAMFES property;
- C. To fix the time and place for the Annual Meeting;
- D. To plan the Annual Meeting in cooperation with the Affiliate Local Arrangements Committee and the Program Committee;
- E. To act for and in behalf of IAMFES in any administrative, financial, educational, or other capacity as IAMFES may direct, or to act on its own initiative between meetings and report such action at the next Annual Meeting;

- F. To make protem appointments to fill any vacancy or vacancies that may occur among the officer(s) between IAMFES meetings, and to recommend the replacement of an officer at the Annual Meeting, because of inability or inactivity or for other causes which may be in the best interest of IAMFES;
- G. To recommend expulsion from membership for cause by two-thirds of all votes cast, but in no case to recommend revocation without giving the member written notice of reasons for the contemplated action at least one month before action is taken and an opportunity for a hearing in person and/or a rebuttal in writing;
- H. To employ an Executive Director for the Association and fix his or her compensation and duties;
- I. To execute the policies of IAMFES and report to the members at the business meeting at the Annual IAMFES Meeting, any action taken that was not specifically authorized;
- J. To set the amount of the Registration Fee for the Annual Meeting;
- K. To authorize the issuance or revocation of a Charter to an Affiliate Association;
- L. In the absence of an Executive Director, due to illness, death, resignation, or prolonged absence, the Executive Board will be responsible for all duties shown in Article III for these Bylaws.

ARTICLE III.

EXECUTIVE DIRECTOR

Section 1. The Executive Board shall hire an Executive Director to perform the following duties:

- A. Keep a list of members and their addresses.
- B. Assemble and transmit to the Editors of the publications of IAMFES, all papers, addresses, and other matter worthy of publication in a timely manner after receipt from authors.
- C. Keep a current list of names and addresses of IAMFES members entitled to receive the publications.

- D. Issue notices of all meetings, conduct correspondence pertaining to the affairs of IAMFES and perform other duties incident to the office as the Executive Board may authorize.
- E. Receive all monies due IAMFES, giving receipt therefore, and keeping account thereof.
- F. Faithfully care for all monies received, paying out expenses as authorized by the Executive Board and keeping account thereof.
- G. File a surety bond with the President of IAMFES in an amount as directed by the Executive Board.
- H. Provide a detailed statement of the financial condition of IAMFES at the Business Meeting of the Annual Meeting.
- I. With the approval of the Executive Board, employ all staff and fix their compensation in accordance with the approved budget, as well as define their specific duties.
- J. Provide other services as directed by the Executive Board.

ARTICLE IV.

AFFILIATE ASSOCIATIONS

- Section 1.** The conditions for authorizing the issuance of a Charter to an Affiliate Association are as follows:
- A. When a regional group of members of IAMFES want to form an Affiliate Association, a group of at least ten members of IAMFES will sign the application and forward it to the Executive Director of IAMFES with the following information:
 1. A list of the names, addresses and phone numbers of the IAMFES members forming the proposed Affiliate Association;
 2. A list of names, addresses and phone numbers of the temporary officers of the proposed Affiliate Association, at least one of which shall be a member of IAMFES;
 3. The name of the proposed Affiliate Association, and
 4. A definition of the geographical area desired to be covered.
 5. A copy of the proposed Affiliate Constitution and Bylaws.

- B. When an already-existing organization with at least ten (10) members of IAMFES wants to become an Affiliate Association, the Secretary or other duly authorized officer of the applicant organization will make written request for affiliation status and provide the following information:
 1. A list of the names, addresses and phone numbers of the IAMFES members forming the proposed Affiliate Association;
 2. A list of names, addresses and phone numbers of its officers, at least one of which shall be a member of IAMFES;
 3. The name of the organization;
 4. A definition of the geographical area desired to be covered;
 5. A copy of the Affiliate Constitution and Bylaws, and
 6. An attested copy of the minutes authorizing said application.

Section 2. Upon majority vote of the Executive Board, the Executive Director, or, in the absence thereof, the Secretary of IAMFES will notify the responsible officer of the applicant organization concerning the action taken.

- A. Upon receipt of any further information requested by the Executive Board, a Charter will be executed to an Affiliate Association in form and substance as approved by the Executive Board.
 1. The Charter will be presented to the duly authorized Affiliate representative member at the IAMFES Annual Meeting or at the Annual Meeting of the Affiliate.
- B. After the granting of the Charter by IAMFES, and yearly thereafter, the Secretary of the Affiliate Association or other duly authorized officer shall submit the names, addresses and phone numbers of each IAMFES member and Affiliate member, and other official business to the Executive Director of IAMFES.

Section 3. Any Affiliate Association may use the expression "Affiliated with the INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.," or an equivalent legend that is approved by the IAMFES Executive Board.

Section 4. An Affiliate Association Charter may be revoked by the IAMFES Executive Board:

- A. Upon recommendation by the Affiliate Council, on two-thirds (2/3rds) vote of the total number of votes cast by that Council after due and reasonable notice has been given in writing at least three months before such a vote is to be taken and a reasonable opportunity is given for a hearing.
- B. A Charter may be revoked for the following causes:
 1. When the affairs of the Affiliate Association are not conducted consistent with the Constitution and Bylaws of IAMFES.
 2. When the Affiliate Association has ceased to function for two years, or
 3. When the Affiliate Association fails to maintain at least ten (10) members in IAMFES for two (2) consecutive years.

ARTICLE V.

COMMITTEES

Section 1. Standing committees of IAMFES shall consist of the following: Program Committee, *Journal of Food Protection* Management Committee, *Journal of Dairy, Food and Environmental Sanitation* Management Committee and Past Presidents' Advisory Committee.

- A. The Program Committee shall consist of a chairperson, vice chairperson and other individuals appointed by the Executive Board. These appointments shall be for 3-year terms on a rotating basis with balanced representation from education, government and industry.
 1. The Committee shall assist the Executive Board in developing the scientific and technical content of the Annual Meeting.
 2. The Committee shall meet at each Annual Meeting and other times as deemed necessary.
- B. The journal management committees shall consist of chairpersons, appointed by the President, the editors of the IAMFES publications, members appointed for 3-year terms and the Managing Editor of the publications, unless otherwise designated by the Executive Board.

1. The Committees shall handle all editorial matters concerning publications of the Journal(s) and other publications of IAMFES, with the approval of the Executive Board.
- C. The Past Presidents' Advisory Committee shall be composed of Past Presidents of IAMFES.
 1. The Immediate Past President will act as liaison between this committee and the Executive Board.
 2. This committee will meet at each Annual Meeting.
 3. In the absence of all Executive Board members, this committee would select interim officers until new officers could be elected.
 4. Advise Executive Board on any IAMFES matters as deemed advisable.

Section 2. Each year, prior to the Annual Meeting, the President-Elect shall appoint a seven member Nominating Committee.

- A. At least one member shall have served on the Nominating Committee the previous year, and the members should be representative of geographical and membership groups.
- B. The Chairperson of the committee shall be announced at the Annual Meeting, and published in the official publication of IAMFES the month following the Annual Meeting, together with the date by which candidates for nomination(s) for office(s) shall be submitted.
- C. The Nominating Committee shall submit the names of at least two nominees for the office of Secretary to the Executive Director as directed by the President-Elect. The names, with pictures and biographical sketches, shall be published in the official publication of IAMFES not later than April 1 of the year in which the election is to be held.
- D. Ballots shall be distributed by the Executive Director as directed by the Executive Board and must be returned to the Executive Director by June 1, for checking against the IAMFES eligible voter list and then forwarded to the Teller's Committee for counting.

- E. The person receiving the greatest number of votes shall be certified to the President at least one month in advance of the Annual Meeting.

Section 3. The President-Elect shall appoint a Teller's Committee composed of three persons for the purpose of certifying the results of each election of Officers.

Section 4. Other special committees and regular continuing committees may be authorized by the Executive Board or by the President for special work or assignment.

- A. The need for continuation of such committees shall be subject to annual review of the Executive Board.
- B. All appointments of Chairpersons to continuing committees shall be made by the President-Elect prior to the Annual Meeting and shall be subject to annual review of the Executive Board. Proposed members of committees will be designated by the Committee Chairperson and presented to the Executive Board for approval.

Section 5. The terms of office of all committee Chairpersons shall expire at the end of the Annual Meeting next following their appointment, except as provided in the Bylaws.

ARTICLE VI.

MEETINGS

Section 1. Each year, IAMFES shall hold an Annual Business Meeting.

- A. A quorum for any meeting to conduct business shall consist of at least 50 voting members.

Section 2. Other meetings of IAMFES may be called by the Executive Board, by duly announcing any called meeting at least 60 days prior to the date of the meeting.

Section 3. The Executive Board and the Affiliate Council shall meet at the Annual Meeting.

Section 4. When, in the discretion of the Executive Board, it is considered advisable to conduct a vote on a question by mail ballot, a majority of the votes cast will be necessary to carry the proposition.

Section 5. Robert's Rules of Order shall govern the procedures at all meetings. Voting by proxy shall not be permitted.

ARTICLE VII.

PUBLICATIONS

Section 1. All publications of IAMFES will be issued under the authority of the Executive Board.

- A. Any Affiliate Association may publish its own material but must assume full responsibility therefore, and obligate IAMFES in no way.

Section 2. *Dairy, Food and Environmental Sanitation* shall be the official publication of IAMFES and the *Journal of Food Protection* will be the scientific publication.

- A. These Journals will be the property of IAMFES, which will own the copyrights and all the articles published therein.
- B. The Editors will serve at the pleasure of the Executive Board.

Section 3. The Executive Board will authorize and direct other publications of IAMFES.

ARTICLE VIII.

AMENDMENTS

Section 1. Any member may propose amendments to these Bylaws by submitting them in writing to the Executive Director at least 60 days before the date of the next announced meeting.

- A. The Executive Director shall notify all members, at least 30 days before the next announced meeting, that the proposed amendment(s) will be open for discussion and voting at the next meeting.
- B. These Bylaws may be amended by majority affirmative vote of the voting members present.

Preliminary Program of the IAMFES 86th Annual Meeting

SUNDAY EVENING — AUGUST 1, 1999

Opening Session

- Welcome Comments
- Presentation of the IAMFES Fellows Awards
- Ivan Parkin Lecture — "Global Food Safety in the 21st Century" presented by Dr. Fritz Käferstein, FDA/USDA, Joint Institute for Food Safety and Applied Nutrition at the University of Maryland, College Park, Maryland.

Cheese and Wine Reception will follow in the Exhibit Hall.

MONDAY MORNING — AUGUST 2, 1999

S1 Globalization of Foodborne Disease

- Types of Foodborne Outbreaks in Developing Countries — EWEN TODD, Health Canada, Ottawa, Ontario, Canada
- The Prevention of Spread of Foodborne Disease from a WHO Perspective — YASMINE MOTARJEMI, WHO, Geneva, Switzerland
- The Americas — ELLEN MORRISON, FDA, Washington, D.C., USA
- Trade with and within Europe — MICHIEL VAN SCHOTHORST, Nestec Ltd., Vevey, Switzerland
- Japan — HIROSHI TAKAHASHI, National Institute of Infectious Diseases, Tokyo, Japan
- Australia and New Zealand — TRISH DESMARCHELIER, CSIRO, Tingalpa, Queensland, Australia

S2 Fruits and Vegetables: Are They Safe Enough?

- Outbreaks Associated with Produce — MORRIS E. POTTER, CDC, Atlanta, GA, USA
- Risk Management Strategies at the Farm — NANCY NAGLE, Nagle Resources, Pleasanton, CA, USA
- Assuring the Safety of Unpasteurized Juices — ROBERT BUCHANAN, FDA, Washington, D.C., USA
- Interventions to Reduce the Risk of Pathogens Associated with Alfalfa Sprouts — LARRY BEUCHAT, University of Georgia, Griffin, GA, USA
- Quantitative Risk Assessment of *E. coli* O157 and *E. monocytogenes* in Fresh-cut Produce — EWEN TODD, Health Canada, Ottawa, Ontario, Canada
- Microbiological Issues Associated with Packaged Produce — E. JEFFREY RHODEHAMEL, Cryovac North America, Duncan, SC, USA

S3 Mini Workshop for Dairy Plant Employees and Regulators

- Plant Regulatory Inspection — CHARLES PRICE, SR., FDA, Chicago, IL, USA
- Employee G.M.P.'s — GAYLORD SMITH, Mohawk Assoc., Inc., Schenectady, NY, USA
- Standards Pertaining to Product Quality — RUTH FUQUA, Quality Creek Dairies, Inc., Mt. Juliet, TN, USA
- Sanitary Design & Installation of Equipment — DON GRAHAM, Graham Sanitary Design Consulting, Chesterfield, MO, USA

Microbiology of Meat and Poultry — Technical Session

- T1 Reduction of *E. coli* O157:H7 Concentrations in Ruminant Contents In Vitro; Bacteriocidal Effect of Sodium Chlorate — ROBIN C. ANDERSON, David J. Nisbet, Sandra A. Buckley, Roger B. Harvey, and Larry H. Stanker, USDA, ARS, College Station, TX, USA
- T2 Incidence of *E. coli* O157:H7 in Frozen Beef Patties Produced Over an Eight Hour Shift — W. PAYTON PRUETT, JR., Timothy Biela, Russell S. Flowers, Peter Mrozinski, Charles Lattauada, Bonnie Rose, Ann Marie McNamara, James O. Reagan, David Theno, and William Osborne, Silliker Laboratories Group, Inc., Homewood, IL, USA
- T3 Commercial Evaluation of Multiple-Sequential Interventions for Decontamination of Beef Carcasses — R. TODD BACON, J. N. Sofos, K. E. Belk, J. O. Reagan, and G. C. Smith, Colorado State University, Fort Collins, CO, USA
- T4 Verification of the Effectiveness of a Second Generation Steam Pasteurization™ System for Decontaminating Pre-rigor Beef Carcass Sides in a Commercial Slaughter Facility — D. D. RETZLAFF, R. K. Phebus, S. B. Sporing, M. D. Schafer, and S. A. Rueger, Kansas State University, Manhattan, KS, USA
- T5 Effectiveness of Potassium Lactate and Lactic Acid against *Campylobacter* on Chicken Breasts — DAVID D. RASMUSSEN, S. S. Sumner, C. R. Hackney, J. E. Eifert, M. L. Eckhoff, and B. T. deVegt, Virginia Tech, Food Science and Technology, Blacksburg, VA, USA
- T6 Chlorination of Chill Tanks Reduces Salmonellae on Processed Broiler Carcasses — J. STAN BAILEY, N. A. Cox, and N. J. Stern, USDA, Athens, GA, USA

- T7 Cross-contamination Model for *Salmonella* in Poultry Chilling Process – HONG YANG, Yanbin Li, and Michael G. Johnson, University of Arkansas, Fayetteville, AR, USA
- T8 A Computer Software Application of Assessing the Risk and Severity of *Salmonella* and *Campylobacter* Infections from Poultry Products – THOMAS P. OSCAR, USDA, ARS, Princess Anne, MD, USA
- T9 Changes in the Native Microflora, Weight, and pH of the Ceca of Turkeys Subjected to Feed Withdrawal – ARTHUR HINTON, JR., R. Jeff Buhr, and Kimberly D. Ingram, PPMQ, ARS, USDA, Athens, GA, USA
- T10 Use of Whey-based Film Containing Antimicrobial Agents to Inhibit *L. monocytogenes* in Frankfurters – CRYSTAL R. MCDADE, S. M. Zutara, E. Ryser, C. W. Donnelly, and H. Chen, University of Vermont, Burlington, VT, USA
- T11 Levels of Microbiological Contamination of Pork Carcasses during Slaughter – HENRY N. ZERBY, K. E. Belk, M. Hardin, J. N. Sofos, and G. C. Smith, Colorado State University, Fort Collins, CO, USA
- T12 Extent of Microbiological Contamination on Pork Variety Meats – HENRY N. ZERBY, K. E. Belk, M. Hardin, W. Lloyd, J. N. Sofos, and G. C. Smith, Colorado State University, Fort Collins, CO, USA
- P7 Rapid Preparation of PCR Samples from Food Combined with Shortened PCR Cycles for the Detection of *E. coli* – WILLIAM K. SHAW, JR., and L. A. McLandsborough, University of Massachusetts, Amherst, MA, USA
- P8 Enumeration of *Campylobacter jejuni* and *C. coli* within 36 h by Immunoblotting from Modified Blood Agar Medium – RAMA NANNAPANENI, R. Story, and M. G. Johnson, University of Arkansas, Dept. of Food Science, Fayetteville, AR, USA
- P9 A Single Medium for the Quantitative Screening of Three Foodborne Pathogens – R. VICTOR LACHICA, U.S. Army Natick Labs, Natick, MA, USA
- P10 Comparison of Microbial Identification Methods – MARLENE CELIS, Joshua Deabel, Vidhya Gangar, and Mishael Curiale, Silliker Laboratories Research Corp. Center, South Holland, IL, USA
- P11 A PCR-ELISA for Detecting Shiga Toxin-producing *E. coli* in Food – BEILEI GE, J. Meng, and S. Zhao, University of Maryland, College Park, MD, USA
- P12 Evaluation of the TECRA® Unique™ Test for Rapid Detection of *Salmonella* in Food: A Collaborative Study – DENISE HUGHES, A. Dailianis, and L. Hill, TECRA Diagnostics, Roseville, Australia
- P13 Rapid 24 H Multiplex Detection of Four Pathogens in Food from a Single Enrichment – ANNE DAVIES, R. Owen, D. Nelson, B. Wicks, L. Parsons, C. Hamill, R. Mackee, and B. Thomas, Celsis, Inc., Evanston, IL, USA

Rapid Methods and Miscellaneous – Poster Session

- P1 Modification of Some Selective Media for the Rapid Detection of *Salmonella* Using Impedance-splitting Method – PRAVATE TUITEMWONG, T. Hongdusit, and K. Tuitemwong, King Mongkut's University of Technology Thonburi, Bangkok, Thailand
- P2 Use of Membrane Fraction and Selective Motility for the Rapid Screening of *L. monocytogenes* – PRAVATE TUITEMWONG, J. Wongchavalit, and K. Tuitemwong, King Mongkut's University of Technology Thonburi, Bangkok, Thailand
- P3 Evaluation of the BAX for Screening/Genus *Listeria* Method for Testing Environmental Sponges – JOSEPH D. MEYER, Kara B. Mikkelsen-Baldus, Adam C. Borger, W. Mark Barbour, and Paul A. Hall, Kraft Foods, Oscar Mayer Division, Madison, WI, USA
- P4 Immunoassay-based Test for Detection of Peanuts in Food Products – MOHAMED M. ABOUZIED, Scott A. Askegard, Paul S. Satoh, Susan L. Hefle, Julie A. Nordlee, and Steve L. Taylor, Neogen Corporation, Lansing, MI, USA
- P5 Detection of Egg Contamination in Food Products by Immunoassay-based Test – MOHAMED M. ABOUZIED, Carrie J. Fetzner, Paul S. Satoh, Susan L. Hefle, Elizabeth Jeanniton, and Steve Taylor, Neogen Corporation, Lansing, MI, USA
- P6 Accuracy of *Salmonella* Detection in Food Using Commercially Available *Salmonella* ELISA tests – CATHERINE SMITH, K.W. Doherty, and C.-M. Chen, Idexx Laboratories, Westbrook, ME, USA
- P14 Rappaport-Vassiliadis Enrichment Procedure for Use with DNA Hybridization Assays for Detection of *Salmonella* spp. in Foods – MARK A. MOZOLA and Gregory W. Durbin, GENE-TRAK Systems, Hopkinton, MA, USA
- P15 Differentiation between Types and Strains of *Clostridium botulinum* by Riboprinting – GUY E. SKINNER, G. A. Fingerhut, S. M. Gendel, and H. M. Solomon, USFDA/NCFST, Summit-Argo, IL, USA
- P16 Evaluation of Clearview™ and Bax™ for the Detection of *Listeria* sp. and *L. monocytogenes* – MARIA T. DESTRO and D. A. Rodrigues, FCF/USP, San Paulo, SP, Brazil
- P17 Comparison of Different Dye Indicators for Early Detection of Microbial Growth – *E. coli* O157:H7 Using Biosys 32 – ADALGISA M. MORA, S. L. Archie, N. E. Allen, and A. P. Dessai, Tuskegee University, Tuskegee, AL, USA
- P18 The Influence of Pre-enrichment Media on the Detection of *E. coli* O157:H7 with a Fluorogenic DNA-based Assay – ROBERT L. GREEN, Michiko Matsuura, Lisa A. Yagi, and Paul A. Foxall, PE Biosystems, Foster City, CA, USA
- P19 Comparison of BAX® and Organon Teknika® *Salmonella*-Tek to Standard Selective Enrichment Method for the Detection of *Salmonella* in Food – THEODORA MORILLE-HINDS, Hugh Trenk, and Paul A. Hall, Kraft Foods, Tarrytown, NY, USA

- P20 Isolation of Foodborne *Salmonella* Using Dynabeads® Anti-*Salmonella* and Oxiod S.P.R.I.N.T. *Salmonella* Medium – KOFITSYO S. CUDJOE, R. Krona, M. Ron, and A. Campbell, Dynal AS, Norwegian College of Vet. Medicine, Oslo, Norway
- P21 Collaborative Testing of a Prototype Automated IMS System for Rapid Detection of *Salmonella* and *E. coli* O157 Using Dynabeads® – KOFITSYO S. CUDJOE, R. Krona, M. Ron, and A. Campbell, Dynal AS, Norwegian College of Vet Med., Oslo, Norway
- P22 The Use of Rapid Methods to Assess the Incidence and Public Health Risk of *S. aureus* in Food and Food Production Environments – JILL GEBLER, Murray Goulburn Co-operative Co. Ltd., Victoria, Australia
- P23 Evaluation of the Rapid SimPlate™ Yeast and Mold Test for Various Food Bar Products – Y. JENNIFER LEE, S. D. Allard, and D. J. Yonker, Amway Corporation, Ada, MI, USA
- P24 Comparison of Two ELISA Tests against Standard Method for the Detection of *Listeria* Species in Food Samples – HAOYI GU, K. Osborne, and C. M. Chen, Idexx Laboratories, Inc., Westbrook, ME, USA
- P25 *Salmonella* Detection in Food: Study of a Two-step Enrichment Protocol Combined with an ELISA – PATRICE ARBAULT and S. Pomerol, Diffchamb S.A., Lyon, France
- P26 Cleaning Validation in Food Retail Environments by a New Protein Assay – BRIAN ECKENROTH and Elizabeth Ehrenfeld, IDEXX Laboratories, Westbrook, ME, USA
- P27 A Comparative Media Analysis of Newspaper Coverage of Microbial Food Safety Issues in Canada, the US, the UK and Australia, 1994-1998 – AMANDA WHITFIELD, K. Vandenberg, J. Seib, S. Grant, and D. A. Powell, University of Guelph, Guelph, Ontario, Canada
- P28 Statistical Process Monitoring and Fault Diagnosis in a Continuous Dairy Pasteurization Process – F. KOSEBALABAN, J. E. Schlessler, and Ali Cinar, Illinois Institute of Technology, Chicago, IL, USA
- P29 Cleaning Validation of Food Processing Equipment: A Comparison between a New Ultrasonic Apparatus and Swab Method – NADIA OULAHAL-LAGSIR, A. Martial, E. Marquis-Boistier, and M. Bonneau, Raliment: Rhone Alpes Food Research Center, France
- P30 A Comparative Evaluation of the Cleaning Performances of a Range of Seven Floors in Food Industry – NADIA OULAHAL-LAGSIR, Elisabeth Marquis-Boistier, and Jean-Paul Larpent, Raliment/Alimentec Recherche, Hygiene and Quality, France
- P31 Indicative Microbes on Processed Shrimp before Implementation of US FDA's HACCP Regulations – CUSTY F. FERNANDES, C. D. Veal, D. L. Marshall, and K. R. Cadwallader, Mississippi State University, Pascagoula, MS, USA
- P32 Evaluation of HACCP Program for Deli Food Service Managers – JULIE A. ALBRECHT, Dianne L. Peters, and Susan S. Sumner, University of Nebraska, Lincoln, NE, USA

MONDAY AFTERNOON — AUGUST 2, 1999

S4 Science-based Criteria for Harmonizing Food Safety Regulations

- Scientific Basis for Setting Performance Standards – MICHEL VAN SCHOTHORST, Nestec Ltd., Vevey, Switzerland
- Harmonization of *Listeria* Tolerance Limits – European Experience – PAUL TEUFEL, Federal Institute for Health Protection of Consumers and Veterinary Medicine, Berlin, Germany
- Harmonization of Acceptance Criteria for Microbiological Methods – RUSSELL FLOWERS, Silliker Laboratories Group, Chicago, IL, USA
- Equivalence of Inspection Systems for International Trade – ROBERT BUCHANAN, FDA, Washington, D.C., USA
- Verotoxigenic Versus Other *E. coli* Standards – MICHAEL DOYLE, University of Georgia, Griffin, GA, USA
- Panel Discussion

S5 Manure and Water: Produce Safety Implications

- Water and Manure Safety Issues for the Next Millennium – DEAN O. CLIVER, University of California-Davis, Davis, CA, USA
- Water Quality and Safety – JOAN ROSE, University of South Florida, St. Petersburg, FL, USA
- Developing Manure Management Controls for Conventional and Organic Farming – TREVOR SUSLOW, University of California-Davis, Davis, CA, USA
- Manure Quality and Safety – GARRY FORNEY, Bull Enterprises, El Centro, CA, USA
- Field Sanitation/Worker Hygiene Issues – FRANCES PABRUA, California Strawberry Commission, Watsonville, CA, USA
- Panel Discussion

S6 Dairy Plant Quality and Safety Programs

- Preventive Maintenance in Dairy Plants – CHRIS NEWCOMER, New-Tech Consulting, Inc., Cincinnati, OH, USA
- Dairy Plant Quality Control – DEAN SUMMERS, Alto Cheese, Wampun, WI, USA
- Implementing a HACCP Program – JEFF MAIATICO, DFA, New Wilmington, PA, USA
- Designing a HACCP Plan – RANDY DOUGHERTY, National Sanitation Foundation, Ann Arbor, MI, USA
- Report from the NCIMS HACCP Committee – CLANDIA COLES, Washington State DPA, Olympia, WA, USA
- Dairy Plant Prerequisites – STEVE SIMS, M.S.B., Washington, D.C., USA

General Food Microbiology — Technical Session

- T13 Modeling the Growth Boundary of *Staphylococcus aureus* for Risk Assessment Purposes — CYNTHIA M. STEWART, Martin B. Cole, J. David Legan, Donald Schaffner, Louise Slade, and Mark Vandeven, Nabisco Inc., E. Hanover, NJ, USA
- T14 Response Surface Models for Effects of Previous Sodium Chloride and Temperature on Growth Kinetics of *Salmonella typhimurium* on Cooked Chicken Breast — THOMAS P. OSCAR, USDA, ARS, Princess Anne, MD, USA
- T15 Bacteriophage Activity against *E. coli* O157:H7 and *Salmonella* spp. — ANANTA P. DESSAI, L. R. Chery, and S. L. Archie, Tuskegee University, Tuskegee, AL, USA
- T16 Effect of Chlorine Treatment on Heat Inactivation of *E. coli* O157:H7 — JAMES P. FOLSOM and Joseph F. Frank, University of Georgia, Athens, GA, USA
- T17 Application of Treatments to Reduce Contamination of Pork Variety Meats — HENRY N. ZERBY, K. E. Belk, M. Hardin, W. Lloyd, J. N. Sofos, and G. C. Smith, Colorado State University, Fort Collins, CO, USA
- T18 Inactivation of *E. coli* O157:H7 and *L. monocytogenes* on Apples Using Ozone, Chlorine Dioxide, Sodium Hypochlorite and Peracetic Acid — STEPHANIE L. RODGERS, Jerry N. Cash, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA
- T19 Microbial Reduction of Laboratory Inoculated Produce Surfaces by Rinsing and Wiping with Paper Towels and Comparison to 200 PPM Chlorine Dip — BARRY MICHAELS, Vidhya Gangar, Eric Meyers, Heidi Johnson, and Michael S. Curiale, Georgia Pacific Corporation, Palatka, FL, USA
- T20 Efficacy of Ultraviolet Light to Eliminate *E. coli* O157:H7 in Unpasteurized Apple Cider — JIM R. WRIGHT, S. S. Sumner, C. R. Hackney, and M. D. Pierson, Virginia Tech Food Science and Technology, Blacksburg, VA, USA
- T21 Inhibition of Growth and Aflatoxin Production of *Aspergillus parasiticus* by Korean Soybean Paste (Doen-jang) and Identification of the Active Component — JONG-GYU KIM, Yong-Wook Lee, Pan-Gyi Kim, Woo-Sup Roh, and Hideharu Shintani, Keimyung University, Taegu, Korea
- T22 Critical Role of *Pediococcus* sp. Cytoplasmic Membrane in Thermal Resistance — BASSAM A. ANNOUS, USDA, Wyndmoor, PA, USA
- T23 Antibiotic Resistance of Gram-negative Enteric Pathogens Isolated from Retail Meats — ROBERT L. SUDLER JR., J. Meng, D. T. Ingram, and L. Liu, University of Maryland College Park, College Park, MD, USA
- T24 Distribution and Role of Integrons in Multi-resistant *Salmonella* — LANCE F. BOLTON, Lynda C. Kelley, and Paula J. Fedorka-Cray, USDA-ARS-PMSRU, Athens, GA, USA

Microbiology of Meat, Poultry, and Produce — Poster Session

- P33 Growth of Salmonellae in Previously Irradiated Ground Beef — JAMES S. DICKSON and D. G. Olson, Iowa State University, Ames, IA, USA
- P34 Reduction of Bacterial Contamination on Hog Carcasses with Hot Water and Organic Acid Rinses — JAMES S. DICKSON, L. Eggenberger-Solorzano, S. E. Niebuhr, R. J. Huber, M. Hardin, and G. R. Acuff, Iowa State University, Ames, IA, USA
- P35 Dissemination of *L. monocytogenes* in a Brazilian Frozen Chicken Nuggets Processing Line — MARIA T. DESTRO and D. A. Rodrigues, FCF/USP, San Paulo, SP, Brazil
- P36 Production of Mortadella: Behavior of *L. monocytogenes* under Commercial Manufacturing and Storage Conditions — MARIA T. DESTRO and L. S. Bersot, FCF/USP, San Paulo, SP, Brazil
- P37 Enumeration of *E. coli* in Poultry Carcass Rinse Using SimPlate and Petrifilm Methods — PURNENDU C. VASAVADA, D.E. Townsend, and G. Eaton, University of Wisconsin River Falls, River Falls, WI, USA
- P38 Sensitivity of *Salmonella typhimurium* DT104 to Irradiation — STEVEN E. NIEBUHR, R. J. Huber, K. T. Rajkowski, D. W. Thayer, and J. S. Dickson, Iowa State University, Ames, IA, USA
- P39 Fate of *Salmonella* Enteritidis in Hard-cooked Eggs — WALAIRUT CHANTARAPANONT and L. R. Beuchat, University of Georgia, Griffin, GA, USA
- P40 Survival of Multidrug-resistant *Salmonella typhimurium* DT104 in Egg Powders as Affected by Water Activity and Temperature — YONGSOO JUNG and L. R. Beuchat, University of Georgia, Griffin, GA, USA
- P41 Consumer Acceptability and Microbial Inactivation in Home-style Beef Jerky Produced by Various Methods — JUDY A. HARRISON, Mark A. Harrison, Ruth Ann Rose-Morrow, and Robert L. Shewfelt, The University of Georgia, Athens, GA, USA
- P42 Evaluation of Environmental Microflora in a Korean Meat Plant for HACCP Application — DONG KWAN JEONG and J. S. Lee, Kosin University, Pusan, Korea
- P43 Reduction of Normal Flora by Irradiation and Its Effect on Multiplication of *L. monocytogenes* on Ground Turkey at 7°C in a Modified Atmosphere — DONALD W. THAYER and Glenn Boyd, USDA, ARS, ERRC, Wyndmoor, PA, USA
- P44 Microbiological Contamination Baselines of Beef Carcasses, Wholesale Cuts and Retail Cuts — MINDY L. KAIN, J. N. Sofos, K. E. Belk, J. O. Reagan, G. C. Smith, D. R. Buege, W. P. Henning, J. B. Morgan, T. P. Ringkob, and G. R. Bellinger, Colorado State University, Fort Collins, CO, USA
- P45 Therapeutic Anti-idiotypic Antibodies to *E. coli* K88 as an Alternative to Antibiotic Use in Meat Industry — ZIAD WAHEED JARADAT and Ronald R. Marquardt, University of Manitoba, Winnipeg, Manitoba, Canada

- P46 *E. coli* O157:H7 Risk Assessment for Production and Cooking of Blade Tenderized Beef Steaks – SARAH B. SPORING, R. K. Phebus, J. L. Marsden, D. D. Retzlaff, M. D. Schafer, C. B. Chandler, and A. L. Truax, Kansas State University, Manhattan, KS, USA
- P47 Reduction of *Salmonella* Contamination on Pork Products Using Radiant Wall Oven Heating – MARK A. HARRISON, Shanna Lively, and Romeo Toledo, The University of Georgia, Athens, GA, USA
- P48 The Occurrence of *Campylobacter* spp. in Swine Carcass Dressing Operations – SAMUEL A. PALUMBO, Jeffrey E. Call, Benne S. Marmer, and Linda S. Yu, USDA, ARS, Wyndmoor, PA, USA
- P49 Automated Real Time CCP Monitoring of External Cooked Sausage Temperature Utilizing Infrared Sensors and Statistical Process Monitoring – JEFFREY DECICCO, A. Cinar, J. E. Schlessler, and B. Verdorn, Illinois Institute of Technology, Chicago, IL, USA
- P50 Extending the Shelf-life of a Cooked Ham Product Using L-glucose and D-tagatose – D.A. BAUTISTA, P. J. Shand, and R. B. Pegg, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
- P51 Microbial Population of Ready-to-Serve Salads in Tekirdog, Turkey – TUNCAY GUMUS, M. Arici, and O. Simjek, Trakya University, Tekirdog, Turkey
- P52 A Quantitative Assessment of the Risk of *E. coli* O157:H7 in Apple Cider – SIOBAIN DUFFY, Cook College, Rutgers University, New Brunswick, NJ, USA
- P53 Nature of *E. coli* O157:H7 Attachment to Lettuce Leaves and the Effect of Chlorine Disinfection – KAZUE TAKEUCHI and Joseph F. Frank, University of Georgia, Athens, GA, USA
- P54 Sodium Chloride and Sodium Bicarbonate Washing Solution for Removal of Enterohemorrhagic *E. coli* O157:H7 from the Surfaces of Chopped Lettuce – MARLENE E. JANES, R. Nannapaneni, L. Howard, and M. G. Johnson, University of Arkansas, Fayetteville, AR, USA
- P55 Survival of *E. coli* O157:H7 in Bovine Feces Applied to Lettuce and Effectiveness of Chlorine as a Disinfectant – L. R. BEUCHAT, University of Georgia, Griffin, GA, USA
- P56 Survival of *E. coli* O157:H7 and *Salmonella* spp. on Fresh Strawberries – DAWN M. KNUDSEN and Linda J. Harris, University of California, Davis, CA, USA
- P57 Recovery of Generic *E. coli* from Juice – DAVID E. TOWNSEND and Shawn Higgins, IDEXX Laboratories, Inc., Westbrook, ME, USA
- P58 Inactivation of *E. coli* O157:H7 and *Salmonella* spp. in Unpasteurized Apple and Orange Juice by High Pressure Processing – GUODONG WANG, E. Raghuber, and E. Ting, National Food Processors Association, Dublin, CA, USA
- P59 Cold Shock Decreases the Thermal Tolerance of Bacterial Pathogens in Apple and Orange Juice – DARRELL O. BAYLES, USDA, ARS, NAA, ERRC, Wyndmoor, PA, USA
- P60 Use of pGFP to Determine the Survival of *E. coli* O157:H7 and *Salmonella typhimurium* in Manure Applied to Soil – GENEVIEVE JOHNSON, J. J. Churey, and R. W. Worobo, Cornell University, Geneva, NY, USA
- P61 Keeping Quality of Sprouts after Irradiation and D Radiation Values for *Salmonella* and *E. coli* O157:H7 – KATHLEEN T. RAJKOWSKI, USDA, ARS, ERRC, Wyndmoor, PA, USA
- P62 Bacterial Decrease of Vegetable Juice by Ozone and Gamma Ray Irradiation – KOOK HEE KANG and S.C. Kwon, Sungkyunkwan University, Suwon, Korea
- P63 The Study on Safety and Crisp Property of Pickled Peeled-hot Chili – MING CHANG WU, National Pingtung University of Science and Technology, Nei Pu, Pingtung, Taiwan
- P64 Microbial Analysis of Lettuce Used in Ready-to-Eat Salads – NEDRA E. ALLEN, A. P. Dessai, A. M. Mora, and S. L. Archie, CAENS, Tuskegee, AL, USA

TUESDAY MORNING – AUGUST 3, 1999

Produce and Sanitation – Technical Session

- T25 Development, Implementation and Analysis of an On-farm Food Safety Program for the Ontario Greenhouse Vegetable Grower's Marketing Board – MAURICIO B. RUIZ and D. A. Powell, University of Guelph, Guelph, Ontario, Canada
- T26 Microbial Colonization with Biofilm Formation on Packaging Film and Vegetable Tissue of Ready-to-Use Packaged Spinach – SUSAN ABRAHAM, Heidi Schraft, and Marvin A. Tung, University of Guelph, Guelph, Ontario, Canada
- T27 Effect of Microwave Cooking on the Recovery of *Cryptosporidium* oocysts from Spinach – MILDRED M. CODY, T. Arcaro, V. O'Leary, S. Roman, J. Rau, and R. Cordell, Georgia State University, Atlanta, GA, USA
- T28 Survey of Production Practices Used by Virginia Apple Cider Processors – JIM R. WRIGHT, S. S. Sumner, C. R. Hackney, and M. D. Pierson, Virginia Tech, Blacksburg, VA, USA
- T29 Science, Society, and Cider: A Comparative Analysis of Integrative Food Safety Risk Management in Canada and the US – JEFF SMITH, S. E. Grant, and D. A. Powell, University of Guelph, Guelph, Ontario, Canada
- T30 A Quantitative Risk Assessment for Determining the Efficacy of Various Hand Washing Practices – REBECCA MONTVILLE, Cook College, New Brunswick, NJ, USA
- T31 The Dynamics of Surface Cleaning and Sanitization – BARRY MICHAELS, Vidhya Gangar, Ann Roering, and Michael S. Curiale, Georgia Pacific Corporation, Palatka, FL, USA

- T32 Occurrence of *L. monocytogenes*, *Salmonella*, *E. coli* O157:H7 and Other Shiga-like Toxin-producing *E. coli* in Retail Fresh Vegetables and Ground Beef – W. MARK BARBOUR, M. Samadpour, P. Yang, F. Buck, S. Ammerman, G. Depavia, E. Mazengia, and D. Alfi, Qualicon, Inc., Wilmington, DE, USA
- T33 Behavior of *E. coli* O157:H7 on Alfalfa Sprouts during the Sprouting Process as Influenced by Treatments with Various Chemicals – PETER J. TAORMINA and L. R. Beuchat, University of Georgia, Griffin, GA, USA
- T34 Outbreaks of Viral Gastroenteritis Associated with Imported Raspberries – COLETTE GAULIN, Danielle Ramsay, Pierrette Cardinal, and Marie-Alix D'Halevyn, Public Health Center of Quebec City, Beauport, Canada
- S7 Problems of and Possible Solutions for the Development of Pathogen Resistance to Traditional Processing**
- Critical Role of Membranes in Bacteriocin, Antibiotic, and Preservative Resistance – THOMAS MONTVILLE, Rutgers, The State University of New Jersey, New Brunswick, NJ, USA
 - Potential for Emergence of Resistance to Antimicrobials Used in the Food Industry – P. MICHAEL DAVIDSON, University of Tennessee, Knoxville, TN, USA
 - Problems and Solutions to Development of Pathogen Resistance to Thermal Processing – ALEJANDRO S. MAZZOTTA, National Food Processors Assn., Washington, D.C., USA
 - F-ATPases, Adaptive Acid Tolerance and Coupled Oxidative Stress Resistance in Lactic-acid Bacteria – ROBERT MARQUIS, University of Rochester, Rochester, NY, USA
 - Sanitizers/Disinfectants – LYNNE M. SEHULSTER, CDC, Atlanta, GA, USA
 - Microbial Resistance and Food Irradiation – ELSA MURANO, Texas A&M University, College Station, TX, USA
- S8 Overview of Dairy Plant Regulations**
- Overview of Agencies and Jurisdictions – CARY FRYE, IDFA, Washington, D.C., USA
 - USDA Responsibilities as It Pertains to Plant Regulations – PHILIP WOLFF, USDA, Washington, D.C., USA
 - OSHA and EPA's Role in Plant Regulations – JOHN WOLGEMUTH, J. W. Safety Management and Training, Hummelstown, PA, USA
 - 1999 IMS Conference: From a State Perspective – PAUL HOGE, PDA, Harrisburg, PA, USA
 - Bureau of Weights and Measures: Role in Plant Regulation – MICHAEL PINAGEL, Michigan Department of Agriculture, Williamston, MI, USA
 - Viewpoint: Codex/Inter. Standards – ROB BYRNE, NMPF, Arlington, VA, USA

Microbiological Methods and Miscellaneous – Technical Session

- T35 An Epidemiological Study of *Pseudomonas aeruginosa* Strains Associated with Mastitis among Dairy Animals and Human Infections Based on Automated Ribotyping with the Restriction Enzyme *PvuII* – JAMES L. BRUCE, Ariel L. Rivas, Mary Bodis, Renate Klein, and Kevin Anderson, Qualicon, Inc., Wilmington, DE, USA
- T36 Fate of *L. monocytogenes* and *E. coli* O157:H7 in Dairy Foods – FATHY E. EL-GAZZAR and Seham Farrag, University of Assiut, Egypt
- T37 Biochemical Comparison of *L. lactis* spp. *Lactis biovar. diacetylactis* WRP297 and WRP298, Phage Resistant Variants, with Original Sensitive Culture Used for Cheese Manufacture – R. PIRABHAKARAN and Rattan Chand, National Dairy Research Institute, Karnal, India
- T38 A Comparative Study of a Colorimetric ATP Measurement Test, ATP Bioluminescence and Protein Detection for Hygiene Monitoring – MARK CARTER, Ramin Pirzad, James Baker, Drew Ferguson, Paul Meighan, and Peter Grant, Celsis, Inc., Evanston, IL, USA
- T39 An Isolation and Detection System for *L. monocytogenes* Using Fluorogenic and Chromogenic Substrates for Phosphatidylinositol-specific Phospholipase C – LAWRENCE RESTAINO, Elon W. Frampton, Robert M. Irbe, Gunter Schabert, and Hans Spitz, R & F Laboratories, West Chicago, IL, USA
- T40 Detection and Tracking of *L. monocytogenes* in Smoked Fish Plants – MARTIN WIEDMANN, Dawn Norton, Meghan McCamey, Ken Gall, and Kathryn J. Boor, Cornell University, Ithaca, NY, USA
- T41 Effects of Cryogenic Cooling and Traditional Cooling on *Salmonella* Enteritidis Population in Table Eggs – LAVONDA A. HUGHES, D. E. Conner, P. A. Curtis, and K. M. Keener, Auburn University, Auburn, AL, USA
- T42 The Impact of Training on Grocery Store Seafood Employees' Food Safety and Sanitation Knowledge, Practices, and Department Profitability – TORI L. STIVERS and Keith W. Gates, University of Georgia Marine Extension Service, Peachtree City, GA, USA
- T43 Microbiological Monitoring of "Bobby" Calf Slaughter and Dressing: The Need for a Stand-alone Program Design – ROGER COOK, Christine Esquerra, Monique Biss, and Steve Hathaway, Ministry of Agriculture & Forestry Regulatory Auth., Wellington, New Zealand
- T44 Species and Strain Differentiation of *Pseudomonas* spp. by Ribotyping – KATHRYN J. BOOR, Martin Weidmann, John W. Czakja, Denise Weilmeier, Sean Dineen, and Robert Ralyea, Cornell University, Ithaca, NY, USA

- T45 A Single-step Polymerase Chain Reaction for Combined Gene Detection and Epidemiological Typing (COGEDET) of *L. monocytogenes* Strains – JEFFREY M. FARBER, Elaine Daley, and Diane Medeiros, Health Canada, Ottawa, Ontario, Canada
- T46 Development of Hybridoma Cell Line for the Production of a Monoclonal Antibody to Pesticide Bromacil – SUNG J. KANG, Jin S. Kang, and Duck H. Chung, Gyengsang National University, Chinju, Gyangnam, Korea
- General Food Microbiology – Poster Session**
- P65 Development of a Standard Method for Assessing the Sanitizing Efficacy of a Prototype “GRAS” Produce Wash on Tomatoes – LINDA HARRIS, L. R. Beuchat, T. M. Kajs, C. H. Taylor, and T. E. Ward, University of California, Davis, CA, USA
- P66 Assessment of the Microbial Efficacy of a Prototype GRAS Produce Wash on Alfalfa Seeds, Sprouts, and Selected Salad Vegetables – LARRY R. BEUCHAT and T. E. Ward, University of Georgia, Griffin, GA, USA
- P67 Control of *E. coli* O157:H7 in Milk Using a Natural Antimicrobial Agent-Bacteriophage – STEPHANIE ARCHIE, A. M. Mora, N. E. Allen, and A. P. Dessai, Tuskegee University, Tuskegee, AL, USA
- P68 Effect of Starter Culture and Fermentation Temperature on Survival of *E. coli* O157:H7 and *L. monocytogenes* during Fermentation and Storage of Soy Yogurt – MICHAEL M. KAYES, Boonsong Saeng-On, David A. Golden, and James L. Collins, The University of Tennessee, Knoxville, TN, USA
- P69 Effect of Packaging Atmosphere and Storage Temperature on Survival of *L. monocytogenes* on Culture Media Containing Elevated NaCl and Lactic Acid – ROBERT C. WILLIAMS and David A. Golden, The University of Tennessee, Knoxville, TN, USA
- P70 Occurrence of *L. monocytogenes* in Mexican Cheeses – JORGE A. SALTIJENAL O., Claudia E. Solano L., Valente B. Alvarez, Beatriz Garcia F., and Humberto Hernandez S., Ohio State University, Columbus, OH, USA
- P71 Effect of Simulated Gastric Fluid and Bile on Survival of *Vibrio vulnificus* and *Vibrio vulnificus* Phage – JAHEON KOO, Angelo DePaola, and Douglas L. Marshall, Mississippi State University, Mississippi State, MS, USA
- P72 In Vitro Evaluation of the Effects of Nitrite and NaCl on the Antimicrobial Activity of Lysozyme, Nisin and EDTA Combination Treatments – ALEXANDER O. GILL and R. A. Holley, University of Manitoba, Winnipeg, Manitoba, Canada
- P73 Fate of pGFP-bearing *E. coli* O157:H7 in Ground Beef at 2° and 10°C, and Effects of Lactate, Diacetate, and Citrate – SRILATHA AJJARAPU and Leora A. Shelef, Wayne State University, Detroit, MI, USA
- P74 Use of Extracts of *Nigella sativa* (NS) to Inhibit Spoilage and Pathogenic Microorganisms in Rainbow Trout – MONA ELGAYYAR and F. Ann Draughon, The University of Tennessee, Knoxville, TN, USA
- P75 Inhibition of *E. coli* O157:H7 by Herbal and Spice Essential Oils – MONA ELGAYYAR, F. Ann Draughon, David A. Golden, and John R. Mount, The University of Tennessee, Knoxville, TN, USA
- P76 Membrane Bio-catalysts as Growth Stimulator of *L. monocytogenes* in Enrichment Media – PRAVATE TUITEMWONG, J. Wongchavalit, K. Tuitemwong, and D. Y. C. Fung, King Mongkut's University of Technology Thonburi, Bangkok, Thailand
- P77 Combined Effect of Antibiotic and Competitive-Exclusion Treatment on *Salmonella* Enteritidis Fecal Shedding in Molted Laying Hens – KUN-HO SEO, P. S. Holt, C. L. Hofacre, and R. K. Gast, Southeast Poultry Research Laboratory, USDA, ARS, Athens, GA, USA
- P78 Mechanisms of Antibacterial Activity of Allyl Isothiocyanate – CHIA-MIN LIN and C. -I. Wei, University of Florida, Gainesville, FL, USA
- P79 Enhanced Inhibitory Effect of *E. coli* O157:H7 by Chitoooligosaccharide and Monolaurin – DEOG-HWAN OH, M. K. Lee, and B. K. Park, Kangwon National University, Chunchon, Kangwon, Korea
- P80 Effect of Balsam Apple Extract on Bacteria – CHUNG-YI HUANG, C. H. Lai, P. Y. Peng, F. C. Chao, H. L. Liang, and D. K. Kan, I-Lan Institute of Technology, I-Lan, Taiwan R.O.C.
- P81 Water Activity pH and Potassium Sorbate Concentration Effects on the Growth/No Growth Interface of *Saccharomyces cerevisiae* – AURELIO LOPEZ-MALO, S. Guerrero, and S. M. Alzamora, Universidad de las Americas-Puebla, Puebla, Mexico
- P82 Synergistic Effect of Vanillin and Potassium Sorbate Combinations to Inhibit Mold Growth – AURELIO LOPEZ-MALO, B. Matamoros-Leon, and A. Argaiz, Universidad de las Americas-Puebla, Puebla, Mexico
- P83 Modeling and Simulating Growth of *Clostridium botulinum* at Varying Inoculum Size, Temperature, pH, and Salt Concentration – LIHUI ZHAO, Rutgers University, New Brunswick, NJ, USA
- P84 Modeling the Bacterial Spoilage of Ready-to-Drink Beverages – ALYCE STILES-BATTEY and Donald Schaffner, Kraft Foods, Inc., Tarrytown, NY, USA
- P85 Use of *Bacillus megaterium* Spore Germination and Cell Parameter Distributions to Predict Spoilage Times at Low Inoculum Size and Differing Environmental Conditions – MARISA L. CAIPO and D. W. Schaffner, Rutgers University, New Brunswick, NJ, USA
- P86 Survival of *E. coli* O157:H7 in Dried Beef as Affected by Water Activity, Sodium Chloride, and Temperature – J.-H. RYU, Y. Deng, and L. R. Beuchat, University of Georgia, Griffin, GA, USA

- P87 Critical Temperatures to Inhibit *Zygosaccharomyces bailii* Growth in Mango Puree Preserved by Combined Factors – ENRIQUE PALOU, X. Castanon, J. Welte-Chanes, and A. Lopez-Malo, Universidad de las Americas-Puebla, Puebla, Mexico
- P88 Growth and Recovery of Selected Gram Negative Bacteria in Reconditioned Wastewater – KATHLEEN T. RAJKOWSKI and Eugene Rice, USDA, ARS, NAA, ERRC, Wyndmoor, PA, USA
- P89 Contamination Ways of Cold-smoked Fish with *L. monocytogenes* – MARIELLE GAY, ASEPT, Laval Cedex 9, France
- P90 The Effect of Temperature on the Survival of *Shigella flexneri* at Low pH – LAURA L. ZAIKA and Joseph S. Fanelli, USDA, ARS, NAA, ERRC, Microbial Food Safety RU, Wyndmoor, PA, USA
- P91 Models for Growth of *Zygosaccharomyces bailii* in High-acid Foods – PHYLLIS JENKINS, Peter G. Poulos, Martin B. Cole, Mark Vandeven, and J. David Legan, Nabisco, Inc., E. Hanover, NJ, USA
- P92 Survival of *E. coli* O157:H7 in Margarine, Reduced Fat Spreads and Liquid Water-in-Oil Toppings – MICHAEL C. CIRIGLIANO, A. M. Keller, R. B. Zemer, and P. J. Rothenberg, Lipton, Cresskill, NJ, USA
- P93 Growth Response of *L. monocytogenes*, *Salmonella* Enteritidis and *Salmonella typhimurium* DT104 in Pasteurized and Raw Liquid Whole Egg Held at Chill Abuse – MICHAEL C. CIRIGLIANO and R. T. McKenna, Lipton, Cresskill, NJ, USA
- P94 Modulation Effects of Antioxidant Vitamins on Ochratoxin A-induced Oxidant Toxicity in Mice – JUNG HYEON PARK, Sung J. Kang, and Duck H. Chung, Gyongsand National University, Chinju, Gyangnam, Korea
- P95 Dry Rehydratable Film Method for the Rapid Enumeration of *Staphylococcus aureus* in Foods: 3M Petrifilm Rapid *S. aureus* Count Plates – PATRICK A. MACH, Kathryn Lindberg, and Deborah McIntyre, 3M Microbiology Products, St. Paul, MN, USA
- P96 Microrestriction Fingerprinting: A New Tool for Studying the Molecular Epidemiology of *E. coli* O157:H7 – MANSOUR SAMADPOUR, Dalia Alfi, and Linda Grimm, University of Washington, Seattle, WA, USA
- P97 Model for the Implementation of HACCP in the Food Industry of Developing Countries, J. ROMERO, T Tecn De Alimentos, Bogota, Colombia

TUESDAY AFTERNOON – AUGUST 3, 1999

- S9 General Session – Anatomy of a Multi-state USA Listeriosis Outbreak Issues, Insights and Take-home Messages
- Molecular Typing of *Listeria monocytogenes* in US Outbreak, MARTIN WIEDMANN, Cornell University, Ithaca, NY, USA
 - Epidemiology of *Listeria* Outbreak, PAUL MEAD, CDC, Atlanta, GA, USA

- Industry Perspective of *Listeria* Outbreak, DANE BERNARD, National Food Processors Association, Washington, D.C., USA

IAMFES Business Meeting

WEDNESDAY MORNING – AUGUST 4, 1999

- S10 USDA Risk Assessment of *E. coli* O157:H7 in Ground Beef
- An Overview and Scope of the USDA Risk Assessment of *E. coli* O157:H7 in Ground Beef – MARK POWELL, USDA/FSIS/OPHS/ERAD, Washington, D.C., USA
 - Production Module – ERIC EBEL, USDA/FSIS, Ft. Collins, CO, USA
 - Slaughter Concentration Variables – TANYA ROBERTS, USDA/ERS, Washington, D.C., USA
 - Slaughter Product Fraction Variables – PETER COWEN, USDA/FSIS/OPHS/ERAD, Washington, D.C., USA
 - Slaughter Simulation Model – CLARE NARROD, USDA/FSIS/OPHS/ERAD, Washington, D.C., USA
 - Preparation Module – WAYNE SCHLOSSER, USDA/FSIS, Fort Collins, CO, USA
 - Public Health Module – PEG COLEMAN, USDA/FSIS/OPHS/ERAD, Washington, D.C., USA
 - Risk Communication – PETER COWEN, USDA/FSIS/OPHS/ERAD, Washington, D.C., USA
 - Panel Discussion
- S11 Animal Waste Management and Its Relationship to Food Safety
- Microbes and Manure: Animal and Human Health Concerns – ALICE PELL, Cornell University, Ithaca, NY, USA
 - Overview of Dairy, Swine, Poultry and Beef Waste Management Systems and Options in the United States – ROBERT BURNS, University of Tennessee, Knoxville, TN, USA
 - Persistence of Pathogenic Bacteria in Animal Waste – CAROLYN BOHACH-HOVDE, University of Idaho, Moscow, ID, USA
 - Persistence of Viruses in Animal Waste – DEAN CLIVER, University of California-Davis, Davis, CA, USA
 - Presence of Microbial Pathogens in Processed Animal Waste Used as Animal Feed – JAMES S. CULLOR, University of California-Davis, Davis, CA, USA
 - Animal and Waste Water Management: Who's Minding the Store? – EMILIO ESTEBAN, CDC, Atlanta, GA, USA
- S12 New Emerging Pathogens – *Mycobacterium* spp.
- Overview of *Mycobacterium* spp. and Their Role as Foodborne Pathogens – LUCIC MUTHARIA, University of Guelph, Guelph, Ontario, Canada

- Survival of *M. paratuberculosis* in HTST Milk – MIKE COLLINS, University of Wisconsin, Madison, WI, USA
- *Mycobacterium* spp. as Environmental Pathogens – YVONNE TAYLOR, University of Ottawa, Ottawa, Ontario, Canada
- Crohn's Disease and the Link to Foodborne Pathogens: Fact or Fallacy – To be announced
- Methods to Detect and Identify *Mycobacterium* spp. in Environmental Samples – BOB ARBEIT, VA Hospital, Boston, MA, USA
- Panel Discussion

S13 – HACCP in Retail Operations

- The Maryland Voluntary Retail HACCP Program – LISL WILKINSON, Maryland Hospitality Education Foundation, Baltimore, MD, USA
- Retail HACCP in Florida – CLIFF WARWICK, REHS, Orlando, FL, USA
- HACCP in Hotel Food Service – DONALD B. GRIM, Marriott International, Inc., Washington, D.C., USA
- HACCP in Food Markets – FREDRICK REIMERS, H-E-B Grocery Company, San Antonio, TX, USA
- HACCP in Restaurants – DEE CLINGMAN, Darden Restaurants, Inc., Orlando, FL, USA
- Integrating FDA Fisheries, USDA, FDA Industrial, and FDA Retail HACCP into One Set of National Industry Self-control Requirements – O. PETER SNYDER, JR., Hospitality Institute of Technology and Management, St. Paul, MN, USA

WEDNESDAY AFTERNOON – AUGUST 4, 1999

S14 USDA HACCP Implementation – Where Have We Been; Where Are We Going?

- Overview and Reflections of HACCP for Meat and Poultry Plants – DANE T. BERNARD, National Food Processors Association, Washington, D.C., USA
- HACCP Implementation Experiences in a Large Plant – PETER BODNARUK, ConAgra Refrigerated Prepared Foods, Downers Grove, IL, USA
- HACCP Implementation Experiences in a Small Plant – HERB TETENS, Marathon Enterprises, Jersey City, NJ, USA
- USDA FSIS Overview of HACCP – Past, Present and Future Challenges – BARBARA MASTERS, USDA/FSIS Technical Service Center, Omaha, NE, USA
- HACCP Model Demonstration Project Experiences – The Future? – ALAN OSER, Hatfield Quality Meats, Inc., Hatfield, PA, USA
- Regulatory Challenges and Perspectives for the Future – MICHAEL ROBACH, International Continental Grain Company, Gainesville, GA, USA

S15 *Campylobacter* and Food Safety: The State of the Science

- Prevalence of *Campylobacter* in Human Disease – FRED ANGULO, CDC, Atlanta, GA, USA
- Guillain-Barre Syndrome and Other Chronic Sequellae of Campylobacteriosis – BAN MISHU, Vanderbilt University, Nashville, TN, USA
- Modern Cultural Methodology for the Isolation of *Campylobacter* spp. – J. ERIC LINE, USDA, ARS, Athens, GA, USA
- Subtyping of *Campylobacter* spp. – SCOTT FRITSCHER, Qualicon®, Inc., Wilmington, DE, USA
- Risk Assessment and Regulatory Significance of *Campylobacter* spp. – ANNA LAMMERDING, Health Canada, Guelph, Ontario, Canada
- Poultry Industry Response to the Challenges of *Campylobacter* – LENORE BENNETT, Perdue Farms, Horsham, PA, USA

S16 Methods for the Detection of Infectious Viruses in Foods

- An Overview of Conventional Methods for Detecting Enteric Viruses in Foods – DEAN O. CLIVER, University of California-Davis, Davis, CA, USA
- Limitations in Cell Culture and Molecular Biological Methods for Detecting Infectious Viruses in Foods – GARY P. RICHARDS, USDA, ARS, Dover, DE, USA
- Integrated Cell Culture-PCR Techniques – CHARLES P. GERBA, University of Arizona, Tucson, AZ, USA
- Detection and Control of Viruses in Produce – MARK D. SOBSEY, University of North Carolina, Chapel Hill, NC, USA
- Role of Molecular Epidemiology in Virus Outbreak Investigations – LEE-ANN JAYKUS, North Carolina State University, Raleigh, NC, USA
- Panel Discussion

S17 The Seafood Safety Initiative

- Overview of Seafood Safety Initiative – ROBERT BUCHANAN, FDA, Washington, D.C., USA
- Considerations for Testing of *Listeria* in Seafood – CATHERINE DONNELLY, University of Vermont, Burlington, VT, USA
- Control of Viral and Bacterial Human Pathogens in Seafood – WILLIAM BURKHARDT, US FDA, Dauphin Island, AL, USA
- Food Service Chain Experience – KEITH JACKSON, Darden Restaurants, Orlando, FL, USA
- Levels of *V. vulnificus* and *V. parahaemolyticus* in Retail Seafood – ANGELO DEPAOLA, US FDA, Dauphin Island, AL, USA
- West Coast Working Group on *V. parahaemolyticus* Outbreaks – TIM SAMPLE, US FDA, Seattle, WA, USA

IAMFES ANNUAL MEETING



EVENT INFORMATION

EVENING EVENTS

Cheese and Wine Reception

Sunday, August 1, 1999, (8:00 p.m. – 10:00 p.m.)

An IAMFES tradition continues for attendees and guests. The reception begins immediately following the Ivan Parkin Lecture on Sunday evening in the exhibit hall.

Exhibit Hall Reception

Monday, August 2, 1999, (5:00 p.m. – 6:30 p.m.)

Relax with colleagues and friends in the exhibit hall at the end of the day. Exhibitors showcase the latest developments in the industry at an informal reception.

Historical Adventures

Monday, August 2, 1999, (6:00 p.m. – 9:30 p.m.)

Ride a carriage back into history at the Greenfield Village Living Museum. Discover what inspired inventors Henry Ford, Thomas Edison, and Orville and Wilbur Wright. Gather around the antique carousel. Enjoy dinner and spend the evening with friends.

An Evening in Wine Country

Tuesday, August 3, 1999, (5:30 p.m. – 10:30 p.m.)

A quiet country evening begins in surroundings reminiscent of an "Old World" wine cellar at Pelee Island Winery, located near Kingsville, Ontario. Then tempt your taste buds in the tropical gardens of Colasanti while exotic birds call to you from the wild.

(When traveling to Canada, proof of citizenship such as voter's registration, passport, or birth certificate is required.)

Take Me Out to the Ballgame

Tuesday, August 3, 1999, (6:00 p.m. – 10:30 p.m.)

Cheer yourself silly as the Detroit Tigers take on the Chicago White Sox in one of the oldest baseball stadiums in the US. When the game is over, you can claim to be one of the last fans to visit the original Tiger Stadium before it closes. Tickets and round trip bus transportation included.

IAMFES Awards Banquet

Wednesday, August 4, 1999, (7:00 p.m. – 9:30 p.m.)

A special occasion to formally recognize the accomplishments of deserving food safety professionals. An elegant reception and dinner are followed by the awards ceremony. Business attire requested.

TOURS

Great Lakes and "Motor City" Culture

Sunday, August 1, 1999, (9:30 a.m. – 3:00 p.m.)

Belle Isle, a 1000 acre island park, beckons you to visit the Dossin Great Lakes Museum and other cultural attractions. Tour the Coast Guard Station on the Detroit River. Then it's smooth sailing to lunch on the waterfront at Sinbad's restaurant. Start your engines at the interactive "Motor City Exhibition" in the Detroit Historical Museum. Race to explore your favorite destinations including the Detroit Institute of Art, the Museum of African American History and the Detroit Science Center.

At Home with the Auto Barons

Monday, August 2, 1999, (9:30 a.m. – 3:30 p.m.)

Just for a day, imagine you are a guest in Fair Lane, the 15th and final home of Henry Ford. Stroll through the same rooms as some of the world's most influential people.

Don't forget your invitation for lunch at the Eleanor and Edsel Ford Estate, located on the shores of Lake St. Claire. Architect Albert Kahn created a sense of the English countryside in the home at Grosse Point. Inside, original masterpieces line the walls. Your tour includes the home, the scenic gardens, the pool-house, the garage with Mrs. Ford's custom-built 1952 Lincoln Town Car, and the children's playhouse.

All Things Canadian

Tuesday, August 3, 1999, (9:30 a.m. – 3:30 p.m.)

Watch as world famous Canadian Club Whiskey is produced at the Hiram Walker & Sons Distillery. Then stroll through the classical Jackson Park gardens featuring over 12,000 rose bushes in bloom. Soak up the local flavor during lunch at a restaurant in downtown Windsor, Canada. Step inside the log cabin used as terminal of the Underground Railway built by fugitive slave John Freeman Walls.

(When traveling to Canada, proof of citizenship such as voter's registration, passport, or birth certificate is required.)

GOLF TOURNAMENT

FORE! Best-Ball Golf Tournament

Sunday, August 1, 1999, (6:00 a.m. – 2:00 p.m.)

A swinging good time at the newest golf course in the area — the Inkster Golf Course. You don't even need to know how to play to win a prize. Golf, transportation, breakfast, lunch and prizes all included in your registration fee.



GENERAL INFORMATION

IAMFES 86th ANNUAL MEETING AUGUST 1-4, 1999 DEARBORN, MICHIGAN

IMPORTANT! Please read this information before completing your registration form.

■ Meeting Information

Register to attend the world's leading food safety conference.

Registration includes:

- Technical Sessions
- Symposia
- Poster Presentations
- Ivan Parkin Lecture
- Exhibit Hall Admittance
- Cheese and Wine Reception
- Exhibit Hall Reception
- Awards Banquet
- Program and Abstract Book

■ Registration Information

Please mail the registration form with payment today. Registrations post-marked after July 1, 1999 must pay the late registration fee. Checks should be made payable to: IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2863, USA. For faster service, use your credit card and call 800.369.6337, or fax the completed registration form with credit card information to 515.276.8655.

■ Refund/Cancellation Policy

Registration fees, minus a \$50 processing charge and any applicable bank charges, will be refunded for written cancellations received by July 15, 1999. **No refunds will be made after July 15;** however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 6, 1999.

■ Hotel Information

For reservations, contact the hotel directly and identify yourself as an IAMFES Annual Meeting attendee to receive a special rate of \$102 per night, single or double. Make your reservations as soon as possible, this special rate is available only until July 2, 1999.

Hyatt Regency Dearborn
Fairlane Town Center
Dearborn, Michigan 48126
Phone: 313.593.1234; Fax: 313.593.3366

■ EVENTS

(See the preceding page for detailed descriptions)

■ Evening Events

Sunday, August 1, 1999

Cheese and Wine Reception (8:00 p.m. - 10:00 p.m.)

Monday, August 2, 1999

Exhibit Hall Reception (5:00 p.m. - 6:30 p.m.)

Historical Adventures (6:00 p.m. - 9:30 p.m.)

Tuesday, August 3, 1999

An Evening in Wine Country (5:30 p.m. - 10:30 p.m.)

Take Me Out to the Ballgame (6:00 p.m. - 10:30 p.m.)

Wednesday, August 4, 1999

IAMFES Awards Banquet (7:00 p.m. - 9:30 p.m.)

■ Tours

Sunday, August 1, 1999

Great Lakes and "Motor City" Culture
(9:30 a.m. - 3:00 p.m.) (Lunch included)

Monday, August 2, 1999

At Home with the Auto Barons
(9:30 a.m. - 3:30 p.m.) (Lunch included)

Tuesday, August 3, 1999

All Things Canadian
(9:30 a.m. - 3:30 p.m.) (Lunch included)

■ Golf Tournament

Sunday, August 1, 1999

FORE! Best-Ball Golf Tournament (6:00 a.m. - 2:00 p.m.)

JOIN TODAY!

MEMBERSHIP RATES

	UNITED STATES	CANADA/MEXICO	INTERNATIONAL
Membership with <i>Journal of Food Protection and Dairy, Food and Environmental Sanitation</i> (Student Membership)*	\$140.00 (\$70.00)	165.00 (\$95.00)	\$210.00 (\$140.00)
Membership with <i>Dairy, Food and Environmental Sanitation</i> (Student Membership)*	\$85.00 (\$42.50)	\$95.00 (\$52.50)	\$110.00 (\$67.50)
(Student Membership* with <i>Journal of Food Protection</i>)	(\$42.50)	(\$57.50)	(\$87.50)

*Full-time student verification required

All prices include Shipping & Handling

Prices effective through August 31, 1999

REGISTRATION FORM

IAMFES 86th Annual Meeting August 1-4, 1999 Dearborn, Michigan

FOR OFFICE USE

Last name _____
First initial _____
Registration # _____

IAMFES

Name (Print or type your name as you wish it to appear on name badge) _____

Title _____ Employer _____

Mailing Address (Please specify: Home Work) _____

City _____ State/Province _____ Country _____ Postal/Zip Code _____

Telephone _____ Fax _____ E-mail _____

IAMFES Member since: 19 _____

 Regarding the Americans with Disabilities Act, please indicate special requirements you may have. _____

REGISTER BY JULY 1, 1999 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES:

Registration (Awards Banquet included) _____
 IAMFES Student Member* _____
 Retired IAMFES Member* _____
 One Day Registration: Mon. Tues. Wed. _____
 Spouse/Companion (Name): _____
 Children 15 & Over (Names): _____
 Children 14 & Under (Names): _____

*Awards Banquet not included

MEMBERS

\$ 245 (\$295 late)
 \$ 40 (\$ 50 late)
 \$ 40 (\$ 50 late)
 \$ 125 (\$150 late)
 \$ 35 (\$ 35 late)
 \$ 25 (\$ 25 late)
 FREE

NONMEMBERS

\$365 (\$415 late)
 Not Available
 Not Available
 \$180 (\$205 late)
 \$ 35 (\$ 35 late)
 \$ 25 (\$ 25 late)
 FREE

AMOUNT

EVENTS:

FORE! Best-Ball Golf Tournament (Sunday, 8/1) _____
 Historical Adventures (Monday, 8/2) _____
 Children 14 and under _____
 An Evening in Wine Country (Tuesday, 8/3) _____
 Take Me Out to the Ballgame (Tuesday, 8/3) _____
 IAMFES Awards Banquet (Wednesday, 8/4) _____

PER PERSON

\$ 80 (\$ 95 late)
 \$ 39 (\$ 44 late)
 \$ 29 (\$ 34 late)
 \$ 49 (\$ 54 late)
 \$ 22 (\$ 27 late)
 \$ 40 (\$ 45 late)

OF TICKETS

TOURS:

Great Lakes and "Motor City" Culture (Sunday, 8/1) _____
 At Home with the Auto Barons (Monday, 8/2) _____
 All Things Canadian (Tuesday, 8/3) _____

\$ 45 (\$ 51 late)
 \$ 42 (\$ 47 late)
 \$ 43 (\$ 48 late)

JOIN IAMFES TODAY AND SAVE!!! (Attach a completed Membership application) _____

TOTAL AMOUNT ENCLOSED _____

(CHECK PAYABLE TO IAMFES — US FUNDS ON US BANK)



International Association of Milk, Food and Environmental Sanitarians

6200 Aurora Avenue, Suite 200W
 Des Moines, Iowa 50322-2863, USA
 Phone: 800.369.6337; 515.276.3344
 Fax: 515.276.8655; E-mail: iamfes@iamfes.org

Credit Card Payments:



Card #

Exp. Date _____

Name on Card _____

Signature _____

EXHIBITORS DO NOT USE THIS FORM

Coming Events

MAY

• **1-7, The 27th National Conference on Interstate Milk Shipments**, will meet at the Spirit of Atlanta Hotel (formerly Radisson), in Atlanta, GA. For additional information, contact Leon Townsend, Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601; Phone/Fax: 502.695.0253; E-mail: lcontown@dcrr.net.

• **4-5, Wyoming Environmental Health Association Annual Educational Conference**, Casper, WY. For further information, contact Laurie Leis at 307.266.1203.

• **4-6, Principles of Food Microbiology**, Marriott Fisherman's Wharf, San Francisco, CA. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Rd., Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

• **5-7, Public Health in the 20th Century: 100 Years of Success**, Cavanaugh's Inn at the Park, Spokane, WA. For additional information, call the Washington State Environmental Health Association at 425.334.5399.

• **6-12, 15th International Trade Fair for Packaging Machinery, Packaging and Confectionery Machinery**, in Düsseldorf, Germany. For further information, contact Düsseldorf Trade Shows, Inc., 150 N. Michigan Ave., Suite 2920, Chicago, IL 60601 or Phone: 312.781.5180; Fax: 312.781.5188; Web site: www.dtsusa.com/dts/.

• **12-14, Food Irradiation 99 Conference—The Solution to the Food Safety Crisis**, Sheraton National Hotel, Arlington, VA. This international conference will present

an examination of the business and technical outlook for food irradiation as a solution to the growing global problem of food safety. For further information, contact Deborah Crommett, Conference Coordinator, Intertech Conferences, 411 US Route One, Portland, ME 04105 or Phone: 207.781.9800; Fax: 207.781.2150; E-mail: info@intertechusa.com or www.intertechusa.com.

• **17-21, Laboratory Methods in Food Microbiology**, Silliker Laboratories' Corporate Research Center, South Holland, IL. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Rd., Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

• **18-19, The Pennsylvania Association of Milk, Food, and Environmental Sanitarians 60th Annual Meeting**, to be held at the Nittany Lion Inn, University Park, PA. Golf tournament begins at 1:00 p.m. on Monday, May 17. The conference begins with registration at 8:00 a.m., Tuesday, May 18 and concludes at 3:00 p.m., Wednesday, May 19. For further information, call PAMFES at 814.865.8301.

• **18-19, Aseptic Processing and Packaging Introductory Workshop**, University of California-Davis, Davis, CA. This course focuses on the engineering, microbiological and chemical principles related to aseptic processing. Hands-on laboratories allow participants to learn methods of aseptic product quality evaluation, packaging and equipment particulars. For further information, contact Diane Barrett at 530.752.4800; E-mail: dmbarrett@ucdavis.edu.

• **20, Advanced Aseptic Processing and Packaging**, University of California-Davis, Davis, CA. As a continuation of the 2-day introductory

workshop, this course will focus on heat penetration and distribution, process deviation and recommendations, and a computerized program for calculating thermal processes is demonstrated. For further information, contact Diane Barrett at 530.752.4800; E-mail: dmbarrett@ucdavis.edu.

• **20-21, US Poultry & Egg Association's 1999 Poultry Processor Workshop**, Marriott Marquis Hotel, Atlanta, GA. Topics to be discussed include On-line reprocessing; microbial update; *E. coli*; *Campylobacter*, and *Listeria*; ideas for hiring and retaining supervisors and maintenance managers; and new equipment status report. To register, contact US Poultry, 1530 Cooledge Road, Tucker, GA 30084-7303; Phone: 770.493.9401; Fax: 770.493.9257; E-mail: seminar@poultryegg.org; Web site: www.poultryegg.org.

• **24-26, 3rd International Symposium on Recombined Milk and Milk Products**, Penang, Malaysia. The symposium will seek to discuss and review issues facing the milk recombination industry, the need for the industry to keep pace with the challenges of the future, and product development opportunities presented by the introduction of new technologies and emerging markets. For further information, contact Alison Johnson, The Secretariat, 3rd International Symposium on Recombined Milk and Milk Products, Private Bag 16, Werribee, Victoria Australia, 3030 or Phone: 61 3 97 42 0117; Fax: 61 3 9742 0201; E-mail: alison.johnson@foodscience.afisc.csiro.au.

• **25-29, Florida Environmental Health Association Annual Education Conference**, at the Delta Orlando Resort. For further information, contact Seldon Carsey at 813.962.0167.

JUNE

• **3-4, International Prospects for Dairying in the Next WTO Negotiating Round**, Hotel Claridge, Buenos Aires, Argentina. Sponsored jointly by Food & Agriculture Organization of the UN, Pan American Dairy Federation, and International Dairy Federation. For additional information, contact Mr. Ricardo A. James, President Comité Nacional Argentino de la FIL, Medrano 281, 1178 Buenos Aires, Argentine; Phone: 54 1 983 6149; 54 1 983 0587, 54 1 983 1865; Fax: 54 1 958 4056; E-mail: cil@cil.org.ar.

• **7-10, New Applications of Membrane Technology in the Dairy Industry**, Palais du Grand Large, Saint-Malo, France. The seminar will attempt to assemble the most recent information on new applications of the membrane processes that would benefit the dairy processing industry worldwide. For further information, contact Prof. J. L. Maubois, Dairy Research Laboratory INRA, 65 Rue de Saint Brieuc, FR-35042 Rennes Cedex, France.

• **14-16, The Food Safety Summit and Expo**, Washington, D.C. The conference serves food processors and manufacturers, as well as the food service and grocery fields, and others who produce, sell, or serve food. For more information, Phone: 800.746.9646.

• **14-16, Food Engineering**, Rutgers University, New Brunswick, NJ. For additional information, contact Keith Wilson, Phone: 732.932.9271; Fax: 732.932.1187; E-mail: ocpe@aesop.rutgers.edu; Web site: www.cook.rutgers.edu/ocpe.

• **14-16, A Basic Concept for Food Protection**, Chapman University, Orange, CA. Managers and supervisors of food processing companies should attend this conference who are responsible for microbiology, quality assurance, quality control, sanitation, and for establishing

HACCP programs. For further information, contact The Food Processors Institute, 1350 I St., N.W., Suite 300, Washington, D.C. 20005-3305; Phone: 202.393.0890; Fax: 202.639.5941.

• **21-23, FDA Regulation of New Food Ingredients and Dietary Supplements**, Chicago, IL. This course will enable participants to become familiar with all current FDA laws, regulations, practices and procedures governing the marking of new food ingredients and dietary supplements. For further information, contact Registrar, The Center for Professional Advancement, P.O. Box 1052, East Brunswick, NJ 08816; Phone: 732.613.4500; Fax: 732.238.9113.

• **23-24, Introduction to Microbiological Criteria and Sampling Plans**, Disneyland Pacific Hotel, Anaheim, CA. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Road, Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

JULY

• **9-16, Rapid Methods and Automation in Microbiology International Workshop XIX**, Manhattan, KS. For scientific content, contact Daniel Y. C. Fung, Director of the Workshop at 785.532.5654; Fax: 785.532.5681; E-mail: dfung@oz.oznet.ksu.edu. For registration information, please see www.dec.ksu.edu/dcc/conf/microbiology.

• **30-31, IAMFES 86th Annual Meeting Workshop**, Dearborn, MI. Workshop I, "Procedures to Investigate Foodborne Illness," and Workshop II, "An Insider's Look at Microbial Risk Assessment." For additional information see page 249 in this issue of *DFES* or contact IAMFES at 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@iamfes.org.

AUGUST

• **1-4, IAMFES 86th Annual Meeting**, Dearborn, MI at the Hyatt Regency Dearborn. Registration information available in this issue of *DFES* on pages 307 or contact Julie Cattanach at Phone: 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@iamfes.org.

• **9-13, Laboratory Methods in Food Microbiology**, Silliker Laboratories' Corporate Research Center, South Holland, IL. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Road, Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

SEPTEMBER

• **1, Management of Dairy Food Safety**, University of Wisconsin-Madison, Madison, WI. This workshop will address why we keep plants clean, how we keep plants clean, and what to do if a sanitation problem occurs in your plant, including recall programs and legal ramifications. For additional information, contact Mary Thompson, Wisconsin Center for Dairy Research, 1605 Linden Dr., Babcock Hall, Room 241, Madison, WI 53706; Phone: 608.262.2217; Fax: 608.262.1578; Web site: www.cdr.wisc.edu.

• **13-17, Food Micro 99**, Veldhoven - The Netherlands, co-sponsored by IAMFES. Food Micro 99 is primarily for individuals working in food microbiological research and those who are studying food microbiology as well as for professionals responsible for the production of (safe) food and authorities involved in safe food regulation. For additional information, contact Dr. Leon Gorris, Unilever Research Laboratorium Vlaarding, Postbus 114, 3130 AC Vlaarding, The Netherlands, Phone: 31 10 4605709; Fax: 31 10 4605188; E-mail: leon.gorris@unilever.com.

• **16-18, Lead Auditor Training Seminar**, Embassy Suites, St. Louis, MO. For further information, contact Christine VerPlank or Shelia Brewer, ASI Food Safety Consultants, 7625 Page Blvd., St. Louis, MO 63133; Phone: 800.477.0778; Fax: 314.727.2563.

• **19-24, The International Institute of Refrigeration (IIR) 20th International Congress of Refrigeration**, Sydney, Australia. For further information, contact ICR99 Secretariat, 52 Rosslyn St., West Mel-

bourne Vic 3003 Australia; Phone: +61 3 9328 2399; Fax: +61 3 9328 4116; Web site: www.airah.org.au/icr99.

• **22, New York State Association of Milk and Food Sanitarians Affiliate Meeting**, at the Rochester Marriott Throughway Hotel in Rochester, NY. For further information, contact Janene Lucia at 607.255.2892.

• **23-24, Wisconsin Association of Milk and Food Sanitarians Affiliate Meeting**. For further information, contact Randy Dags at 608.266.9376.

OCTOBER

• **6-7, Associated Illinois Milk, Food & Environmental Sanitarians Annual Meeting** at Pere Marquette Hotel in Peoria, IL. For additional information, contact Lee Dressel at 618.654.3438.

• **6-7, Iowa Association of Milk, Food and Environmental Sanitarians, Inc. Affiliate Meeting**. For further information, contact Monica Streicher at 319.933.4521.

For information on membership with IAMFES, Circle #100 on this card. ▼



Reader Service Card

DFES April '99

Expires: July 31, 1999 (International expiration: October 31, 1999)

INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

6200 Aurora Avenue, Suite 200W • Des Moines, IA 50322-2863

Mail or Fax to 515.276.8655

Name _____	Title _____
Company _____	
Address _____	
City _____	State/Prov. _____
Country _____	Zip/Postal Code _____
Phone Number _____	

100	115	130	145	161	175	190	205	220	235	250	265	280	295	310	325	340
101	116	131	146	162	176	191	206	221	236	251	266	281	296	311	326	341
102	117	132	147	163	177	192	207	222	237	252	267	282	297	312	327	342
103	118	133	148	164	178	193	208	223	238	253	268	283	298	313	328	343
104	119	134	149	165	179	194	209	224	239	254	269	284	299	314	329	344
105	120	135	150	166	180	195	210	225	240	255	270	285	300	315	330	345
106	121	136	151	167	181	196	211	226	241	256	271	286	301	316	331	346
107	122	137	152	168	182	197	212	227	242	257	272	287	302	317	332	347
108	123	138	153	169	183	198	213	228	243	258	273	288	303	318	333	348
109	124	139	154	170	184	199	214	229	244	259	274	289	304	319	334	349
110	125	140	155	171	185	200	215	230	245	260	275	290	305	320	335	350
111	126	141	156	172	186	201	216	231	246	261	276	291	306	321	336	
112	127	142	157	172	187	202	217	232	247	262	277	292	307	322	337	
113	128	143	158	173	188	203	218	233	248	263	278	293	308	323	338	
114	129	144	160	174	189	204	219	234	249	264	279	294	309	324	339	

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