ISSN: 1043-3546
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DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION, INC.

JULY 2001

- IAFP 2001 Annual Meeting Issue

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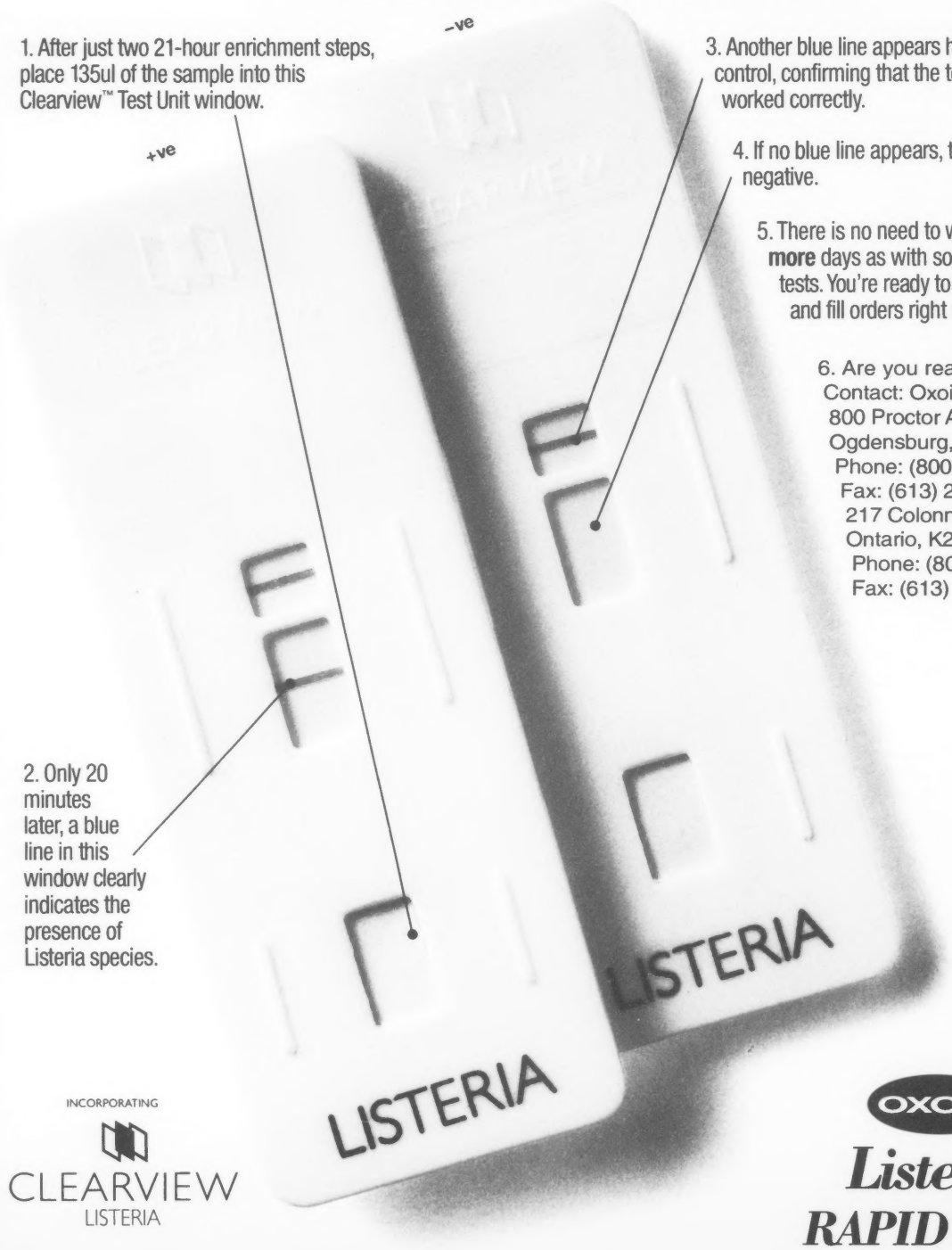

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Web site: www.foodprotection.org

DAIRY, FOOD AND ENVIRONMENTAL

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A PUBLICATION OF THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

Dairy, Food and Environmental Sanitation (ISSN-1043-3546) is published monthly beginning with the January number by the International Association for Food Protection, 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2863, USA. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, Iowa 50010, USA. Periodical Postage paid at Des Moines, Iowa 50318 and additional entry offices.

Manuscripts: Correspondence regarding manuscripts should be addressed to Donna A. Bahun, Production Editor, International Association for Food Protection.

News Releases, Updates, Coming Events and Cover Photos: Correspondence for these materials should be sent to Donna A. Bahun, Production Editor, International Association for Food Protection.

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Business Matters: Correspondence regarding business matters should be addressed to Lisa K. Hovey, Managing Editor, International Association for Food Protection.

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Subscription Rates: *Dairy, Food and Environmental Sanitation* is available by subscription for $192.00 US, $202.00 Canada/Mexico, and $217.00 International. Single issues are available for $24.00 US and $33.00 all other countries. All rates include shipping and handling. No cancellations accepted. For more information contact Julie A. Cattanach, Membership Services, International Association for Food Protection.

Claims: Notice of failure to receive copies must be reported within 30 days domestic, 90 days outside US.

Postmaster: Send address changes to ***Dairy, Food and Environmental Sanitation,*** 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2863, USA.

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My Perspective

By JENNY SCOTT
President

"IAFP 2001 is just around the corner"

Summer is here, reminding me that IAFP 2001 is fast approaching. This issue of *Dairy, Food and Environmental Sanitation* is the Annual Meeting issue, where you can find details about the exciting sessions and speakers we have scheduled for this year's meeting. I'm sure there will be lots to keep food safety professionals busy, regardless of where your interests lie. In fact, I expect to hear even more complaints this year about having to make difficult choices among excellent concurrent sessions.

Are you involved in the dairy industry? You may be particularly interested in sessions on dairy HACCP, on ensuring the quality and safety of extended shelf-life milk products, and on *Mycobacterium paratuberculosis*, the most recent "bug" of concern to the dairy industry. Are you more interested in fruits and vegetables? Don't miss the poster symposium on "Detection and Control of Human Pathogens in Fresh Fruits and Vegetables." And "Organic Foods: Unique Characteristics and Growth Potential" will provide information about organic foods from those actively involved in their production.

Now that HACCP has been implemented extensively by the food industry worldwide, many will be interested in how we determine if HACCP is effective; the session "HACCP: How to Evaluate Success" should give us some insight, including perspectives of industry, regulators and consumer groups. Are you interested in the latest thinking on programs to assess and manage foodborne hazards and risks? There are two sessions on "Moving Beyond HACCP – Risk Management and Food Safety Objectives" that will outline an evolving framework for food safety management and show us how public health goals can be converted to criteria that can be used by food producers, processors, distributors, marketers, regulatory agencies and others. Speakers in these sessions will also cover the role of risk assessment in determining risk management options and discuss the concept of "tolerable level of risk" and its significance for international trade. Speaking of risk assessment, there will be a symposium on the "Joint FAO/WHO Initiative on Microbial Risk Assessment" in which international experts will update you on the latest iteration of their risk assessments on *Salmonella* and *Listeria monocytogenes*. And if you are struggling with issues related to control of *L. monocytogenes*, you won't want to miss the session on "Zero Tolerance – Boon or Bust" to hear experts consider the "zero tolerance" risk management strategy: Has it been effective? Is it time to move to a new strategy?

Many food safety professionals will admit that regulatory agencies and industry are often at odds on issues. "The Benefits of Better Government and Industry Relations in Assuring Food Safety" will discuss how we might enhance public health by a different approach. And IAFP's Student PDG has put

together an excellent symposium on "Communicating Science Effectively," a session that will benefit many of us scientists who need to convey technical material in layman's terms.

I want to draw your attention in particular to two key program events: the General Session and the Ivan Parkin Lecture. The General Session this year focuses on an area that has received increasing attention in the last few years: food irradiation. Food safety professionals have long touted the benefits of this food safety tool. Speakers at the General Session "Irradiation Pasteurization: Realizing the Food Safety Potential" will examine the progress we are making in bringing such foods to the market and how they can have a real impact on reducing foodborne illness.

The IAFP "keynote" speech, the Ivan Parkin lecture, will be delivered this year by Dr. Linda Detwiler, from USDA's Animal and Plant Health Inspection Service (APHIS), who will provide an update on bovine spongiform encephalopathy (BSE), a topic that has probably been in more news headlines in the last few years than any other food safety issue. Dr. Detwiler is one of the foremost experts in the US on this topic, acting as media spokesperson for APHIS activities regarding BSE and other Transmissible Spongiform Encephalopathies (TSE) in national and international arenas. Dr. Detwiler serves on national and international TSE advisory committees and coordinated the development of a national BSE response plan. She will tell you what has been done to prevent BSE from occurring in the US, and what the US would do if a case of BSE should occur in this country. Dr. Detwiler will answer questions you have, like: What is the most likely theory on why BSE developed in the UK? Have we put enough controls in place in the US? Are there risks to public health from non-compliant animal feed production operations? What type of risk of BSE did the imported sheep in Vermont pose? Were the actions taken appropriate or overly precautious? I'm sure you can expect an informative presentation on one of the hottest topics in food safety today.

These are just some highlights of what is in store for you at IAFP 2001. But there is much more to the Annual Meeting, not the least of which are the meetings of the PDGs (Professional Development Groups). PDGs promote professional development by bringing together food safety professionals to address topics in specific disciplines and interest areas: e.g., Applied Laboratory Methods, Retail Food Safety and Quality, Microbial Risk Analysis, Viral and Parasitic Foodborne Disease, etc. These groups are key in developing components of the program for next year's Annual Meeting. Many have long-term projects to develop pamphlets, manuals or Web sites containing information on specific issues of interest to PDG members. Many attendees will come to Minneapolis on Saturday to get a reduced airfare. I encourage you to attend one or more PDG meetings on Sunday. The meetings are open to all – whether you wish to be an active, continuing member or just sit in and listen to the discussion. You do not have to be a member of IAFP to participate in a PDG.

I want to also note the many social events – the Sunday night Cheese and Wine Reception, the Monday Night Exhibit Hall Reception followed by the Mississippi River Dinner Cruise, the Minnesota Twins/ Cleveland Indians baseball game on Tuesday, and the IAFP Awards Banquet Wednesday evening. You can also find many excellent restaurants in downtown Minneapolis, take a relaxing stroll down Nicollet Mall, or visit the famous Mall of America to shop every store imaginable. August in Minneapolis should be delightful!

So make your plans now to join us in Minneapolis for an informative and lively meeting – you'll be sure to learn something new about food safety, you'll meet colleagues who will become lifelong friends and resources, and you will have fun as well!

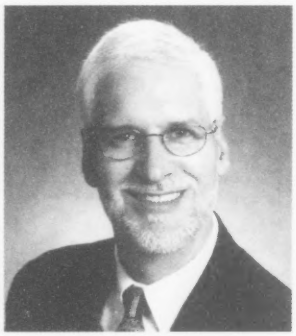
A NEW PDG is Forming!

An "Outreach Education" PDG

will meet August 5, 2001
at IAFP 2001!

COMMENTARY

From the Executive Director



By DAVID W. THARP, CAE
Executive Director

"How do we cope?"

Do you become overwhelmed by the number of tasks that must be done and the amount of time you have to get them completed? Of course you do. At least the majority of working people today have more tasks to accomplish than can be accomplished in the work week. How do we get by? How do we cope with this stress that we all encounter day-to-day? When you add in family commitments, time for relaxation and sleep (don't forget sleep!); most people are living on a very thin edge. How do we cope?

One way that we cope is to prioritize our lives – both our personal and work lives. We must recognize what is most important to our existence and place those items first on the list. Family must come first, but we have to also remember that we work to enable us to make things better for our loved ones. Therefore, we are again caught in a struggle having to prioritize at times which is more important, our work or our family. Life is strange that way! We want to be there for our family, but we know how important it is to our employer (and to our future employment) that we serve our employer.

As an employer, IAFP has evolved to recognize that our staff must place a high value on their involvement in family activities. At one time, our staff had very few children and most were able to dedicate their attention to work. Through attrition, marriages and other life-changing events, our staff evolved to where we now have a majority of employees with children and even grandchildren. This is a good thing and makes our staff outings much more exciting. It is fun to see how fast the children grow.

This evolution to more family has meant that we, as an employer, had to become more flexible in allowing time for employees to attend school functions, in allowing parents to leave work on a moment's notice when their child became ill during the day and in allowing time for our staff to be able to spend time with their families. A few years ago, we converted from the traditional "sick time off" and "vacation time" to a "PTO" system. "PTO" stands for Personal Time Off and allows our staff to access a pool of PTO hours anytime they need to miss work. The staff member controls the use of this pool and accumulates time each pay period. Many employers use this system now and it surprises me today when I find companies not under some sort of PTO system.

Not too long ago, I was involved in a conversation with a friend. He was talking about how he and his wife planned to visit their son in Colorado the following week, but had to cancel their trip because his employer "might need him" to work. This friend is not employed in a technical position or one that requires travel, not that this should make much difference. He is approaching retirement age, has always been a responsible worker and does more than what is required of him. For his employer to

disallow his vacation time for their convenience (because they "might just need him to work that week") doesn't make logical sense. When you weigh the ill feelings of my friend towards his employer and how this decision affects his productivity, you can easily see that granting the vacation time would have been a much better decision. Had the time been granted, my friend would have come back to work refreshed, enthused after visiting his son and been grateful that he was able to take the vacation he had planned. Instead, he cancelled his vacation, worked the week he planned to take off (of course it wasn't a particularly busy week) and now harbors a bad attitude towards his employer. This has to affect his long-term productivity and also has a negative effect on those working with him.

From that short example it is evident how management decisions affect employees and staff. Whether you are an employee or in a management position, I hope that you value family time and know how to balance the two. I encourage managers to be open to allowing staff to attend school functions, to be understanding when someone has to leave work mid-day to tend to a sick child and to think twice before declining a vacation request. For employees and staff, I encourage you to recognize the benefits you receive. If you are able to participate in family activities and your employer is supportive of your doing so, take a moment to thank them because not all employers see the advantages of providing this benefit.

At IAFP, we are indeed fortunate to have seen the benefits of prioritizing family early on as our staff evolved towards growing families. The IAFP staff works hard and prioritizes their daily work in order to meet deadlines. Many times deadlines affect other staff and our Members. When unplanned absences do occur, staff members are willing to take responsibility to continue projects to a timely completion. As we enter into the final weeks before Annual Meeting, it is rewarding to see the effort and dedication of our staff. All stops are pulled out and everyone knows what they are responsible for as they finalize their piece of the Annual Meeting pie. I continue to be amazed at the extreme effort by our staff throughout the year, but especially at Annual Meeting time. I want to thank each member of the IAFP staff for the work they do and I applaud them for balancing their work life with their families' needs. Keep it up!

Dairy, Food and Environmental Sanitation, Vol. 21, No. 7, Pages 570-581

Consumer Perceptions of Three Food Safety Interventions Related to Meat Processing

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SUMMARY

A focus group study with 37 residents of Manhattan, Kansas, was conducted to examine consumers' risk perceptions of foodborne illnesses from eating beef. The four focus-group sessions were designed to determine (1) relative preferences for alternative combinations of public food safety measures (Hazard Analysis Critical Control Points [HACCP], carcass pasteurization, irradiation) and private protection (home preparation of rare, medium, and well-done hamburgers); (2) how who is at risk (children vs. adults) influences preferences; (3) whether consumers would pay a premium for increased product safety arising from the adoption of three different innovations in processing plants; and (4) how to improve risk communication about foodborne illnesses and protection against them. Although participants seemed aware of many food safety practices, misinformation and misconceptions also were found. The majority of the participants preferred hamburgers that were well-done and steam-pasteurized or medium and irradiated. For a 5-year-old child, the majority chose hamburgers that were well-done, and steam-pasteurized or well-done and irradiated. Concerning willingness to pay, the majority of participants preferred steam-pasteurized ground beef to regular ground beef when the two were priced the same. Results indicated that new technologies available for food safety interventions provided marginal value to participants. Participants also expressed a need for more information.

A peer-reviewed article.

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INTRODUCTION

Foodborne disease outbreaks caused by *Escherichia coli* O157:H7 in ground beef have caused increased consumer concern about the safety of red meats. The US Centers for Disease Control and Prevention (CDC) estimate that of the annual cases of disease caused by *E. coli* O157:H7 (4,900 to 9,800), 49 percent are due to consumption of undercooked ground beef *(2)*.

To become more prevention-oriented and to address pathogen control, the United States Department of Agriculture (USDA) has established programs that eliminate or reduce bacterial contamination of meat products throughout the food system, from production to consumption. Innovations in meat processing such as Hazard Analysis Critical Control Points (HACCP), carcass steam pasteurization, and irradiation are available commercially for slaughter and processing plants to achieve these standards. Irradiated meat can be purchased in some parts of the United States, but capacity for production is low currently.

Food safety is perceived to be as much a societal issue as one that is under the control of the individual and is perceived to involve credibility and trust in risk regulators as well as individual choice regarding risk control and risk exposures *(4)*. A portion of foodborne illnesses result from voluntary and entirely avoidable behavior, although this is not well quantified, such as eating raw foods of animal origin or engaging in unsafe food preparation practices. Contaminated beef looks and smells normal, and, in the case of *E. coli* O157:H7, the number of organisms required to cause disease is probably very small, although this is not certain. To prevent food-borne illnesses, proper handling procedures and cooking temperatures are required. Research shows that people tend to underestimate relatively large risks such as heart disease and heart attacks and overestimate relatively small risks such as botulism, a foodborne illness caused by *Clostridium botulinum*. The latter phenomenon is described as the *overoptimistic bias (9)*. Recent studies have assessed the public's perception of food safety risks. Prior studies have assessed consumers' overall knowledge of, and public concern about, food safety *(1, 3, 5)*. Our study also assessed food safety knowledge and perceptions, but in addition provided information on three processing innovations that can enhance the safety of meat.

The objectives of this study were to determine: (1) relative preferences for alternative combinations of public food safety (HACCP, carcass pasteurization, irradiation) and private protection (home preparation of rare, medium, and well done hamburgers); (2) how who is at risk (children vs. adults) influences preferences; (3) whether consumers would pay a premium for the higher levels of product safety arising from the adoption of three different innovations in slaughter and processing plants; and (4) how to improve risk communication about foodborne illnesses and protection against them.

One means of accomplishing these objectives is to solicit consumer reactions to food safety issues through consumer focus-group sessions. The focus group is one of the most frequently used qualitative research methods *(6)*. For example, a study by USDA/FSIS *(11)* showed that the focus group is a reliable method for determining consumer barriers to the use of meat thermometers.

METHODOLOGY

After approval had been obtained from the Institutional Review Board for Research Involving Human Subjects, which is required for conducting surveys at Kansas State University, 37 subjects participated in four focus groups of 7 to 13 participants. Each subject was on a list of 200 single-family households of Manhattan, Kansas, residents; the list had been purchased from a market research company. A letter sent to the selected households invited the primary grocery shopper to attend a focus-group session. Individuals responsible for food purchases and food preparation were believed to provide the most accurate information regarding beef purchases and consumption. The invitation letter contained information on general topic, dates of the study, and approximate time commitment.

One week after the first letter was sent, the households were contacted via phone to determine availability and willingness to participate in one of four focus-group sessions. If interest in participation existed, three screening questions were asked to determine whether the individual purchased and consumed ground beef. Individuals who indicated that they were vegetarians, were employed in the beef industry, or raised their own cattle were eliminated as participants, because of the belief that individuals with these backgrounds might unduly bias the outcomes of the sessions.

The focus-group sessions were conducted in Manhattan, Kansas, in a room designed for such research. A trained moderator who used a pre-developed set of questions and protocols conducted all sessions to ensure that each group covered the same topics. All focus-group sessions were recorded on audiotapes that were then transcribed for use in the analysis. Specific comments of individuals were noted. Each session lasted approximately 1.5 hours. Prior to the beginning of each focus-group session, the participants were asked to respond in writing to a one-page questionnaire about demographic characteristics and beef consumption. They were also asked to indicate the frequency of beef consumption per week.

During the introduction, the moderator discussed the general nature and purpose of a focus group, the role of the moderator, and the general objective of the study. The moderator's guide included 33 questions divided into

Figure 1. Public/private food safety interventions

Figure 2. 3X3 set of risk-reduction strategies from

Degree-of-doneness	Hamburger A (Standard hamburger from **HACCP** process)	Hamburger B (HACCP process with **Carcass Pasteurization**)	Hamburger C (HACCP with Carcass Pasteurization and **Irradiation**)
Medium /Rare			
Medium			
Well done			

two sections. The first section included questions about participants' meat consumption habits, their knowledge of food safety, and their food safety concerns. These questions were broad in scope and designed to establish discussions in the groups.

The second section was designed to meet the study objectives. Information about technologies used to reduce microbial contamination in meat was distributed. Participants described their perceptions of the risk of illness from a hamburger produced by use of these innovations and indicated their interest in purchasing this hamburger. The innovations were (A) HACCP programs in meat processing, (B) carcass pasteurization, and (C) irradiation. At the time of the study, irradiated ground beef was not available in Manhattan. Hamburger "A" was described as having been produced under a HACCP program, and participants were informed that HACCP was currently the required industry standard. Hamburger "B" was described as having been produced under HACCP but with the addition of steam pasteurization of the animal carcass. Hamburger "C" was described as an irradiated hamburger produced with HACCP and steam pasteurization. Thus, the innovations represented additions of food safety interventions.

In addition to this handout, two other props were distributed: (1) a full-color pamphlet describing the steam pasteurization process and (2) a black and white graphic of electron beam irradiation. A package of fresh, packaged ground beef was displayed on the table as the moderator read the description of the HACCP program.

Following the discussion of meat safety innovations, we assessed the participants' preferred degree-of-doneness for hamburgers. Participants responded to questions on a set of three charts. Each participant could see one of the colored guides showing a hamburger in three different degrees of doneness (medium-rare, medium, and well-done) that were posted on the table.

After indicating their preferred degree of doneness, participants were asked the reason for their choice. This question aimed at finding out if this degree of doneness was chosen for safety or for taste. Then participants were asked to indicate which degree of doneness of hamburgers they would choose for a 5-year-old child. To find out if the availability of new safety-enhancing technologies altered their preference for degree of doneness of a hamburger, participants next were asked to indicate in a 3×3 grid the preferred hamburgers for themselves and for a 5-year-old child (Fig. 1).

The grid represented alternative strategies to reduce risk of *E. coli* O157:H7 infection from beef consumption: three levels of private protection and three levels of public protection. Consumers could choose how they prepare the meat (medium-rare, medium, well-done), thereby having some private control over the risk. Public risk reduction was represented by HACCP, steam pasteurization, and irradiation. Steam pasteurization was described as reducing *E. coli* O157:H7 risk by 99%, and irradiation by 100%. Thus, the grids gave participants a choice among nine hamburgers (Fig. 2).

It should be noted that participants first stated their preferred private risk-reduction strategy (degree of doneness) given the current standard mechanism for collective risk reduction (HACCP) and then stated their preference to move to an alternative risk-reduction strategy given the additional alternative combinations of private

TABLE 1. Demographic profile of focus group participants in food safety interventions study, Manhattan, KS

Characteristic	%
Age:	
25-35	10.8
36-49	73.0
50-64	13.5
60 & over	2.7
Education level:	
Less than high school	0
High school grad., G.E.D.	13.5
Some college experience	24.3
College	62.2
Income:	
$25,000 or less	2.7
$25,001 to $50,000	51.3
$50,001 to $100,000	40.5
More than $100,000	5.5
Household size:	
1-2	16.2
3-4	56.8
5+	27.0
# of children under 18 years:	
0	18.9
1-3	75.7
4+	5.4
Weekly beef consumption:	
2-5 times	81.1
6-11 times	18.9

and collective actions (columns 2 & 3 in Fig. 1). For example, choosing medium-done meat with irradiation treatment rather than the well-done HACCP product represented a preference for a more-processed but less-done product.

The next three questions were designed to determine whether participants would be willing to pay a premium for ground beef that had been treated with steam pasteurization or the combination of steam pasteurization/irradiation. If the answer to this question was yes, they were asked to identify the highest price per pound that they would be willing to pay, assuming that the type A hamburger costs $1.60 per pound (the actual market price on the package of fresh ground beef). Next, participants again filled out the 3×3 grid and answered the same three questions, assuming that they were choosing a hamburger for a 5-year-old child.

RESULTS

Demographic characteristics

The demographic characteristics of the focus-group participants are summarized in Table 1. The 37 participants ranged from 24 to 70 years in age. Seventy-three percent of them were age 36 to 49, and 86 percent were female. Of the total, 62.2 percent had graduated from college, whereas 13.5 percent had completed only a high school education. The mean household income for the sample was between $50,000 and $100,000 per year.

The total number of individuals comprising participants' households ranged from two to nine, with a mean of 3.8. The average number of children under the age of 18 years in participants' households was two. For weekly beef consumption, answers ranged from once a week to 11 times per week, with an average of almost five times.

Consumption habits and awareness of food safety issues

Favorite meats: The first section of the focus-group questionnaire asked participants about their favorite meats or meat dishes. "Steak", used generically, always was mentioned first, then hamburger, brisket, roast beef, ribs, and sirloin tips.

Participants indicated that they liked the flavor of these meats and the versatility and economy of hamburger. Further, they pointed out the ease of preparation, especially during summertime for grilling outdoors.

Participants in all four groups mentioned problems of cleanliness in the processing and packaging of beef, bacterial contamination of meat during the slaughter process, exposure of meat to fecal material, and concerns related to grinding and packaging. Participants expressed concerns about "*E. coli*" and other organisms that cause

foodborne illnesses and also about quality factors such as freshness of meat. Other important issues associated with meat consumption were the fat and cholesterol contents, chemicals, steroids, and veterinary supplements that might have been added to the meat during production. Participants believed that cattle feed often contains pesticides, hormones, and vitamin supplements; this worried participants, because they did not know the side effects of these inputs.

Many focus-group members expressed mistrust about the level of cleanliness and sanitation in restaurants. Worries were also expressed about the cooking and handling of hamburgers. Most participants said they felt more secure when they cooked for themselves at home. Nearly every participant discussed means other than temperature measurement for determining the doneness of the meat they cook, such as a visual check or a check by time. All focus-group members associated *E. coli* O157:H7 with ground beef and hamburgers. They knew that it causes foodborne illness and even death. Most participants were aware that although such sources of concern are present in many food items, proper care and handling could prevent foodborne illnesses from these sources. They also stated that *E. coli* O157:H7 arises because of lack of cleanliness of processing plants and that cross-contamination as well as the spread of the organisms occur when the meat is processed or handled more.

Innovations: Public interventions

Participants reviewed a brief paragraph about three innovations used in meat processing, (A) HACCP programs, (B) carcass pasteurization, and (C) irradiation. After reading the information, they were asked to indicate their perceptions of the risk of illness from a hamburger that is processed in a plant that has the specific technology in use. All plants now operate with HACCP programs. Carcass pasteurization may be a part of that system in some plants, but irradiation of meat is uncommon.

HACCP programs: Most participants saw only a slight risk in the basic hamburger; this is assumed, since the descriptions referred to it as a "standard hamburger." All consumers had positive experiences with hamburger. Concerning risk to a 5-year-old child, many participants pointed out that the hamburger might be more dangerous for young children or older people. Several women indicated that if the hamburger contained *E. coli* O157: H7, very young children could develop severe disease because of their weaker immune system. One participant said she would eat a hamburger that was a little pink in the middle, but she would never give it to her daughter, because she did not want to take the risk with her.

Participants in each focus group discussed trusting one's senses regarding the safety of the food they eat. In general, participants agreed that they could identify something as unsafe by its odor or appearance. Most participants were not familiar with the safe food handling labeling that is present on all fresh cuts of meat.

Whereas some participants indicated that a HACCP program makes the hamburger safer, others doubted that it affected the ultimate safety of a standard hamburger. The pro-HACCP program participants argued that because of the increased safety precautions and awareness in the meat plants, employees might work in a more sanitary manner and would be willing to cooperate more with the requirements of the HACCP program. The skeptics argued that the meat department in the supermarkets might grind the old and the fresh meats together and present it again as fresh, so every standard meat still had the chance to be contaminated, and the HACCP program at the processing plant did not affect the safety of the hamburger at all.

Most participants understood the basics of sanitation and kitchen cleanliness and the importance of being especially careful with raw meat products. However, misperceptions and misinformation existed. For example, one participant said that she made the meat "germ free" by microwaving for 20 s before she refrigerates it: she had learned this bit of misinformation from a television program.

Participants in all groups agreed that there are many ways to check if food is properly cooked. Each group stressed the importance of cutting into meat to visually check doneness. According to participants, if the juice ran clear out of the patties, then they were well-done and, therefore, safe. Other participants check by time or by the external appearance of the hamburger to determine if it was done.

One participant said that when the seal of the package was broken, the meat inside was unsafe. Many focus-group members added that meat was also risky when it started to smell or showed a slimy surface and a color change.

Carcass pasteurization: After the moderator read the description of carcass steam pasteurization on the handout, participants described their perceptions of risk of foodborne illness from a steam-pasteurized hamburger. The perceptions of hamburger B (HACCP+ steam pasteurization) varied greatly among the focus-group members. Some participants considered this hamburger to be safer, because the meat is more processed. But the fact that more processing was done to the beef products scared some of the other participants. They thought that steam pasteurization was a process of "over kill," and that this step in addition to HACCP was too much; they therefore did not want steam-pasteurized meat. The fact that just the surface of the carcass was pasteurized with steam at 195°F led some participants to think that the bacteria stayed inside the meat, so that contamination might still occur during grinding of the meat. Others expressed concerns about heating the outside of the carcass, uncertainty of destruction of bacteria other than *E. coli* O157:H7, higher costs, and losses of vitamins

and flavor. In general, many participants said that they would not necessarily look for steam-pasteurized beef in a grocery store, because they feel comfortable with the way it has been processed until now.

Participants were asked if they thought carcass pasteurization made hamburger B safer than the HACCP-only product A. Again, opinions were split. Some participants were positive that the meat might be safer, especially for a 5-year-old child. Other participants had more doubts about it. The descriptions of HACCP and carcass pasteurization ended with the same words "However, recontamination of the meat may occur later in processing or prior to reaching consumers." This led some participants to conclude that the process was not necessarily needed; they said that they had never been sick from eating ground meat.

Regarding handling or cooking of steam-pasteurized meat, all participants answered that they would not do anything different than they usually do.

Irradiation: After reading the provided information on irradiation, participants were asked to indicate their perception of risks of foodborne illness for hamburger C (HACCP + steam pasteurization + irradiation). The answers of the four focus groups were very different, and the discussion about meat irradiation revealed a lack of information concerning this process. However, most of the participants in two of the groups had no concerns about meat irradiation; they thought this process should be used for all kinds of meat, especially chicken, because then they would feel safer about buying generic branded chicken. However, participants in the other two focus groups were scared by the irradiation procedure. Their concerns started with the word "Irradiation;" one participant said that he had heard the procedure causes cancer, because it changes the molecules of the food. Many of the skeptics said that they liked the benefit of killing *E. coli* O157:H7 and others organisms in meat, but because they did not know enough about the side effects of irradiation, they had concerns about buying irradiated meat. They wanted to see more studies and information about irradiation's side effects.

Some participants thought product C might be the safest of the three hamburgers, whereas others emphasized their need for more information about the irradiation procedure in order to judge the safety of the meat; they also were worried about any additional costs.

Nearly 50 percent of all focus-group participants would pay more for hamburger C than for hamburger A, but the rest would not because of their concerns about irradiation and because they had never had any problems with foodborne illnesses. Fewer participants would pay more for hamburger C than for B, and again they expressed the need for information about the side effects of irradiation. Positive opinions stressed the fact that the shelf life was increased and that the process had great value for special uses where temperature and cooking cannot be controlled, as during camping. One participant preferred hamburger C for her children, and she would buy it at the same price as non-irradiated meat. Some participants said that they would not pay more because they believed in the safety of standard meat. No participants in the focus-group sessions indicated that they would handle or cook irradiated meat differently than non-irradiated meat. Some participants wondered whether the meat gets drier after the irradiation procedure.

Degree of doneness of hamburgers

The majority of the participants (58.1 percent) indicated a preference for a well-done hamburger. The next largest category identified was medium-rare (28.4 percent) and only 13.5 percent of participants preferred a medium-cooked hamburger.

Most participants identified taste as the primary reason for their preference. Reasons given for picking a medium-rare or medium hamburger were juiciness and the original flavor of the meat. They noted that a well-done hamburger could be a bit dry and that a medium hamburger was not as chewy as a medium-rare one and should be just a little pink in the middle. Some focus-group members indicated that well-done is the way you cook hamburgers and also kill the bacteria in the beef. One participant said that she always liked her hamburger medium, but after the "*E. coli* scare," she preferred it strictly well-done. Other participants who preferred a well-done hamburger explained that a hamburger should not be raw or bloody because the hamburger bun gets soggy. Fans of the well-done style pointed out that they would rather prepare a steak medium-rare but would not have a pink hamburger. For them, pinkness in the middle of a medium-rare meat patty did not look appetizing; it looked like it was still alive and uncooked.

For a 5-year-old child, 89 percent of participants would cook a hamburger to the well-done stage; 19 percent of this group also had chosen a well-done hamburger for themselves. They mentioned that a pink steak could be served to a child but not a pink hamburger. Thirteen and a half percent or five individuals would cook the hamburger medium done for the child, because a well-done hamburger is dry and spongy. Only one participant did not really understand why she might cook the hamburger any differently for a 5-year-old child and decided on the medium degree-of-doneness that she chose for herself, which is safe if measured by temperature, but not if measured by appearance.

TABLE 2. Respondents' preference for hamburger doneness when new safety-enhancing technologies are available

Degree of doneness	Hamburger A (Standard hamburger from HACCP program)	Hamburger B (HACCP process with carcass pasteurization)	Hamburger C (HACCP with carcass pasteurization and irradiation)	Percentage
Medium /Rare	2 (1)[1]	0 (0)	2 (0)	10.8 (2.7)
Medium	3 (1.5)[2]	2 (0)	10 (3)	40.4 (12.2)
Well done	4 (4.5)	11 (15)	3 (12)	48.8 (85.1)
Percentage	24.3 (19)	35.2 (40.5)	40.5 (40.5)	100

n= 37

[1] Numbers in parentheses are the results for the respondents' preference for hamburger doneness for a 5-year-old child when new safety-enhancing technologies are available

[2]If a participant made a cross exactly between two categories, his/her vote was split in half between the two choices; hence, unequal numbers appear in some of the fields.

Innovations and degree of doneness: Private interventions

Concerning the degree-of-doneness, which represented the level of private protection, the largest number of participants (48.8 percent) preferred their hamburger well-done (Table 2). Only 10.8 percent chose a medium-rare hamburger. For a 5-year-old child, a large majority of the participants, 85.1 percent, preferred well-done meat. This means that most participants would like to provide the 5-year-old child the highest level of private protection. Of the three choices for public risk reduction, 40.5 percent of the participants preferred hamburger C, which underwent application of all three innovations. Most of the participants preferred either a well-done, steam-pasteurized hamburger (29.7 percent) or a medium, irradiated hamburger (27 percent). Concerning the public risk reduction for a 5-year-old child, both carcass pasteurization and irradiation were chosen by 40.5 percent of the participants. Relative to the previous question, which asked them to pick a hamburger for themselves, some women switched to a higher degree of doneness, but with the same innovation. One participant picked a well-done hamburger B because to her it seemed to be a safe method no matter who is going to eat it. Some women emphasized that they would never serve irradiated meat to their children. Most of the participants chose a combination of a well-done, steam-pasteurized hamburger or a well-done, irradiated hamburger. This demonstrates that who is at risk (children vs. adults) influences preferences. Participants who chose the highest level of risk reduction represented by a well-done, irradiated hamburger for themselves chose the same for the 5-year-old child. In general, participants who decided on hamburger C for themselves also chose the same hamburger for the 5-year-old child (Fig. 3).

Figure 4 shows how the participants' choice for degree of doneness was influenced by the availability of new collective risk-reduction strategies. When public risk reduction was available, more people chose a medium hamburger, but well-done still remained the most preferred degree of doneness. This means that the safety aspect of a hamburger seemed to be more important than its flavor to the participants who originally preferred a well-done hamburger and then switched to a medium hamburger. Some participants indicated that they moved from a higher to a lesser degree-of-doneness along with a higher degree of technology that had been added to the hamburger. These participants traded private protection for public risk reduction; the availability of the new safety-enhancing innovation provided a marginal value to them.

Nearly all participants indicated that they had been cooking a certain way for many years and had never gotten sick in the past. They

Figure 3. Focus group participant's preference for the degree-of-doneness of hamburgers

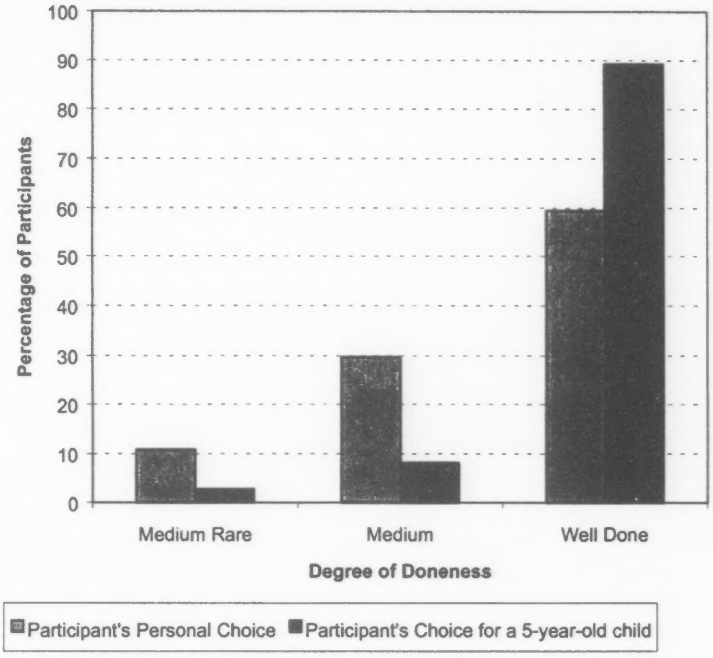
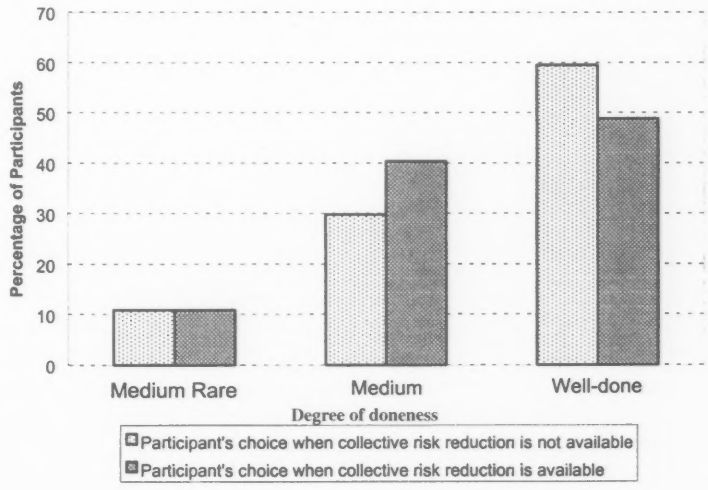


Figure 4. Participant's preference for the degree of doneness of hamburgers with/without public food safety interventions



doubted the importance of changing their behavior at this time. Another participant said that she chose hamburger B because she liked the fact that the surface of the carcass was cleaned. One participant explained that if they did everything to hamburger C, it would be a lot safer, so she could cook it a little juicier. A similar reason was given by another participant to change from a well-done HACCP-hamburger to a medium steam-pasteurized hamburger B. She said if the meat had been treated an extra time, eating it the way she had always liked it might be safer. She had been scared by the *E. coli* O157:H7 outbreaks and had started to cook hamburgers well-done. The skeptics about irradiation chose a type A or type B burger, because they claimed to have insufficient knowledge about the irradiation process.

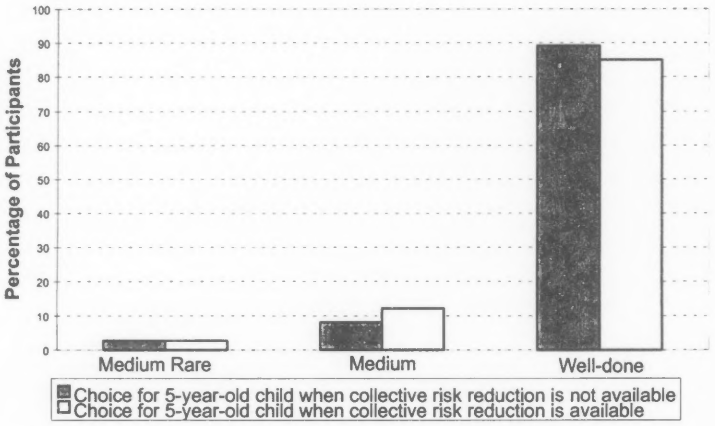
Willingness to pay

At the retail meat market, a minority of focus-group participants would pay between 3 and 10 cents per pound more for hamburger B (steam-pasteurized). Some would pay the same as for hamburger A. The skeptics would not pay more because they had never had any problems with foodborne illnesses.

Most of the participants who chose either hamburger B or hamburger C indicated that they would pay more for these than for a standard hamburger, A (HACCP). When asked to indicate how much more they would pay, assuming the type A standard hamburger costs $1.60 per pound, the answers varied from 2 cents per pound to 40 cents per pound, with a mean of 8.19 added cents per pound. Ten of those participants who preferred B or C hamburger would not pay anything more; one participant would pay only 2 to 3 cents more. One participant indicated that she would only pay 40 to 50 cents more per pound for ground beef when she would use it for cooking out. One participant chose a medium-rare standard hamburger, but indicated that she would pay more only in a restaurant for a higher degree of safety, because she mistrusted the hygiene of the restaurant kitchen.

Few participants switched their choice from a well-done to a medium hamburger for a 5-year-old child when new safety-enhancing technologies were available; 85 percent still chose a well-done ham-

Figure 5. Preference for the degree of doneness for a 5-year-old child with/without collective risk reduction



burger (Fig. 5). Most of the participants decided on the same hamburger regardless of whether collective risk reduction was available. This means that fewer participants traded private risk reduction for public risk reduction and that the availability of new safety-enhancing technologies did not provide a marginal value for those participants.

The moderator asked participants who chose type B or type C hamburgers about their willingness to pay for them and to specify the number of cents per pound, assuming that the standard hamburger, type A, costs $1.60 per pound. The answers ranged from 5 to 35 cents more, with a mean of 7.67 added cents per pound.

The participants' willingness to pay increased when they considered the hamburger for the 5-year-old child. Only the participant who would have paid 40 to 50 cents more per pound for the ground beef would never feed irradiated ground beef to a 5-year-old child. She decided in this grid on a well-done standard hamburger, because it seemed to be the safest choice for a child. Most of the participants would pay between 5 and 10 cents more per pound, and 11 participants would not pay anything more. Several participants said their willingness to pay would change if they heard weekly about foodborne illness caused by eating beef. They were not willing to pay extra for something that they did not really think was needed.

Other comments on hamburger safety

Many emphasized that processing plants should make the meat safer by using more hygiene and sanitation. One participant indicated that the US Food and Drug Administration should check on the irradiation process and give out some more information about it. Most participants expressed positive feelings about food safety.

Finally, participants described the perfectly safe hamburger. Cleanliness and freshness were important to most of the participants. They said that requiring employees to wear gloves and hairnets and having more inspections would improve the food safety of restaurants. Two women expressed their desire for a hamburger that contains less fat and less cholesterol; they would pay more for that. Other focus-group members described the perfect hamburger as drug free, germ free, showing less risk of recontamination, tasty, and already cooked.

Private vs. public risk reduction trade-offs

The majority of participants, 22 individuals, indicated a preference for a well-done hamburger, which represented the highest degree of private protection. We label this group "well-done." One objective of the study was to determine relative preferences for alternative combinations of collective action and private protection. Hence, one question of the questionnaire was designed to determine whether the availability of new safety-enhancing technologies would alter their choice of degree of doneness. In the following section, results from the "well-done" group are examined to see if a trade-off exists between reductions of private risk and public risk. Figure 6 shows the results for the "well-done" group. The largest number of participants *(11)* chose a well-done hamburger from meat that had undergone the carcass pasteurization process (hamburger B). This means that the public risk-reduction strategy represented a marginal value to these participants. Because these individuals did not change their preference concerning the degree of doneness, which represents private risk reduction, no trade-off was seen between public and private risk reductions. Only a small number (3 participants) of the "well-done" group switched to a lesser degree-of-doneness; they chose a medium hamburger from meat that had undergone all three innovations (hamburger C) and hence traded private risk for public risk reduction.

Figure 7 shows that 14 participants of the "well-done" group chose a well-done, carcass-pasteurized hamburger (hamburger B) for the 5-year-old child and 13 individuals decided on a well-done hamburger associated with all three innovations (hamburger C). Hence, these two public risk-reduction strat-

Figure 6. Preference for hamburger doneness by participants from the "well-done" group when new safety-enhancing technologies are available

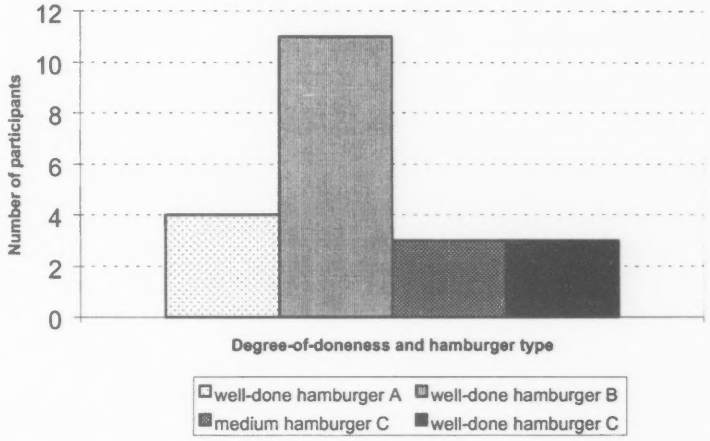
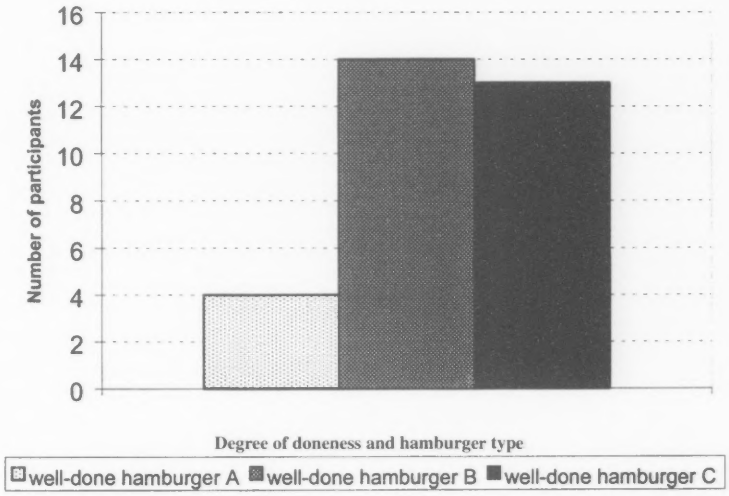


Figure 7. Preference for hamburger doneness for a 5-year old child by participants from the "well-done" group when new safety-enhancing technologies are available



egies represented a marginal value to these participants. Only a minority of the participants of the "well-done" group picked the same hamburger (A) that they chose in the situation when new safety-enhancing technologies were not available. None of the participants chose a medium hamburger, which means that nobody traded private for public safety.

Implications

Food safety as a product attribute has to be based on consumers' trust. This trust can be established only by identifying the knowledge and concerns that consumers have about food safety, and a consumer focus group is one means of identifying these. Once identified, these insights can be used to develop educational materials, programs, and effective consumer information about innovations related to meat processing. Consumers rely upon food processors and government regulators to provide safe food, because it is almost impossible for the consumer to determine the safety of a particular food product.

Along with demographic distinctions, several interesting themes and issues emerged from the focus groups in this study. Although participants seemed aware of many important food safety practices, misinformation and misconceptions regarding general food safety topics, particularly irradiation, were found. Participants in all focus groups indicated that they were worried about cleanliness in meat-processing plants. This is consistent with a previous study *(10)* in which participants suggested that meat-processing plants and supermarkets should be cleaner and more sanitary in the processing and handling of meat. In a 1985 study by USDA/FSIS, food-manufacturing facilities were ranked first out of six choices as the place where food safety hazards most likely occur *(12)*. The same result was found in a 1992 FSIS study *(5)*. However, epidemiological data indicate that restaurants, institutions, and other large preparation facilities are far more likely to be the sites of mistakes that can lead to foodborne illness. The focus-group participants were also very concerned about the microbial safety of the food in restaurants.

Participants in all groups seemed aware of many important food safety issues and felt safe about the meat they served in their own kitchens. This conclusion is identical to previous results for focus groups *(10)* in which participants felt confident that they handled meat products with appropriate caution and safety. However, some misperceptions and misinformation also existed: To the question "under what condition is the meat safe for you," many participants answered that contaminated meat

smells and looks bad. This fact indicates that consumers may not understand that a food may contain pathogenic bacteria even though it does not smell, taste, or look bad.

Internal meat temperature is a food safety factor that consumers can control at the preparation stage. However, none of the focus-group participants indicated that they used a meat thermometer. Many participants mentioned that seeing if the juice ran clear or if the meat still looked pink inside indicated the doneness of the meat. The recommended safe endpoint temperature for ground beef is 160°F. Meat at this temperature may be pink or brown, depending on other factors. The visual check for doneness gives a quality indication of doneness, not one of safety. Some focus-group participants checked the doneness by cooking time. In a previous focus-group study *(11)* most participants felt that there are several safe alternatives to the use of a thermometer and that using a thermometer was no guarantee of safety in any event. As reasons for not using a thermometer, participants mentioned "inconvenience," "laziness," and "hassle." These results indicate that education is needed on use of thermometers to ensure that food is thoroughly cooked and safe to eat.

Participants in all groups agreed that they felt safe about the meat they served in their own kitchens in the absence of any opportunity to buy steam-pasteurized or irradiated meat products. In the current market, irradiated meat products are labeled, but steam-pasteurized products are not. Therefore, consumers will not necessarily make a choice in the market regarding steam-pasteurized products, and without such labeling, people may feel they have little opportunity for personal control. However, labeling will have little impact without public understanding of what the labels mean, a fact underlined by this study in relation to irradiation of meat. Hence, the fact that concern exists about steam pasteurization is surprising. It suggests that part of the "anti-irradiation" sentiment is really an "anti-messing-with-my-food" sentiment, i.e., an aversion to processing in general.

However, many participants indicated a willingness to buy irradiated meat if they were convinced that it would not have any side effects such as producing cancer. After reading a brief description of the process, approximately 70 percent of participants expressed a willingness to purchase irradiated meat. This is consistent with the findings from another study *(7)*, in which respondents who received information about irradiation were less concerned about the effects of the technology than those who did not receive the information. Those authors concluded that even a minimal presentation on food irradiation can lead to a significant decrease in consumers' concerns. Many participants in all groups stated that they would be very unlikely to change any behavior regarding what kind of meat they buy. Parents of young children indicated that they could be persuaded to change their behavior, if they felt that such changes would ensure the safety of their children. However, they also indicated that they would be unlikely to change behavior solely for their own benefit. Hence, a clear need exists for effective communication strategies to facilitate public understanding of this technology and to dispel misconceptions about various aspects of safe meat handling.

Concerning willingness to pay, results indicate that the majority of individuals had a preference for steam-pasteurized ground beef over regular ground beef when both are priced the same. Over 70 percent of participants revealed willingness to pay a premium for the safer ground beef. It remains to be seen whether consumers actually would pay for improved safety, when they have the choice at the time of their actual purchase decision.

The study showed that the prevalence of eating undercooked hamburgers was 10.8%. About one quarter of the participants reported that they usually serve medium-rare hamburgers at home. The majority of participants (nearly 60%) liked their beef well-done, which result may be attributed to a higher proportion of the population acknowledging the health risks related to the consumption of undercooked beef. Zhang et al. *(13)* found similar results in their survey about prevalence of selected unsafe food-consumption practices and their associated factors in Kansas. However, results might vary in other geographical locations. Because Kansas is a major beef-production state in the United States, higher media coverage may exist about the incidence of foodborne illness associated with undercooked hamburgers. In addition, there are old rural traditions of cooking all food well. On the other hand, aggressive education efforts on food safety have been made in the past and resulted in better consumer awareness *(8)*.

The focus group's results emphasize the need for continuing research on consumer education related to food safety. Given the limitations of using a convenience sample, this study also suggests guidelines to consider in public risk-communication efforts. The intent of this research was to gather preliminary data that might be used in the design of effective information to educate consumers about innovations related to meat-processing and the role of these innovations in providing safer meat products. The results highlight some special problems for the communicator in the realm of educating people about controversial issues such as risk of foodborne illnesses. Information from this study can be used in designing a nationwide survey, which might provide a more accurate reflection of overall consumer attitudes toward the safety of our nation's meat supply.

Kansas State University Agricultural Experiment Station Contributions No. 01-253-J.

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Dairy, Food and Environmental Sanitation, Vol. 21, No. 7, Pages 582-590

The Promise and Challenge of Food Safety Performance Standards

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SUMMARY

Food safety performance standards offer the promise of increased efficiency and innovation. At the same time, performance standards present both regulatory agencies and the regulated community with significant challenges in regard to regulatory development, implementation, and compliance. The basic tradeoff is that increased flexibility in achieving the desired level of protection is purchased at the cost of additional information and complexity inherent to situation-specific approaches. This paper illustrates one approach to developing a food safety performance standard for a pathogen in a ready-to-eat food, based on available empirical evidence. The example of *Salmonella* Enteritidis in pasteurized egg products points up both the promise and the challenge of developing performance-based regulatory standards for microbial pathogens in ready-to-eat foods.

INTRODUCTION

Consensus is growing among policymakers and regulatory analysts that "command-and-control" process or design standards stifle efficiency and innovation in the pursuit of the desired level of protection. There is also increased emphasis on performance over compliance, results over process, and outcomes over outputs *(8, 12, 13)*. This paper discusses the promise and challenge of developing performance-based regulatory standards for microbial pathogens in ready-to-eat foods.

A performance standard states requirements in terms of results along with criteria for verifying compliance. The performance standard does not, however, state the methods for achieving the required results *(15)*. In reality, performance and process standards mark endpoints on a continuum. Few standards are purely design or performance in nature; most are a mix of both types. For example, requirements in a standard may be written mostly in terms of performance, while the sampling and testing methods used for assuring compliance with the standard may be written in prescriptive design and process terms.

In the context of food safety, a bona fide performance standard would be specified in terms of the risk of human illness. Unfortunately, the principles, methods, data, and conventions for risk analysis of microbial pathogens are largely undeveloped at this time. Nevertheless, a reasonable proxy for illness is exposure to a known pathogen in sufficient quantities to produce a reasonable expectation of infection or illness. For ready-to-eat foods, this threshold could be quite low. Certain pathogens could

A peer-reviewed article.

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TABLE 1. *Salmonella* in unpasteurized liquid eggs

Reference	*Salmonella* species			*Salmonella* Enteritidis		
	pos.	samples	%	pos.	samples	%
Ebel (1993)	524	1003	52	132	1003	13
Hogue (1997)	451	937	48	179	937	21

have a high growth potential following processing, or low doses could be associated with non-negligible likelihoods of severe health outcomes. The severity of potential health outcomes may be taken into account in regard to the expectation of illness at a given level of exposure. Ideally, a performance standard for microbial pathogens in ready-to-eat food products would be defined as a probabilistic tolerance. That is, the concentration of pathogens (or their toxic metabolites) in a serving of the product at the point of consumption must be, with a specific degree of confidence, less than a defined level. From the perspective of a risk manager's ability to administer food safety programs, performance standards must also be designed in a manner that permits verification of compliance. Given current technologies, end-product testing is limited as a means of assuring that food production processes result in finished product within microbiological tolerance limits. Therefore, it is desirable to design enforceable standards that have a high likelihood of detecting failures in process controls. It remains uncertain, however, what criteria and weight of evidence are sufficient to demonstrate attainment of performance-based food safety standards.

This work is intended to provide a concrete illustration of how to develop a food safety performance standard for a pathogen in a ready-to-eat food, based on available empirical evidence. The example is *Salmonella* Enteritidis in pasteurized liquid whole egg products. The illustrative analysis seeks to identify combinations of pasteurization time and temperature and the maximum pre-pasteurization pathogen load predicted to result in performance equivalent to or better than existing time and temperature regulatory requirements for liquid whole egg (7 CFR Part 59). The performance of egg products pasteurization is gauged in terms of the proportion of lots that are estimated to contain one or more viable pathogens after pasteurization.

MATERIAL AND METHODS

Selection of *Salmonella* Enteritidis as indicator pathogen

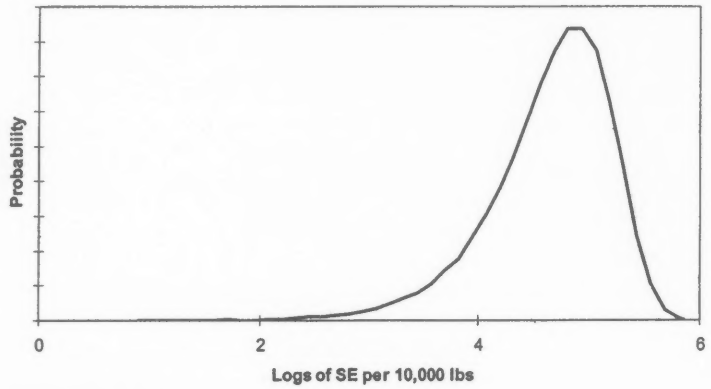
Salmonella Enteritidis (SE) was chosen as the indicator pathogen for this analysis. *Salmonella* was chosen as an indicator because: (1) *Salmonella* is the most common bacterial cause of illness associated with eggs; (2) *Salmonella* occurs in egg products at frequencies that permit changes to be detected and monitored; (3) current methodologies can recover *Salmonella* from egg products; and (4) intervention strategies aimed at reducing *Salmonella* in liquid egg products (i.e., sanitation and pasteurization) should be effective against other pathogens that are likely to be present. Although SE is one of many serotypes present in unpasteurized liquid egg *(9)*, it was chosen as the indicator pathogen for several reasons. After the emergence of eggs as a major source of SE infections *(17)*, SE has rapidly became the serotype most frequently isolated from reported human illnesses during the early 1990s. While *S.* Typhimurium recently retook the lead, SE has remained the second-most frequently identified serotype identified from human sources, with 23% and 18% of all *Salmonella* isolates reported to the Centers for Disease Control and Prevention (CDC) in 1997 and 1998, respectively *(2)*. Furthermore, SE is most commonly associated with egg products, whereas Typhimurium is associated with a broad range of products.

Number of *Salmonella* Enteritidis in a lot of unpasteurized liquid egg

As a point of departure, the analysis requires an estimate of the number of *Salmonella* Enteritidis in a lot of unpasteurized liquid egg. For the purposes of this analysis, a lot is defined as 10,000 lbs of liquid egg, since bulk tanks of this size are commonly used. The 1998 USDA Food Safety and Inspection Service (FSIS) risk assessment of *Salmonella* Enteritidis in shell eggs and egg products led to the conclusion that most SE present in liquid egg prior to pasteurization originates from sources other than egg contents. The assessment found that SE contamination from the contents of eggs is insubstantial relative to the total SE load in liquid egg product prior to pasteurization *(4)*. Other sources include contamination from the shell of eggs, contamination from the breaking machinery, machine operations, and airborne *Salmonella*. Therefore, rather than modeling the growth of SE from the contents of eggs, we rely on surveillance data to estimate the number of SE in a 10,000-lb lot of unpasteurized liquid egg.

The distribution of *Salmonella* Enteritidis in unpasteurized liquid egg across breaker plants nationwide was estimated from two surveys (Table 1). The surveillance results come from a USDA Animal and Plant Health Inspection Service (APHIS) survey of 20 plants conducted in 1991 and repeated in 1995 *(3, 9)*. In each year the APHIS survey was conducted, over 900 10-ml samples of liquid whole egg drawn from bulk tanks at the plants

Figure 1. Logs of SE in a lot (10,000 lbs) of pre-pasteurized liquid egg products



Summary Statistics	
Mean	4.6
Std Dev	0.6
5th Percentile	3.6
95th Percentile	5.4

were cultured for the presence or absence of *Salmonella* Enteritidis and other *Salmonella* serotypes. Data that quantifies the level of *Salmonella* in liquid egg from a 1969 survey *(5)* were not used in this analysis because evidence suggests that these data overestimate the current concentration of SE in liquid egg *(4)*.

The data in Table 1 were used to develop a distribution for the number of SE in a 10,000-lb lot of unpasteurized liquid egg. The SE prevalence data from the APHIS survey were pooled, and the uncertainty regarding the prevalence of SE in 10-ml aliquots was characterized as a Beta distribution (Beta (312,1630). The Beta distribution is the conjugate prior to the binomial probability distribution and is therefore often used to describe uncertainty about proportions *(18)*. This yields a prevalence distribution with an estimated mean of 16% and standard error of 1%. We assumed that the average concentration of SE per ml follows a Poisson distribution.

$$p(x) = \frac{\lambda^x \exp(-\lambda)}{x!} \quad (1)$$

This approach assumes that all bulk tanks of liquid egg are contaminated with similar average concentrations of SE. Such an approach also averages across seasons. To estimate the parameter (l) of a Poisson distribution for the average concentration of SE per ml, the complement of the Beta distribution characterizing prevalence (the probability of drawing an SE-free sample, or Beta (1630,312)), was adjusted for sample size (dividing by 10) and equated with the Poisson probability of detecting zero SE organisms in a 1-ml aliquot. Assuming that the distribution of organisms was Poisson, and that the assay was capable of detecting one or more organisms in each sample, if they were present, this obtains the maximum likelihood estimate of the mean concentration of SE per ml *(6)*. As discussed below, the Poisson parameter can be modeled as the mean of the Exponential distribution to represent vat-to-vat variability.

The idea that prevalence data can tell us something about concentration is intuitively appealing. In effect, we have asked the data, "What concentration would likely explain the observed prevalence results?" Certainly, if every sample in a survey were contaminated, we would have to infer that the concentration must have been high enough to have allowed contamination of every sample. Conversely, if every sample in a survey were pathogen-free, we would have to conclude that the concentration must have been very low; otherwise, at least one of the samples would have been contaminated. Similarly, if almost all of the samples were contaminated, this would imply a higher concentration than if almost all of the samples were pathogen-free.

Naturally, such reasoning is dependent on the assumption that bacterial contamination is randomly (Poisson) distributed in a vat of liquid egg. A collection of samples would then be representative of the rest of the vat. It is possible that some clustering of the bacteria may occur. These clusters would consist of individual cells that would continue to adhere to each other during the mixing and agitation that takes place during the breaking and homogenization steps of producing liquid egg product. Such clusters would then be randomly distributed (i.e., follow a Poisson distribution). If the probability of this clustering were known, the number of bacteria per cluster could then be predicted, using the Negative Binomial distribution. Given the homogenizing effect of breaking plant operations and breaking plant equipment, however, we believe it is unreasonable to model large clusters of bacteria.

This approach of estimating the average concentration from the prevalence data assumes that all vats of liquid egg come from the same population (with an average SE per ml concentration of λ). Because we assume similarity in vats, we are also assuming that all vats are contaminated to some degree, although most would be contaminated below the levels of detection. Currently, we have no data to determine what proportion of vats might be completely free of SE bacteria. Given the widespread distribution of SE in laying flocks in the United States, it seems unlikely that many 10,000-lb vats are composed entirely of eggs produced by SE-free flocks. Nevertheless, additional analysis might support the lack of

Figure 2. Whole egg pasteurization

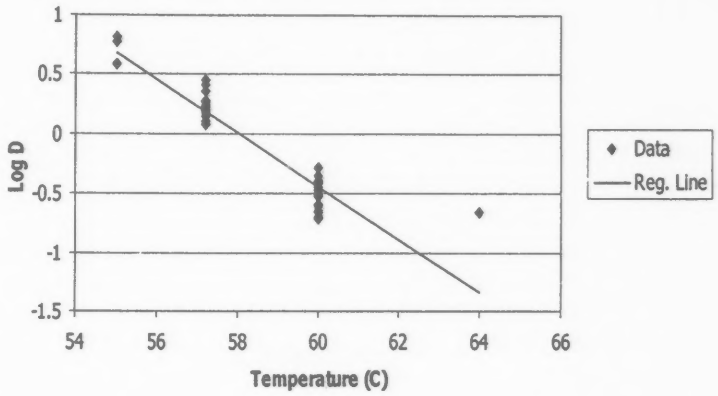
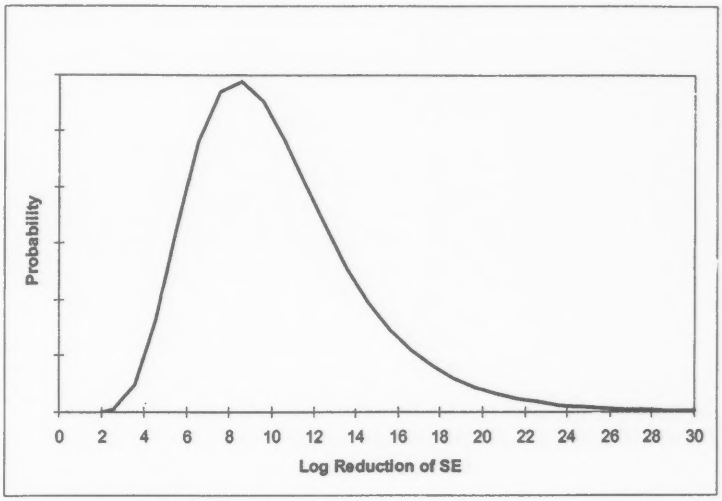


Figure 3. Whole egg pasteurization at 60°C, 3.5 mins



Summary Statistics

Mean	10.3
Std Dev	4.0
5th Percentile	5.2
95th Percentile	17.8

any SE bacteria in some proportion of liquid egg vats. Our methods allow for the incorporation of such information, if warranted. Furthermore, if the sensitivity of the sampling methods used in operation were substantially different from those used in the surveys, the calculated prevalence of SE in liquid egg would need to be adjusted to estimate the actual prevalence to permit meaningful comparisons. This would incorporate additional uncertainty into the analysis, but our methods permit integration of this evidence as well.

Although we assume that all vats come from the same population characterized by a mean concentration (λ), we recognize that there is likely to be marked dissimilarity between vats. Because we have no data to evaluate the actual variability from vat to vat, we are maximally uncertain about what such a distribution might look like. Therefore, in accordance with the maximum entropy principle, we have modeled variability in average concentration contamination across vats as an Exponential distribution with parameter (b=1/λ). Information theory identifies the Exponential distribution as the maximum entropy choice (the choice reflecting least certainty about the true underlying distribution) if only information about the mean of a continuous variable is available (*18*). As discussed above, the APHIS survey data provide information from which to draw inferences about the mean concentration. The subsequent calculation of the probability of contaminated lots after pasteurization was found to be insensitive to deviates that might be sampled randomly from the estimated distribution of the Poisson parameter, λ. Therefore, to avoid commingling the uncertainty about the true value λ with the variability in the concentration of SE across lots, the Exponential parameter (b) was estimated by fixing λ at its expected value of 0.018. (The 90% confidence interval for λ was 0.016-0.019.)

It seems reasonable that most vats would have fewer bacteria and a relatively small number of vats would have large numbers of bacteria. Because the parameter (λ) value is scale-dependent, we apply a conversion factor of approximately 4.38 million ml per 10,000-lb of liquid eggs *(4)*. Figure 1 presents the distribution of $\log_{10}$(SE) per 10,000-lb of unpasteurized liquid egg, derived from the APHIS survey data.

Reduction of *Salmonella* Enteritidis in liquid whole egg from pasteurization

After obtaining an estimate of the number of bacteria present in a lot of raw product, the next step in the analysis is to estimate the $\log_{10}$ reduction of SE in liquid whole egg from pasteurization. Data from two experimental studies by Shah and Humphrey were combined to calculate a single ordinary least

Figure 4. Pasteurization v. incoming load – whole egg baseline scenario

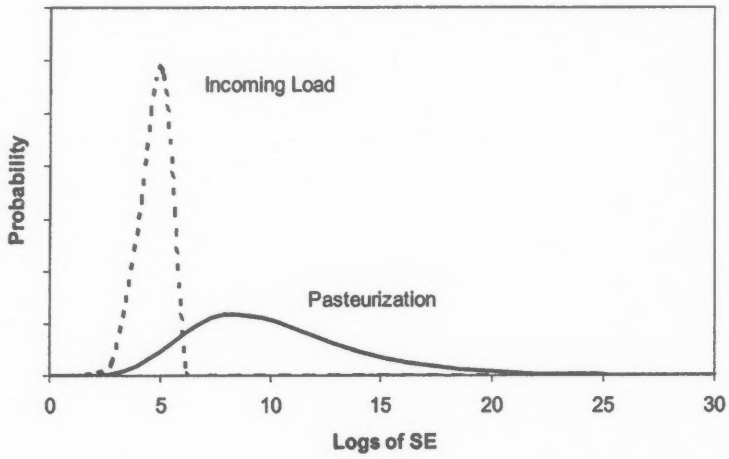
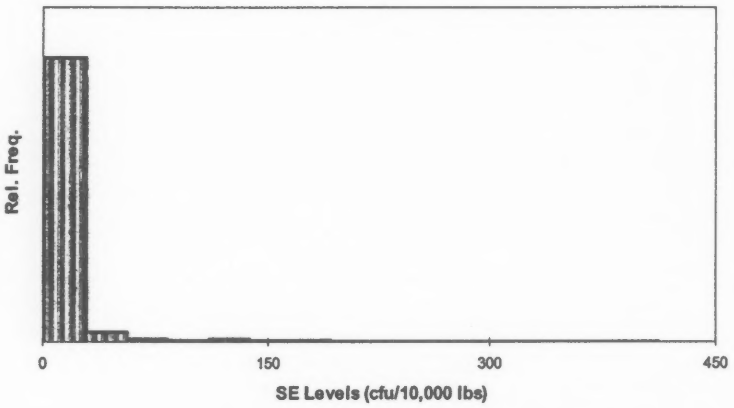


Figure 5. SE levels in 10,000-lb lots remaining positive post-pasteurization



squares (OLS) regression equation to estimate the log-reduction of SE in liquid whole egg from pasteurization *(4, 10, 16, 19)*:

$$\log\text{-}D = b_0 + b_1 T + e \quad (2)$$

where: D is the time (mins) required at a given temperature (T, deg. Celsius) to reduce the pathogen load by 1 log or 90%, b_0 = 13.02696, b_1 = -0.224426, and e (std. error) = 0.163017. Figure 2 presents the regression line fit to the combined experimental data.

The log reduction of SE from pasteurization according to current minimum time and temperature requirements for the pasteurization of liquid whole egg (60°C for 3.5 min) is then modeled as follows:

$$\text{Log Reduction} = 10^{\wedge[\text{Log}(3.5) - (b0 + b1(60) + \text{Normal}(0, e))]} \quad (3)$$

Eq. 3 can be derived as follows: Given D = min/Log Reduction, Log Reduction = min/D, and Log(Log Reduction) = Log(min) – Log(D). Given Log(D) = b0 + b1(T) + Normal (0, e), Log(Log Reduction) = Log(min) – (b0 + b1(T) + Normal (0, e)). Therefore, Log Reduction = $10^{\wedge[\text{Log}(\text{min}) - (b0 + b1(T) + \text{Normal}(0, e))]}$.

Figure 3 is a distribution of the log reduction of SE in liquid whole egg pasteurized at the minimum time and temperature requirements of the current regulation (7 CFR Part 59). Note in particular the large range in the estimate of the log of the reduction of bacteria in liquid egg that has been pasteurized according to the current regulation. This reflects the spread observed in the experimental data *(10, 16)* alone. It is possible that the pathogen reductions achieved under actual processing conditions differ from those observed in the laboratory. This introduces an element of uncertainty that has not been incorporated explicitly into the analysis. In practice, for example, the variance in egg products pasteurization performance may be even greater because of less homogeneous incoming product and other variables that are more tightly controlled in the laboratory than in breaker plants. Currently, we have no data on the pathogen reductions achieved under operational conditions, but our methods allow for incorporation of such information if it becomes available.

Monte Carlo simulation methods

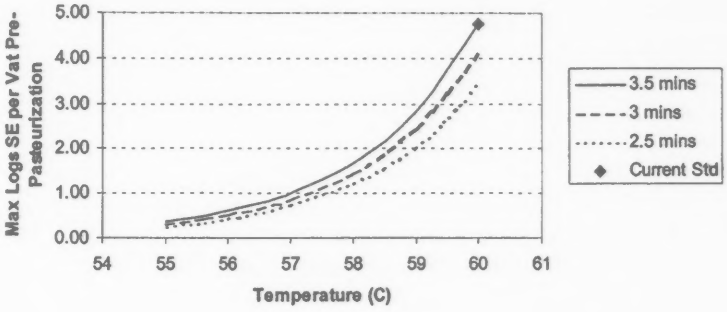
The analysis is performed probabilistically using Monte Carlo simulation methods. Monte Carlo simulation is a computer-intensive technique involving repeated sampling from specified distribution(s) using random number generation techniques. For each iteration of a Monte Carlo simulation, the computer generates a random sample from the specified distribution(s), analyzes the sample, and stores the results. Computational techniques such as Monte Carlo can be used to obtain a description of the sampling properties of empirical estimators when analytically derived theoretical results are not available. Monte Carlo simulations were performed with Latin Hypercube sampling (10,000 iterations) using Palisades© @Risk™ (Ver. 3.5.2), an add-on to Microsoft© Excel™ ('97).

RESULTS

Estimated performance under the baseline scenario

Figure 4 overlays incoming loads of SE in 10,000-lb lots of unpasteurized liquid whole egg and

Figure 6. Pre-pasteurizotion cut-points liquid whole egg



the log reduction under the baseline scenario. The results obtained from combining this information depend slightly on the modeling approach. One approach to simulating the effect of pasteurization is by subtracting the distribution of the log reduction due to pasteurization at 60°C for 3.5 mins. from the distribution of the logs of SE in a lot of liquid egg. That is, to determine the post-pasteurization status of a simulated lot of pasteurized egg products, we calculated the difference between a random draw from the estimated distribution of the pre-pasteurization SE load per lot (log CFU/10,000 lbs of liquid eggs) and a random draw from the distribution of the log reduction due to pasteurization. If the difference is less than zero, the simulated lot is considered to be SE-free. If the difference is greater than zero, the simulated lot is considered to be SE-contaminated, defined as containing one or more SE. Monte Carlo simulation methods were used to repeat this sampling process iteratively to estimate the proportion of lots remaining contaminated after pasteurization. The simulation approach just described considers each vat as a member of a population equal in size to the number of Monte Carlo iterations performed (10,000). The simulation results suggest that under current regulatory requirements, 3% of 10,000-lb lots of liquid whole egg will remain contaminated immediately after pasteurization, albeit at generally low levels.

Another approach to simulating the effect of pasteurization considers each simulated vat to represent a population of vats with the same combination of processing conditions and mean pre-pasteurization pathogen levels. In this case, subtracting the log reduction due to pasteurization from the log contamination distribution yields an estimate of the mean level of post-pasteurization contamination per lot. Using this value to estimate the Poisson parameter (λ), the probability of a pathogen-free lot ($p(x = 0|\lambda)$) can be calculated directly from equation 1. The complement of this probability ($1 - p(x = 0|\lambda)$) is the likelihood that a lot remains contaminated (contains one or more pathogenic organisms) after pasteurization ($p(x>0|\lambda)$). Under this approach, if the difference between the log contamination and log reduction distributions is less than zero, there is still a non-zero probability of a contaminated lot in the population represented by the simulated vat. This probability becomes negligible, however, as the estimated mean level of residual contamination decreases. (If $\lambda < -0.16$ logs [an average of 0.69 SE per 10,000-lb lot], the probability of a lot containing no SE exceeds 50%.) The results obtained using this simulation approach suggests that 4% of 10,000-lb lots of liquid whole egg will remain contaminated after pasteurization under current regulatory requirements. In this instance, since the overlap between the simulated distributions estimating the pasteurization failure rate is essentially complete, the results obtained by the two modeling approaches are virtually indistinguishable, despite the slight difference in their central tendency (3% versus 4%).

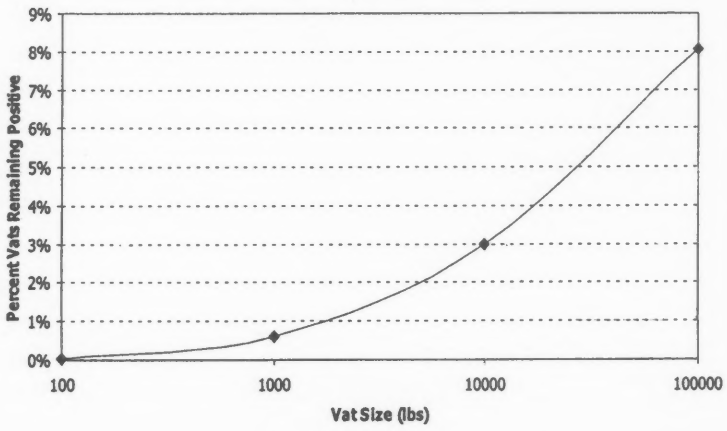
Whichever method is used to simulate the effect of pasteurization, the majority of lots predicted to remain contaminated after pasteurization contain levels of SE below the practical levels of detection, regardless of the sensitivity of the laboratory methods used. That is, the concentrations are so low that is highly unlikely that a small sample drawn from a contaminated vat would contain any SE. Figure 5 shows that the 10,000-lb lots predicted to remain contaminated after pasteurization contain a mean of 10.19 organisms, and 95 percent contain 43 organisms or less.

Sensitivity analysis indicates that the number of SE bacteria before pasteurization is positively correlated with the number of SE bacteria remaining in liquid egg after pasteurization *(4)*. This suggests that reduction of the number of bacteria in liquid egg prior to pasteurization will result in a reduction of bacteria after pasteurization. Plant sanitation, therefore, appears to be a promising means of reducing *Salmonella* in the final product. Sanitation techniques include washing and sanitizing of incoming eggs, preventing cross-contamination from breaking machinery, preventing contamination from machine operators, preventing contamination from airborne *Salmonella*, and preventing contamination from the surface of the shell during the breaking process.

Iso-safety curves: controlling the incoming load

Recall that 3 to 4% of lots of liquid whole egg are estimated to remain contaminated after pasteurization under current requirements. Note that if the incoming load of SE were controlled so as not to exceed the 3rd percentile of the pasteurization distribution at a given time and temperature combination, then the

Figure 7. Lot size-pasteurization failure rate relationship



performance of the time and temperature combination can result in no more than 3 percent of lots remaining contaminated after pasteurization. By simulating the efficacy of pasteurization of liquid whole egg at different time and temperature combinations, we can identify pre-pasteurization cut-points (maximum incoming logs of SE per lot) that yield performance no worse than the baseline scenario. Figure 6 presents three curves defined by combinations of time, temperature, and the maximum pre-pasteurization load predicted to result in no more than 3% of liquid whole egg lots remaining contaminated after pasteurization. At the current standard of 60°C for 3.5 minutes, for example, a maximum pre-pasteurization load of 4.74 logs would be predicted to result in no more than 3% contaminated vats post-pasteurization. All points along each of the three iso-safety curves shown in Fig. 6 are estimated to be equivalent in terms of the performance of pasteurization.

Lot size — pasteurization failure rate relationship

A complicating factor in this analysis is that the estimated failure rate under the current regulatory requirements is conditional on the assumed lot size (i.e., 10,000 lbs). Figure 7 illustrates that the pasteurization failure rate equivalent to that provided under existing time and temperature standards decreases with lot size. In part, this is a result of the increased likelihood of a vat being contaminated with increasing size of the lot considered. As shown in Figure 7, however, there is a non-linear relationship between lot size and the estimated pasteurization failure rate, with the failure rate asymptotically approaching zero as lot size decreases, i.e., the curve is physically constrained to pass through the origin. (Note that the x-axis in Fig. 7 is in log-scale, giving the impression of diminishing returns to decreased lot size. On a linear x-scale, the curve is increasing, concave down, with the failure rate constrained to be below 100% with increasing lot size.) Although a batch size of 10,000-lb is commonly used, a pasteurization failure rate equivalent to that provided under existing time and temperature standards would have to be recalculated on a plant-specific basis for breakers that use bulk tanks with different capacities. (The capacity of bulk tanks varies approximately from 1,000 to approximately 100,000-lb of liquid egg per tank) *(4)*.

Furthermore, the quantity of contaminated product generated, and therefore the extent of consumer exposure, is a function of both the failure rate and the volume of throughput. Consider, for example, one million lbs of raw egg divided in any of three ways: 10,000 lots of 100 lbs each, 1,000 lots of 1,000 lbs each, or 100 lots of 10,000 lbs each. However the entire volume is divided, if pasteurization fails to eliminate all pathogens in 3% of the lots, the net result is 30,000 lbs of contaminated product (comprised of 300, 30, and 3 contaminated lots, respectively). Consider another example: 100 lbs of product with an initial pathogen concentration of 3 logs/lb (or 5 logs per 100 lbs) are subjected to a 4 log lethality, resulting in a final pathogen concentration of –1 log/lb. This is equivalent to a 10% failure rate. Whether the total volume of product is divided into ten-10-lb containers (each with a mean contamination level of 4 logs) or one hundred-1-lb containers (each with a mean contamination level of 3 logs), the net result is a total of 10 pathogens surviving the kill-step applied to the 100 lbs of raw product. These examples are simplistic, but they underscore that, although it seems intuitive that small lot sizes are "less risky," making comparisons without considering the volume of throughput can be misleading with respect to the extent of potential human exposure.

As indicated previously, most lots of processed eggs that are estimated to remain contaminated after pasteurization under the baseline scenario would contain pathogens at concentrations below any reasonable likelihood of detection. Furthermore, the presence of low levels of pathogens in pasteurized egg products appear to pose minimal risk to public health under present conditions. Although *Salmonella* species are occasionally detected in pasteurized egg products, no outbreaks of SE from pasteurized egg products have been reported since the Egg Productions Inspection Act was passed in early 1970 *(4)*. Two explanations may account for the lack of reported *Salmonella* outbreaks from pasteurized egg products: (1) Much of the egg product produced is used in further processing, either in an institution setting or in a consumer's

home. Often this involves an additional heating process that kills most or all remaining *Salmonella*. (2) The number of SE remaining after pasteurization and any subsequent lethality step is below the dose likely to cause disease. If the egg product remains adequately refrigerated, then *Salmonella* species will not multiply, and the few remaining bacteria are diluted in a large volume of product *(4)*.

Nevertheless, low levels of pathogens in pasteurized egg products may pose a residual risk if the products are subjected to temperature abuse or if the subsequent product is consumed raw. Further, the performance of the current time and temperature requirements for egg albumen and blended egg products is estimated to be substantially lower than the performance of the current regulations covering pasteurized liquid whole egg and yolk products. For example, in comparison to the estimated reductions achieved under current minimum pasteurization requirements for liquid whole eggs, the current minimum time and temperature requirements for albumen (with pH = 8.3) yield an expected reduction in SE of less than 4 logs *(4)*. The dependence of pasteurization on albumen pH or blended egg product formulation adds additional complexity and flexibility in the context of developing and implementing performance-based standards.

DISCUSSION

The choice and design of food safety policy instruments is complex and subject to various constraints, including scientific uncertainty about risks and the efficacy of risk mitigations, the real-world consequences of asymmetric distribution of information, and the substantial transaction costs associated with regulatory development and implementation (*7, 11*). Under certain market conditions, plant-specific performance standards negotiated as alternatives to command-and-control regulations may reduce social welfare by lowering the production costs of relatively inefficient firms, thereby helping them to capture market share from more efficient firms. Moreover, because the high fixed costs of participation are more easily borne by large market leaders, negotiated performance standard-setting could result in increased market concentration *(1)*.

The complexity in the choice and design of policy instruments is particularly vexing when direct monitoring of outcomes is either technically infeasible or very costly, as is often the case for low probability-high consequence events. Under this class of probabilistic outcomes falls the low prevalence of high levels of some pathogenic bacteria in processed foods. Because of the low likelihood of detecting pathogens present at low concentrations via end-product testing, safety measures based on detecting the failure of process controls present the most promising means of limiting the risk of human exposure to foodborne pathogens. Designing reliable and enforceable process control measures is particularly thorny, however, in part because the linkage between conditions in food processing establishments and public health outcomes is mediated by a large number of variables in transportation, storage, distribution, preparation, and consumption. By comparison, there is a more direct relationship between the presence of an adulterant in a ready-to-eat food product and the risk of illness. In the context of the pasteurized egg products example, it would be extremely difficult and costly to establish a quantitative association between changes in the level and frequency of particular sanitation techniques in processing plants and the resultant incremental change in incidence of disease in consumers. Some parties also would likely find the level of associated precision unsatisfying, regardless of the analytical rigor used to obtain the estimate. It would be more straightforward, however, to establish that a combination of practices reliably maintains pathogen levels in raw product within specified tolerances and to design measures with a high likelihood of detecting failures of process controls.

While not nearly as prescriptive as technology-based design standards or time and temperature food processing requirements, lethality standards specifying a minimum log reduction of pathogenic microorganisms for ready-to-eat foods may not be regarded as pure performance standards. Lethality standards provide a degree of regulatory flexibility in that they do not prescribe the means of achieving the required level of inactivation. But lethality standards are correctly understood as flexible process standards because they fail to take into account the density of microbial pathogens in raw product. The end result of a 6.5-$\log_{10}$ reduction in *Salmonella* in cooked, uncured meat patties, for example, hinges entirely on whether the incoming raw ground beef contains 1 log or 7 logs of pathogenic microorganisms.

Time-and-temperature or lethality standards are typically developed through a process known as safety assessment, rather than probabilistic risk assessment. Safety assessment is based on an extreme ("worst case") scenario and the application of a margin of safety. For example, requiring lethality two logs higher than the assumed worst case exposure would appear to provide a "safety factor" of two orders of magnitude. A fundamental limitation of the "worst case" approach, however, is that in most instances the theoretical upper bound estimate is generally regarded as implausibly high. Consequently, analysts and stakeholders frequently engage in an unsatisfying and unresolvable argument about what set of conservative assumptions constitutes a 'reasonable' worst case exposure scenario. The worst-case approach also provides no means of evaluating the likelihood or magnitude of health risks.

The current federal guidelines for conducting regulatory impact analyses *(14)* state that in assessing regulatory benefits, extreme (i.e., "worst case") safety or health results should be weighted, along with other possible outcomes, by estimates of their probability of occurrence based on the available evidence to estimate the expected result of a proposed regulation. The guidelines acknowledge that in some cases, "the level of scientific uncertainty may be so large that a risk assessment can only present discrete alternative scenarios without a quantitative assessment of their relative likelihood." The primary attraction of lethality process standard approach is the simplicity of its administration for both the regulatory agency and the regulated community. The safety assessment approach is commonly used in various engineering fields where system failures are critical (e.g., aerospace, nuclear, electrical, computer, civil), and in many circumstances, simplifications such as the use of conservative (risk averse) default assumptions will be sufficient to inform reasoned risk management decisions made under uncertainty *(20)*.

Implementing the egg pasteurization performance standards would require substantial investments in monitoring incoming concentrations and/or demonstrating that pre-pasteurization process controls reliably maintain levels of pathogens below the maximum concentrations. As demonstrated by this work, implementation of food safety performance standards also presents significant analytical challenges. In the end, the choice of policy instruments and design of food safety standards are risk management decisions that involve tradeoffs. When sufficient empirical data are available, however, such decisions can be informed by probabilistic risk assessment that retains the risk management option of performance-based standards.

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SPECIAL REPORT

TWELFTH INTER-AMERICAN MEETING, AT THE MINISTERIAL LEVEL, ON HEALTH AND AGRICULTURE (RIMSA XII)

SÃO PAULO, BRAZIL

MAY 2-4, 2001

INCLUDING THE CREATION OF THE

PAN AMERICAN COMMISSION FOR FOOD SAFETY (COPAIA)

Beginning in 1968, the Pan American Health Organization (PAHO), acting also as the Regional Office for the Americas of the World Health Organization, convened bi-annual meetings, at the ministerial level, on animal health (RIMSA*). The purpose was to assist in and facilitate the coordination of the health and agricultural sectors in North, Central and South America. The Member Governments of PAHO ratified many RIMSA initiatives, such as the eradication of foot-and-mouth disease in South America, the elimination of rabies transmitted by dogs, and the regional program for technical cooperation in food safety.

With the view of strengthening intersectorial coordination, the 11th RIMSA meeting in 1999 decided to change its name to Inter-American Meeting, at the Ministerial Level, on Health and Agriculture, while retaining the well known acronym RIMSA. The first meeting of the "new" RIMSA, RIMSA XII took place from May 2 to 4, 2001 in São Paulo, Brazil. This historic meeting was attended by Ministers of Health and Ministers of Agriculture from 32 countries of the region to discuss policies to prevent and control foot-and-mouth disease, zoonoses (including bovine spongiform encephalopathy, BSE) and food safety.

Dr. Carlos de Souza Meirelles, Secretary of Agriculture of the State of São Paulo and the Brazilian Minister of Agriculture and Food Supply, Hon. Vinicius Pratini de Moraes opened the meeting. The Brazilian Minister of Health, Hon. Dr. Jose Serra gave a special presentation on the importance of world trade in food to public health and socioeconomic development.

The most important topic on the agenda of RIMSA XII was the proposal to create a Pan American Commission for Food Safety (COPAIA) as an advisory body to RIMSA. The purpose of this Commission is: (1) to contribute to improving the safety of food for domestic consumption and export by maintaining the political will of the countries of the region, (2) to set up integrated food safety programs as an essential function of the health and agriculture sectors, (3) to apply the technical aspects of the program, (4) to promote coordination with producers and consumers, and (5) to facilitate the execution of PAHO's regional plan for technical cooperation in food safety. The Commission will review and evaluate each country's progress in food safety and promote collaboration among countries in food safety. The Commission will be comprised of a minister of health and a minister of agriculture from each of the American subregions (i.e. North America, the Andean Area, the English-speaking Caribbean, Central America and the Latin Caribbean and the Southern Cone). In addition, representatives of producers and processors and of consumers of each subregion will serve on the Commission. The Pan American Institute for Food Safety (INPAZ), located in Buenos Aires, Argentina, will act as the Secretariat of the Commission, representing the Director of PAHO.

The creation of COPAIA is a truly historical event in as much as all countries of the Americas will now have to raise food safety to the highest political level. The Food Safety Initiative of the former United States President Bill Clinton served as model for COPAIA. The importance of the COPAIA is demonstrated by the fact that the President of Brazil, His Excellency Dr. Fernando Henrique Cardoso attended and addressed a special session to close RIMSA XII and to install COPAIA.

With the creation of COPAIA, the countries of the Americas have provided a model for the rest of the world on how to implement the WHO Food Safety Resolution of May 2000. The Resolution urges countries to integrate food safety into their public health and public nutrition functions and to provide adequate resources to establish and strengthen their food safety programs.

During the 1st session of COPAIA, immediately after the departure of President Cardoso of Brazil, as a representative of the International Association for Food Protection, I informed the members of COPAIA that IAFP was the largest non-governmental organization of food safety professionals and offered IAFP's support to the work of COPAIA.

This report was prepared by Dr. Fritz Käferstein, Distinguished Visiting Scientist, US Food and Drug Administration/Food Safety Inspection Service, Washington, D.C. Dr. Käferstein attended the RIMSA XII meeting as a representative of the International Association for Food Protection as well as invitee of PAHO and the Brazilian government.

* RIMSA is the acronym of the Spanish title of the bi-annual meetings

CALL FOR SYMPOSIA

IAFP 2002

JUNE 30–JULY 3, 2002

SAN DIEGO, CALIFORNIA

The Program Committee invites International Association for Food Protection Members and other interested individuals to submit a symposium proposal for presentation during the 2002 Annual Meeting, June 30–July 3, 2002 in San Diego, California.

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 Association 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 International Association for Food Protection office for receipt no later than July 16, 2001 or by presenting the proposal to the Program Committee at its meeting on Sunday, August 5, 2001 in Minneapolis, Minnesota. Proposals may be prepared by individuals, committees, or professional development groups.

The Program Committee will review submitted symposia and organizers will be notified in October 2001 as to the disposition of their proposal.

PRESENTERS WHO ARE NOT MEMBERS

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

ASSOCIATION FOUNDATION SPONSORSHIP

The International Association for Food Protection Foundation has limited funds for travel sponsorship of presenters. Symposia 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 per symposium. Organizers are welcome to seek funding from other sources and the Association will provide recognition for these groups in our program materials. Organizers are asked to inform the Association if they obtain outside funding.

HAVE AN IDEA BUT YOU ARE UNABLE TO ORGANIZE IT?

Many Association Members have excellent suggestions for symposia 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. Symposia topics are among the most valuable contribution an Association Member can make to assure the quality of our Annual Meeting.

WHO TO CONTACT:

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SYMPOSIUM PROPOSAL

IAFP 2002

JUNE 30–JULY 3, 2002

SAN DIEGO, CALIFORNIA

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 16, 2001 to:

International Association for Food Protection
Symposium Proposal
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2863, USA

Submit in person
on August 5, 2001 to:

Program Committee
Hilton Minneapolis
Minneapolis, MN

or Contact:

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Milwaukee

New Sustaining Member

Axel Dellenbusch
EM Science
Gibbstown, NJ

UpDates

Robert E. Brackett Named FDA's Center for Food Safety and Applied Nutrition's Director of Food Safety

The Food and Drug Administration's (FDA) Center for Food Safety and Applied Nutrition (CFSAN) has announced the appointment of Robert E. Brackett, Ph.D., as the center's food safety director.

In this position, Dr. Brackett will provide leadership for FDA's food safety work, overseeing all aspects of food safety across the broad range of FDA's food safety responsibilities.

Dr. Brackett currently serves as a senior microbiologist in CFSAN's Office of Plant and Dairy Foods and Beverages where he manages food safety issues related to these products. Prior to coming to FDA, Dr. Brackett was a professor of food science and technology in the Center for Food Safety and Quality Enhancement at the University of Georgia, where he was an active researcher in food microbiology, specializing in the microbiological safety of foods.

A native of Wisconsin, Dr. Brackett is a graduate of the University of Wisconsin-Madison where he received his B.S. degree in bacteriology, and M.S. and Ph.D. degrees in food microbiology.

He is an active member of the American Society for Microbiology, the Institute of Food Technologists, and is also a past president of the International Association for Food Protection.

In addition to serving on a variety of committees of various professional scientific organizations, Dr. Brackett has served as a member of the editorial boards for *Applied Environmental Microbiology*, *Journal of Food Science*, and *Journal of Food Protection*, and routinely reviews manuscripts for several other food safety related scientific journals.

Vega Joins Bell Laboratories, Inc. as Technical Representative

New to the sales staff, Edgardo Vega joins Bell Laboratories, a manufacturer of rodent control products, as its southern technical representative. In his new post, Vega advises distributors and pest management professionals through individual consultations and trade shows. He also visits rodent infestation sites with PMPs, providing technical assistance.

Backed by strong business and science backgrounds, Vega holds an MBA in marketing from the University of South Florida in Tampa, FL. He also earned a bachelor of science degree in bioengineering from Syracuse University in Syracuse, NY.

Before joining Bell, Vega developed his technical sales skills working for The Cardinal Companies, Morton International and IOL International where he grew sales internationally in Latin America, South America and the Caribbean. He held the post of sales manager in each company and has over eight years of technical sales experience.

Steve Gill of Gills Onions Elected Chairman of International Fresh-cut Produce Association

Steve Gills, president of Gills Onions, Oxnard, CA was named the new chairman of the Board of the International Fresh-cut Produce Association (IFPA) during the Association's 14th Annual Conference & Exhibition in Phoenix. Gill succeeds chairman Lorri Koster, who was most recently director of marketing for World Commerce Online in Salinas, CA.

The association also announced its 2000-2001 Officers and Board of Directors. In addition to Gill's election to chairman, Lorri Koster stays on as past chairman; Kelly Dietz, Bakersfield, CA, becomes vice-chairman; and Craig Delaney, Irwindale, CA, becomes secretary-treasurer.

The following industry leaders also were elected to sit on the Board of Directors: Graham Alexander, Lincolnshire, UK; Paul Battaglia, Norfolk, VA; Carey Cooper, Franklin Park, IL; Nicholas Da Costa, Salinas, CA; Alan Heinzen, Gilroy, CA; Steve Karr, Ontario, Canada; Ron Ouwenga, Kankakee, IL; Philip Riggio, Detroit, MI; and Ken Silveira, Salinas, CA.

Sloan Valve Company Appoints Bill Madison as Northeastern Regional Sales Manager

Bill Madison has been appointed northeastern regional sales manager for Sloan Valve Company, the Franklin Park, IL based plumbing manufacturer.

Mr. Madison will be responsible for managing the sales growth for Sloan in the northeastern United States, which includes working with national manufacturer's rep organizations who represent Sloan Valve, as well as key accounts.

Prior to his newly appointed position, Bill served as a manufacturer's sales representative for Edwards, Platt, & Deely, a Sloan sales representative. He also

spent six years with Watts Industries as a steam and hydronics product manager. Mr. Madison has a BS degree in Marine Engineering from the US Merchant Marine Academy.

Campbell, Griswold and Sprangers Promoted at Copesan

Tom Moore, president of Copesan, announced the following appointments and changes.

Mike Campbell, formerly vice president of operations, will assume the responsibilities of the newly created position, vice president of national accounts. In his new role, Mike will directly oversee both the sales and operations departments for the national accounts division. He will continue to report directly to the president.

Carl Griswold, former general manager of Wil-Kil Pest Control (a Copesan Partner based in Madison, WI), will re-join Copesan as director of operations for national accounts.

Scott Sprangers has been promoted from corporate strategic account manager to national sales manager for Copesan. Scott's primary responsibility will be to direct the efforts of Copesan's strategic account managers and partner sales force.

Davis and Wosje Elected by American Dairy Products Institute

Mark Davis, Davisco Foods International, Inc. Le Sueur, MN, was elected president of the American Dairy Products Institute during the association's Annual Meeting held in Chicago. Davis, a member of the ADPI Board of Directors since 1992, has served on the Institute's Executive Committee since 1996; he served as ADPI vice president in 1999 and 2000. Davis succeeds Dr. Lee E. Blakely, Land O'Lakes, Inc., Arden Hills, MN.

Elected as vice president was Walt Wosje, Novi, MI. Wosje was first elected a director of the American Dairy Products Institute in 1988.

Other officers elected to head the association were: secretary, Phillip Dale Smith, Denver, CO and treasurer, Dr. Richard W. Stammer, Lawrence, MA.

Elected to serve as members of the Institute's executive committee were the above-named officers directors: Lee E. Blakely, Arden Hills, MN; Donald L. Brick, Davenport, IA; Bob L. Hall, Batavia, NY; Ken McMahon, Ellsworth, WI; Harlan H. Mammen, New Ulm, MN; Rick Kaepernick, Hilmar, CA; William J. Merrick, Middleton, WI; Harold A. Schild, Tillamook, OR, Robert L. Shore, and John F. Underwood, Seattle, WA.

The following individuals were newly elected to serve as directors of the Institute: Richard Bradfield, St Louis, MO; James A. Gomes, Fresno, CA; David Lenzmeier, St. Paul, MN; Sam McCroskey, Kansas City, MO; and, Gerald L. Reilly, Tampa, FL.

Bruce Smith Promoted at Fristam Pumps

Fristam Pumps, Inc. is pleased to announce the promotion of Bruce Smith to the position of North American sales manager. In his new assignment, Bruce will manage all outside sales activities, new business development and market channel development for Fristam in the United States and Canada.

Bruce has been with Fristam Pumps for 7 years as a regional sales manager. Prior to joining Fristam, he was a sales manager at Anderson Instrument Company. He holds a B.A.degree from Hope College of Michigan and a masters degree from Florida State University.

ConAgra's Dr. R. Bruce Tompkin Wins 2001 NFPA Food Safety Award

Dr. R. Bruce Tompkin, Vice President for Food Safety, ConAgra Refrigerated Prepared Foods, is this year's recipient of the National Food Processors Association (NFPA) Food Safety Award in recognition of his dedication and many contributions to improving food safety. Dr. Tompkin will be presented the award at the Annual Meeting of the International Association for Food Protection (IAFP), August 5-8, 2001 in Minneapolis, MN.

"The hallmark of Dr. Tompkin's career is his commitment to sharing his extensive food safety knowledge and expertise with colleagues throughout industry. For more than 35 years, Dr. Tompkin's active participation in the committees and councils of leading trade, professional and international organizations, and his publication of more than 140 scientific articles, reports and abstracts, have contributed to a safer food supply for consumers worldwide," said Jenny Scott, IAFP President and Senior Director in the NFPA Office of Food Safety Programs.

Dr. Tompkin is widely recognized for his accomplishments in the control of *Listeria monocytogenes*, the development of HACCP principles and the establishment of Food Safety Objectives through his work on the National Advisory Committee on Microbiological Criteria for Foods and the International Commission on Microbiological Specifications for Foods.

Dr. Tompkin earned a B.S. in zoology from Ohio University and an M.S. in bacteriology and Ph.D. in microbiology from Ohio State University. He joined Swift & Company as a research microbiologist in 1964 and established his reputation for innovation and initiative during more than 35 years with the company, according to his colleagues. With the encouragement of his company, he has developed numerous short courses to educate food safety professionals outside his own company and to benefit the food safety practices of the broader food industry.

"On behalf of NFPA and all our members, I congratulate Dr. Tompkin for this well-deserved distinction and for his many accomplishments that have done so much to enhance and ensure the safety of the food supply," said John R. Cady, NFPA President and CEO.

International Association for Food Protection®

NEWS

Maricopa County, Arizona Wins 2001 Crumbine Award

The Samuel J. Crumbine Consumer Protection Award jury has announced that Maricopa County Environmental Health in Phoenix is the 2001 winner of the prestigious annual award. The jury, comprised of leading environmental health officials and public health sanitarians, selected the winner on May 5, 2001 in Washington, D.C.

The Crumbine Award, named for one of this century's most renowned public health sanitarians, is presented each year to a local public health agency that demonstrates excellence in food protection. Agencies who win the Crumbine Award become model programs for other local public health agencies across the nation. Among environmental health and public health circles, the Crumbine Award is the most prestigious recognition that a public health agency can receive.

"This year's jury is pleased to present the 2001 Samuel J. Crumbine award to Maricopa County Environmental Health," said Tommye Schneider, director of environmental health & laboratories for the Madison Department of Health in Wisconsin and chairwoman of the 2001 Crumbine jury. "Although Maricopa County's food protection program is challenged to provide services to a large and fast-growing population, there is a strong commitment to provide quality food protection services to the community."

The Maricopa County Environmental Health's application was chosen among eight entries. "Some of the highlights of this program include solid epidemiology capacity, activities that bring consistency to inspections such as the Chain Food Program; industry partnership, such as the HACCP Alliance; consumer education, such as the Serve It Safe Arizona Alliance; and the Web page which can be accessed to provide information on inspections," explained Schneider.

Maricopa County Environmental Health will receive the Crumbine Award at the Annual Education Conference of the National Environmental Health Association to be held on Saturday, June 30 in Atlanta. Award presentations will also be made at the annual meetings of the National Association of County and City Health Officials to be held in Raleigh on June 28, and the International Association for Food Protection Annual Meeting on August 8 in Minneapolis.

In addition to IAFP, NACCHO, and NEHA, other sponsors of the Crumbine Award include the

Conference for Food Protection, the American Academy of Sanitarians, American Public Health Association, Association of Food & Drug Officials, Foodservice & Packaging Institute Inc., International Food Safety Council, National Sanitation Foundation International, and Underwriters Laboratories Inc.

Alice L. Johnson Joins NFPA as Vice President, Food Safety Programs

Alice L. Johnson, DVM, has joined the National Food Processors Association (NFPA) as vice president of food safety programs. In this position, Dr. Johnson will direct the Association's food safety activities related to food inspections, Hazard Analysis Critical Control Point (HACCP), and crisis management.

Dr. Johnson comes to NFPA from the National Turkey Federation (NTF) where she was vice president of scientific and regulatory affairs. At NTF, Dr. Johnson directed the implementation of new government and industry initiatives such as the FSIS Pathogen Reduction/HACCP and the NTF Environmental Guidelines.

"We are delighted to have Dr. Johnson as part of NFPA's Scientific and Regulatory Affairs staff," said the division's executive vice president, Dr. Rhona Applebaum. "Dr. Johnson's strong expertise and leadership abilities, coupled with her outstanding practical experience and reputation in the scientific policy community, make her an invaluable addition to our food safety team."

Prior to joining NTF, Dr. Johnson was director of scientific and technical affairs at the American Meat Institute (AMI), responsible for implementing the USDA Pathogen Reduction/Hazard Analysis Critical Control Point (HACCP) food safety final rule and directing the AMI Turkey Inspection and Scientific Advisory Committees.

Dr. Johnson's experience also includes an 11-year tenure at USDA where she served as member of the HACCP special team, developing the food safety concept for use in the meat and poultry industry.

Dr. Johnson received her undergraduate degree in biology from Pfeiffer College and her doctorate in veterinary medicine from Tuskegee Institute. NFPA is the voice of the $460 billion food processing industry on scientific and public policy issues involving food safety, nutrition, technical and regulatory matters and consumer affairs.

Antibiotic-resistant Genes Traced from Farms to Groundwater

Genes resistant to tetracycline have been found in groundwater as far as a sixth of a mile downstream from two swine facilities that use antibiotics as growth promoters. The finding is significant in part because it shows the potential for spreading resistance back into the food chain of animals and people, researchers say. United States' farmers for more than 50 years have used tetracycline and other antibiotics to enhance the growth of livestock. In humans, an overuse of antibiotics is blamed for a growing resistance to many antibiotics, and agricultural use has been suspected in the spread of resistance genes. The European Union is phasing out such agricultural use; Sweden banned it in the 1980s.

Researchers from the University of Illinois and Illinois State Geological Survey used a DNA-amplification technique (polymerase chain reaction or PCR) to analyze samples from lagoons, wells and groundwater on and near two Illinois facilities, said Rustam I. Aminov, a visiting professor of animal sciences at the U of I. Their research appeared in the April issue of *Applied and Environmental Microbiology*. Aminov had reported his creation of primers for use with PCR to detect resistance genes in the environment earlier this year in the same journal. In the earlier paper, he also reported the detection of resistance genes in livestock intestines and feces and in commercial feed.

"The use of tetracycline on farms is pushing the evolution of these genes. We found tetracycline resistance genes in soil and groundwater bacteria. The genes are transferred to this type of bacteria, where they can survive and travel long distances in the environment. It has been suggested that there is horizontal transfer of antibiotic resistance genes, but we had only seen it in laboratory experiments, not in in-situ studies. Here, we see such a transfer is occurring in the environment," Aminov said

The researchers were able to identify the trail taken by the resistance genes. The DNA fingerprints in the samples matched the resistance genes previously identified in livestock and feed.

"These genes were found to be predominant in the gastrointestinal tracts of pigs and steers. The elevated frequencies of these genes in the environment surrounding the farms were consistent with the hypothesis that this occurrence was the result of gene flow from the animals," the authors wrote.

"Once resistance genes make their way into drinking water, they will find their way into the guts of the people, animals and wildlife that drink it. We are potentially passing on resistance in a continuous gene cycle in the environment," Aminov said.

The five-member research team consisted of Aminov and Roderick I. Mackie, a professor of animal sciences; Natalie Garrigues-Jeanjean, a post-doctoral researcher in veterinary pathobiology; J.C. Chee-Sanford, now with the USDA; and Ivan J. Krapac of the State Geological Survey.

ARS Scientists Working to Reduce Poultry Crop Breaks

Two Agricultural Research Service scientists are helping to reduce the chances that poultry will become contaminated by disease-causing bacteria during processing.

Physiologist R. Jeff Buhr and agricultural engineer J. Andra Dickens of the Richard B. Russell Research Center in Athens, GA, are currently conducting research to reduce breakage of the bird's crop, a pouch in the neck that stores undigested feed.

Rupturing of the crop is a significant source of contamination during processing, because it can harbor pathogens such as *Salmonella*. The crop is always removed during processing, but it breaks about 25 percent of the time, spilling its contents into and on the chicken.

Buhr and Dickens found two related factors that have bearing on whether crops rupture: the direction in which the crop is removed, and the age of the bird at the time of processing. Both factors determine the amount of pressure needed to extract the crop.

For four-week-old broilers, the researchers found it took 2.72 kilograms of pulling pressure to remove the crop, whereas at eight weeks of age, 4.27 kg of pressure was required – a 157 percent increase.

The standard method of pulling the crop from the carcass through the thoracic (chest) cavity also requires greater pulling pressure. Buhr and Dickens found that taking the crop out through the neck resulted in 95 percent of the crops being removed intact. In contrast, only 64 percent of the crops removed through the thoracic cavity exited without rupturing.

It is too early to recommend changes to the processing industry because the laboratory conditions may not carry through to a commercial setting, according to the scientists. In the laboratory, the crop extractions were done manually and not in the automated fashion of poultry processors. But with a 95 percent intact rate when crops were extracted through the neck, this alternative method should be given consideration in automated commercial evisceration systems, according to Buhr.

World Health Organization (WHO) Surveillance Program for Control of Foodborne Infections and Intoxications in Europe

The Program for Surveillance of Foodborne Diseases in Europe was launched by the WHO Regional Office for Europe in 1980, with the participation of 8 countries.

Currently under the responsibility of the WHO European Centre for Environment and Health, the Program is managed by the Institute for Health Protection of Consumers and Veterinary Medicine (BGVV), a FAO/WHO Collaborating Centre for Training and Research in Food Hygiene and Zoonoses located in Berlin, Germany. The number of participating countries has steadily increased and reached 51 as of December 1998.

The Program is non-mandatory and based on surveillance activities at the national level. Each country has designated a National Contact Point, providing country data to the Program through standardized reporting forms.

The following information and data are reported:

(1) number of ill persons;
(2) causative agent;
(3) type of food;
(4) place where food was consumed;
(5) place where food was acquired;
(6) place where food was contaminated; and
(7) factors contributing to outbreak.

The national sources of this information are: (a) statutory notifications (cases reporting); (b) reporting of investigated outbreaks; (c) laboratory reports; (d) special surveys.

Statutory reporting merely counts the number of patients while reports on foodborne disease outbreaks normally provide epidemiological background information. This information is necessary for the implementation of appropriate control measures.

The Berlin Centre compiles all national data-producing reports available to all interested institutions within and outside Europe. The 7th Report of the Surveillance Program, covering the years from 1993 to 1998, is now available online at: www.bgvv.de/publikationen/who/7threport/7threp_fr.htm.

USDA Report on Product Liability and Microbial Foodborne Illness

This report examines how product liability law treats personal injuries attributed to microbially contaminated foods. The risk of lawsuits stemming from microbial foodborne illness and the resulting court-awarded compensation may create economic incentives for firms to produce safer food.

It is not known how many consumers seek compensation for damages from contaminated foods because information about complaints and legal claims involving foodborne illness is not readily accessible, especially for cases that are settled out of court.

Reviewing the outcomes of 175 jury trials involving foodborne pathogens, the analysis identifies several factors that influence trial outcomes, while noting that the awards won by plaintiffs tend to be modest.

This report is available at the USDA Web site: www.ers.usda.gov/publications/are799/.

Proctor & Gamble Discontinues Fit Fruit & Vegetable Wash

The Procter & Gamble Company announced plans May 17 to discontinue its Fit Fruit & Vegetable Wash and Professional Line Fit Antibacterial Produce Cleaner in the United States, Canada and Mexico effective September 28, 2001. "Fit was reviewed and evaluated against our entire portfolio of established brands and upstream initiatives. We have concluded that the overall at-home and foodservice produce rinse market is currently too small for Proctor & Gamble," said Proctor & Gamble Professional Relations Manager Kay Puryear in a letter to United Fresh Fruit and Vegetable Association (United).

"United respects Proctor & Gamble's decision, and applauds the company for its integrity in that it never chose to market FIT by inflaming fears or concerns about produce safety. They chose a responsible course in their marketing, when a fear campaign might have produced greater consumer sales," said United President Tom Stenzel.

"While many of us in produce were concerned about the entire category of produce rinses and how they might be promoted, Proctor & Gamble always worked openly and responsibly with our industry. While FIT sales may not have met their business goals, our industry needs to recognize that a sizeable group of consumers did show interest in washing their produce with an added cleaner. We need to address their concerns too, and continue to constantly improve the quality and cleanliness of products we deliver to the consumer at retail and foodservice. Consumer confidence is critical to growing consumer consumption," Stenzel continued.

Ms. Puryear thanked United, and industry colleagues, for the dialogue and contributions made throughout the development of Fit and noted that the produce industry's "constructive feedback helped us make changes in our marketing approaches."

"We encourage Proctor & Gamble to continue to bring its significant research capability to developing new tools for the produce industry from field to processing and distribution that can help us always improve the quality of the products we bring to consumers," concluded Stenzel.

Outbreak of Cryptosporidiosis in Northern Ireland

Twelve cases of cryptosporidiosis were reported to the Eastern Health and Social Services Board in Northern Ireland in the first week of April, and 21 more the following week. These weekly totals were considerably greater than would be expected in April. Most of the cases lived in an urban area, and few had been abroad or had had contact with animals. By mapping postcodes of laboratory confirmed cases against water supply zones it was found that the attack rate among those served by the Dunore water treatment works only was 2.8/10,000 population compared with 0.14/10,000 in those who receive water from other sources. Similar investigations in the adjacent Northern Board into a rise in reported cases of cryptosporidiosis over the same time noted similar attack rates in those receiving water from this water treatment works. By April 25 there was a total of 110 confirmed cases within the Dunore supply area.

The Dunore water treatment works uses slow sand filtration and supplies some 100,000 properties in the Greater Belfast and south Antrim areas, which includes parts of the population of the Eastern and Northern Boards.

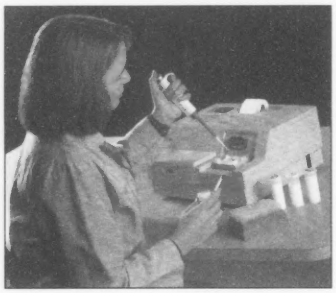
Cryptosporidiosis has not been associated with this water treatment works before. Daily monitoring of continuous water samples in part of this supply area began on February 24: oocyst counts varied between 0 and 0.62/10L up to April 21. Small peaks were noted over a four-day period at the end of February (max 0.22 oocysts/10 l), over a seven-day period in mid-March (max 0.41 oocysts/10 l) and March 29 (0.62 oocysts/10 l).

Allowing for an average seven day incubation period these would approximately correspond to the peaks noted in the epidemic curve. Twenty-five of the positive fecal specimens examined so far have been *Cryptosporidium parvum* genotype 1 and four *C. parvum* genotype 2. All the genotype 1 specimens have been identified from patients living in the affected supply area of both health boards.

A detailed investigation has shown that a blocked drain at the water treatment works may have allowed the entry of a small quantity of untreated water into the filtration system. Remedial action at the water treatment works was completed on April 22.

The outbreak control team managing the incident reminded the public, hospitals, and general practitioners of previous expert advice that all water, from whatever source, that might be consumed by people with impaired immunity should be brought to the boil and allowed to cool before use.

Industry Products



IDEXX Laboratories

IDEXX Laboratories Announces US FDA/CVM Approval of Parallux™ Milk Residue Testing System

IDEXX Laboratories, Inc. has announced that its Parallux™ milk residue testing system received US FDA/CVM approval Friday, May 11, 2001, and has been approved for testing under National Conference on Interstate Milk Shipments (NCIMS) Appendix N. This innovative new technology offers milk processors a faster, more automated way to screen for antibiotic residues with unprecedented speed and accuracy.

The following 6 assays have been approved:

Parallux™ Beta Lactam Assay
Parallux™ Pen/Ceph 2X Assay
Parallux™ Cillins Assay
Parallux™ Cephapirin Assay
Parallux™ Ceftiofur Assay
Parallux™ Cloxacillin Assay

Using a semi-automated platform that requires just two simple hands-on steps and provides results in only four minutes, these assays demonstrate the power and flexibility of the Parallux milk residue testing system to meet both milk industry and FDA/CVM and NCIMS requirements.

"The Parallux Beta Lactam Assay is the only rapid residue test in the world that can detect all six beta lactam antibiotic residues at FDA/CVM tolerance/safe levels in a single test," said Mark Hengerer, dairy product manager for IDEXX. "The Parallux system also has an improved sensitivity profile detecting drugs closer to FDA tolerance/safe levels. Using Parallux gives milk processors a better means of protecting milk supplies and helps them avoid having to reject milk deemed safe for human consumption." In addition, the Parallux system identifies which drug or drug family is in the milk, assisting in the traceback of positive samples.

IDEXX Laboratories, Inc., Westbrook, ME

Reader Service No. 280

EPA Approval Allows Ecolab to Offer Foot & Mouth Disinfectant Solution

The EPA has granted approval of a product from Ecolab Inc., that will help all livestock producers and owners in the United States protect their livestock against potential infection by Foot & Mouth disease. The recent outbreak of the disease has severely damaged the agricultural industry of several European and South American countries. Attempts are being made to limit its spread throughout other parts of the world.

The product, Oxy-Sept® 333 (EPA Reg. No.1677-129), is an anti-microbial disinfectant used in housing facilities and other sources of cross contamination. Formulated for rapid soil penetration and disinfecting properties, its effectiveness is based on a stabilized peroxyacetic acid formulation.

"As a technology, peroxyacetic acid has been known for its effective disinfecting and sanitizing applications for some time. Ecolab expanded the applications of this material into several areas in the food safety arena," says Chris Sigurdson, agri senior marketing manager, Ecolab. "It is already used in processing plants to protect vegetables, dairy products, red meat, and beverages. This new approval takes our program to the next level by offering a new biosecurity solution for food animal producers."

Oxy-Sept 333 is an effective disinfectant against bacteria and viruses. It controls a wide range of pathogens, including: *Salmo-*

nella chloraesius and Enteriditis, *Staphylococcus aureus*, *Enterobacter*, *Pseudomonas aeruginosa*, *Listeria monocytogenes*, *E. coli*, as well as viruses such as several types of Influenza A (H10N7), Newcastle Disease virus, Infectious bovine rbinotracheitis (IBR), and now Foot & Mouth disease (Aphthovirus).

"In the past, food animal producers and livestock owners have concentrated their disease-prevention efforts around animal vaccination and treatment, which are of course crucial elements of disease control. But without a solid environmental sanitation program in place, were potentially leaving too many open doors for disease transmission," Sigurdson added.

Ecolab Inc., St. Paul, MN

Reader Service No. 281

Parker Hannifin Corporation's New Technology Produces Pure Nitrogen Gas from Compressed Air

Eliminate dangerous, costly, inconvenient nitrogen gas cylinders and Dewars with a new compact Balston® Nitrogen Gas Generation System now available from Parker Hannifin Corp.

The Nitrogen Generator produces up to 150 SCFH of compressed nitrogen on site at purities of up to 99.5% and 872 SCFH at 95% purity. This system utilizes proprietary membrane separation technology. The membrane divides the compressed air feed gas into two streams: one is 95% to 99.5% pure nitrogen, and the other is oxygen-rich with carbon dioxide and other trace gases.

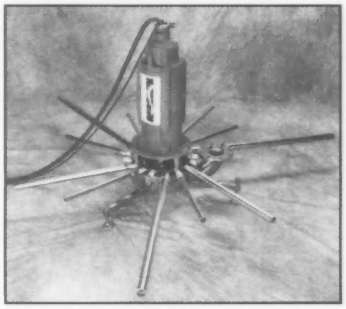
The generator is a complete system comprised of carefully matched components engineered for easy installation, operation and long term reliability. Standard features include: high efficiency coalescing prefilters with automatic drains, an activated carbon filter, and a 0.01 micron membrane final filter.

The product line is ideal for OEM design engineers using nitrogen gas on board their equipment.

Typical applications include: purging or testing of tanks and vessels, solvent blanketing, food processing and packaging, storage of perishables, packaging, chemical transferring, sparging and mixing, etc.

Parker Hannifin Corp., Tewksbury, MA

Reader Service No. 282



Aeromix Systems, Inc.

Aeromix Hurricance Submersible Aerator Increases Efficiency by 22%

With the addition of a new impeller, the self-aspirating Hurricane aerator from Aeromix Systems, Inc. now provides 22% more oxygenation. Available in sizes up to 100 horsepower (75 kw), the impeller is machined from a single piece of 17-4 stainless steel and hardened to Rockwell 45°C. This high efficiency, non-fouling impeller provides greater abrasion and corrosion resistance.

Capable of radial aeration in a full 360° range, the Aeromix Hurricane aerator incorporates new air diffusers specifically designed for high oxygenating efficiency and thorough mixing over a wide area. These self-contained aerators give the user inexpensive installation, requiring no additional pumps, mounting platforms or compressors. Self-aspirating down to a depth of 24 feet below the surface, the Hurricane aerators eliminate the need for an external blower in most application.

These submersible aerators all feature motors that include high reliability moisture detectors and thermal protection. They are explosion proof and feature commercially available bearings and seals for reduced downtime for maintenance.

The Aeromix Hurricane aerator is available in sizes ranging from 2 to 100 horsepower with submersible electric motors directly coupled to the impeller and connected to a stationary stainless steel draft tube complete with an air inlet filter. Each unit is tested at the factory for proper assembly and operation before shipment.

Aeromix Systems, Inc., Minneapolis, MN

Reader Service No. 283

Copesan Gets Physical on Pests

Copesan, a provider for pest management services to the food industry through its Signature Care™ Food Processing Pest Management Program, recently released a new video as part of their award-winning Signature Care™ Video Training Series entitled "Physical Pest Management Practices."

"Many food industry professionals feel that they can't do their job without pesticides," said Ole Dosland, Copesan's director of technical training & education.

"There are solutions. Many of them are what we call physical controls. Physical controls are those direct or indirect measures, such as heat, cold, humidity, sound, lighting, air movement and inert gases that are utilized to destroy pest populations outright or to make their environment unsuitable for their survival."

"Physical Pest Management Practices" is the fifth video in the Signature Care™ Video Training Series for Food Industry Pest Management collection to be released. This 28-minute training video covers numerous tactics of manipulating the physical environment in a manner that will prevent the growth of pest populations, causing them to leave or die.

Copesan, Brookfield, WI

Reader Service No. 284

Palmer "Fearless® Under Pressure" Gauges from the Instrumentation Group

Palmer Instruments, Inc. of Asheville, NC introduces the new Fearless® Under Pressure brand of pressure gauges. These rugged, long-lasting, and accurate instruments offer all the advantages of liquid-filled pressure gauges with none of the disadvantages commonly associated with shipping, storing, installing, calibrating and maintaining wet gauges.

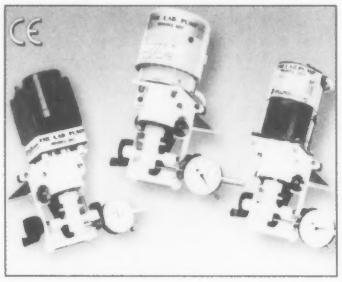
Fearless® pressure gauges employ a special damped movement designed to produce steady pointer action and sharp, legible readings even under the worst vibration and pulsation conditions. The result is a low-maintenance dry gauge that performs like a wet gauge. Fearless® gauges cannot leak during storage and shipment. Since there is no fill media, crystal fronts can be removed for calibration or replacement purposes while still in situ. The new Fearless® gauges eliminate any possibility of messy cleanup or product contamination as a result of leaking fill media.

Fearless® Under Pressure gauges are available from Palmer in three styles, providing the proper instrument for almost any application. Type "SF" All-Stainless Steel gauges with the damped Fearless® movement are offered in a full range of 2", 2-1/2", 4", 6" and 10" sized cases. A bayonet-type case/ bezel ring design yields a watertight and rugged gauge.

Type "FF" Fearless® gauges also utilize all-stainless construction and provide the additional feature of a solid front, blow-out-back case designed for maximum personnel safety in high pressure applications. The Fearless® "safety front" design places a welded partition between the gauge's movement and its dial face. Type "FF" gauges are available in 2-1/2", 4", or 6" case size.

Palmer Instruments, Inc., Asheville, NC

Reader Service No. 285



Fluid Metering, Inc.

Fluid Metering, Inc. Precision Metering Pumps Awarded "CE" Mark

Fluid Metering, Inc. now has available Metering Pumps & Dispensers that meet the "CE" compliance standards.

The three models include the Model QG which is designed for low flow rates from 0.015 ml/min up to 512 ml/min. The Model QD is a High Speed Drive with flow rates from 4 ml/min up to 2,200 ml/min. The Model QSY is a Synchronous Drive which provides exceptional accuracy and a range of 0.18 ml/min to 92 ml/min. The QSY is ideally suited for low and medium pressure preparative chromatography.

FMI's CeramPump® design features one moving part and an inert ceramic and fluorocarbon fluid path for precision fluid control. The CeramPump design uses sapphire hard, dimensionally stable ceramic components for long term, drift free dispense precision of 0.5% over millions of cycles.

FMI Pumps are available with many drive choices to provide flow rates from 2µl per dispense up to 4 liters per minute continuous flow.

Fluid Metering, Inc., Syosset, NY

Reader Service No. 286

Sigma-Aldrich Announces Ezview™ Red Affinity Gels for Immunoprecipitation

Sigma-Aldrich Corporation has developed EZview™ Red Affinity Gels (patents pending) to facilitate immunoprecipitation, a method commonly used to study protein expression, modification and protein-protein interactions. The EZview products complement Sigma-Aldrich's position in antibodies, antibody-conjugates and affinity resins for the detection, selection and purification of epitope-tagged recombinant proteins.

EZview Red Affinity Gels are red-colored agarose affinity beads, which are more clearly visible than standard, non-colored

agarose affinity beads used in molecular pull-down applications. Sigma currently offers two types of EZview affinity gels, EZview Red Protein A Affinity Gel and EZview Red ANTI-FLAG® M2 Affinity Gel, which have enhanced visibility and performance equal to non-colored affinity gels used for immunoprecipitation.

Sigma's EZview Red Affinity Gels demonstrate improved visibility, which reduces the possibility of accidental pellet aspiration during wash steps. This improvement results in higher quality, more reproducible data. Most immunoprecipitation procedures have a number of washing steps, during which an affinity gel with specifically bound proteins undergoes centrifugation, and the resulting supernatant is aspirated from the affinity gel pellet. Unfortunately, most non-colored affinity gel pellets are whitish or translucent, making them very difficult to see in small polypropylene centrifuge tubes. Inadvertent aspiration of all or part of the gel pellet along with the supernatant is a very common problem, resulting in a loss of valuable data.

Sigma-Aldrich Corporation, St. Louis, MO

Reader Service No. 287

NEMA SCA&I Cardiovascular Fluoroscopy Benchmark Phantom from Nuclear Associates

Nuclear Associates' innovative NEMA SCA&I Cardiovascular Fluoroscopy Benchmark Phantom (model 07-680) is a new class of phantom specially developed for effectively evaluating your fluoroscopic system.

The development of the NEMA SCA&I Cardiovascular Fluoroscopy Benchmark Phantom was initiated by the Society of Cardiac Angiography and Interventions (SCA&I) to establish a series of benchmarks for imaging system performance-based or phantom testing. The NEMA Phantom is the very first phantom design that represents a joint consensus among cardiologists, medical physicists, service engineers and technical staff from all of the major original equipment manufacturers of imaging systems.

The benefits of the NEMA SCA&I Cardiovascular Fluoroscopy Benchmark Phantom are undeniable. Phantom and test procedures simulate a range of fluoroscopically-guided invasive and interventional procedures; provides simultaneous objective measurements of image quality and phantom entrance dose; test results characterize the performance of the complete system under simulated clinical conditions; and all tests are performed using the imaging system configured for normal clinical use.

Nuclear Associates, Carle Place, NY

Reader Service No. 288

$100,000

We reached our goal of $100,000 for the Foundation Fund, but we are not done yet. We want the Foundation to contine to grow and be able to support the IAFP mission. Your past support is appreciated; your future support is needed!

Thanks to the following individuals for their support of the IAFP Foundation

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- Ulf Ahlin
- Tom Angstadt
- Henry V. Atherton
- Reginald W. Bennett
- Tom Bennett
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- California Association of Dairy and Milk Sanitarians
- Florida Association for Food Protection
- Associated Illinois Milk, Food and Environmental Sanitarians
- Ontario Food Protection Association
- Texas Association for Food Protection

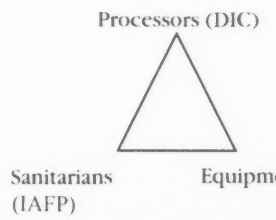
International Association for Food Protection®

The above list represents individual contributors to the Association Foundation Fund during the period June 1, 2000 through May 31, 2001. In addition, a portion of the Sustaining Member dues are allocated to support this Fund. Your contribution is welcome. Call the Association office at 800.369.6337 or 515.276.3344 for more information on how you can support the Foundation.

MARK OF COMPLIANCE

The 3-A Symbol Story

The 3-A Sanitary Standards Symbol Administrative Council, known throughout the industry as the "**3-A Symbol Council**," was organized in 1956. Its purpose is to grant authorization to use the **3-A Symbol** on equipment that meets 3-A Sanitary Standards for design and fabrication.



A Modern Concept

The modern concept of the 3-A program was established in 1944 when the Dairy Industry Committee (DIC) was formed. DIC is one of the three industry segments involved in the preparation of 3-A Sanitary Standards. These industry segments are:

- **Processors,** represented by DIC
- **Equipment Manufacturers**, represented by IAFIS
- **Sanitarians**, represented by IAFP

Use of the Symbol

Voluntary use of the **3-A Symbol** on dairy equipment:

- assures processors that equipment meets sanitary standards
- provides accepted criteria to equipment manufacturers for sanitary design & fabrication
- establishes guidelines for uniform evaluation and compliance by sanitarians.

3-A Sanitary Standards Symbol Administrative Council

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How the Audiovisual Library Serves IAFP Members

Purpose ...

The Audiovisual Library offers International Association for Food Protection Members an educational service through a wide variety of quality training videos dealing with various food safety issues. This benefit allows Members free use of these videos.

How It Works ...

1) Members simply fill out an order form (see page 624) and fax or mail it to the IAFP office. Members may also find a Library listing and an order form online at the IAFP Web site at www.foodprotection.org.

2) Material from the Audiovisual Library is checked out for a maximum of two weeks (three weeks outside of North America) so that all Members can benefit from its use.

3) Requests are limited to five videos at a time.

How to Contribute to the Audiovisual Library ...

1) As the IAFP Membership continues to grow, so does the need for additional committee members and materials for the Library. The Audiovisual Committee meets at the IAFP Annual Meeting to discuss the status of the Audiovisual Library and ways to improve the service. New Members are sought to add fresh insight and ideas.

2) Donations of audiovisual materials are always needed and appreciated. Tapes in foreign languages (including, but not limited to Spanish, French, Chinese [Manderin/Cantonese]), are especially desired for International Members who wish to view tapes in their native language.

3) Members may also make a financial contribution to the Foundation Fund. The Foundation Fund sponsors worthy causes that enrich the Association. Revenue from the Foundation Fund supports the IAFP Audiovisual Library. Call Lisa Hovey, Assistant Director or Lucia Collison McPhedran, Association Services at 800.369.6337 or 515.276.3344 if you wish to make a donation.

Audiovisual Library

as of June 1, 2001

A Member Benefit of IAFP

DAIRY

D1170 **3-A Symbol Council**–(8 minute videotape). A video which was developed to make people in the dairy and food industries aware of the 3-A program and its objectives.

D1180 **10 Points to Dairy Quality**–(10 minute videotape). Provides in-depth explanation of a critical control point in the residue prevention protocol. Illustrated with on-farm, packing plant, and milk-receiving plant scenes as well as interviews of producers, practicing veterinarians, regulatory officials and others. (Dairy Quality Assurance–1992) (Reviewed 1998)

D1010 **The Bulk Milk Hauler: Protocol & Procedures**–(8 minute videotape). Teaches bulk milk haulers how they contribute to quality milk production. Special emphasis is given to the hauler's role in proper milk sampling, sample care procedures, and understanding test results. (Iowa State University Extension–1990). (Reviewed 1998)

D1020 **Causes of Milkfat Test Variations & Depressions**–(30 minute–140 slides–tape–script). This slide set illustrates the many factors involved in causing milkfat test variations or depressions in your herd, including feeding, management, stage of lactation, age of samples, handling of samples, and testing procedures. The script was reviewed by field staff, nutritionists, laboratory personnel and county extension staff. It is directed to farmers, youth and allied industry. (Penn State–1982)

D1030 **Cold Hard Facts**–This video is recommended for training personnel associated with processing, transporting, warehousing, wholesaling and retailing frozen foods. It contains pertinent information related to good management practices necessary to ensure high quality frozen foods. (National Frozen Food Association–1993) (Reviewed 1998)

D1040 **Ether Extraction Method for Determination of Raw Milk**–(26 minute videotape). Describes the ether extraction procedure to measure milkfat in dairy products. Included is an explanation of the chemical reagents used in each step of the process. (CA–1988) (Reviewed 1998)

D1050 **The Farm Bulk Milk Hauler**–(30 minute–135 slides–tape–script). This slide set covers the complete procedure for sampling and collecting milk from farms. Each step is shown as it starts with the hauler entering the farm lane and ends when he leaves the milk house. Emphasis is on universal sampling and automated testing. Funds to develop this set were provided by The Federal Order #36 Milk Market Administrator. (Penn State–1982) (Reviewed 1998)

D1060 **Frozen Dairy Products**–(27 minute videotape). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients; emphasis is on what to look for in a plant inspection. Everything from receiving, through processing and cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA–1987) (Reviewed 1997)

D1070 **The Gerber Butterfat Test**–(7 minute videotape). Describes the Gerber milkfat test procedure for dairy products and compares it to the Babcock test procedure. (CA–1990) (Reviewed 1998)

D1080 **High-Temperature, Short-Time Pasteurizer**–(59 minute videotape). Provided by the Dairy Division of Borden, Inc. It was developed to train pasteurizer operators and is well done. There are seven sections with the first covering the twelve components of a pasteurizer and the purpose and operation of each. The tape provides the opportunity for discussion after each section or continuous running of the videotape. Flow diagrams, processing and cleaning are covered. (Borden, Inc.–1986) (Reviewed 1997)

D1090 **Managing Milking Quality**–(33 minute videotape). This training video is designed to help dairy farmers develop a quality management process and is consistent with ISO 9000 certification and HACCP processes. The first step is to evaluate the strengths and weaknesses of a dairy operation. The video will help you find ways to improve the weaknesses that are identified on your farm.

D1100 **Mastitis Prevention and Control**–(2-45 minute videotapes). This video is ideal for one-on-one or small group presentations. Section titles include: Mastitis Pathogens, Host Defense, Monitoring Mastitis, Mastitis Therapy, Recommended Milking Procedures, Postmilking Teat Dip Protocols, Milk Quality, Milking Systems. (Nasco–1993)

D1110 **Milk Plant Sanitation: Chemical Solution**–(13 minute videotape). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titrations are reviewed... alkaline wash, presence of chlorine and iodophor, and caustic wash and an acid wash in a HTST system. Emphasis is also placed on record keeping and employee safety. (1989)

D1120 **Milk Processing Plant Inspection Procedures**–(15 minute videotape). Developed by the California Department of Food and Agriculture. It covers pre- and post-inspection meeting with management, but emphasis is on inspection of all manual and cleaned in place equipment in the receiving, processing and filling rooms. CIP systems are checked along with recording charts and employee locker and restrooms. Recommended for showing to plant workers and supervisors. (CA-1986)

D1130 **Pasteurizer – Design and Regulation**–(16 minute videotape). This tape provides a summary of the public health reasons for pasteurization and a nonlegal definition of pasteurization. The components of an HTST pasteurizer, elements of design, flow-through diagram and legal controls are discussed. (Kraft General Foods-1990) (Reviewed 1998)

D1140 **Pasteurizer – Operation**–(11 minute videotape). This tape provides a summary of the operation of an HTST pasteurizer from start-up with hot water sanitization to product pasteurization and shut-down. There is an emphasis on the legal documentation required. (Kraft General Foods-1990) (Reviewed 1998)

D1150 **Processing Fluid Milk**–(30 minute-140 slides-script-tape). This slide set was developed to train processing plant personnel on preventing food poisoning and spoilage bacteria in fluid dairy products. Emphasis is on processing procedures to meet federal regulations and standards. Processing procedures, pasteurization times and temperatures, purposes of equipment, composition standards, and cleaning and sanitizing are covered. Primary emphasis is on facilities such as drains and floors, and filling equipment to prevent post-pasteurization contamination with spoilage or food poisoning bacteria. It was reviewed by many industry plant operators and regulatory agents and is directed to plant workers and management. (Penn State-1987) (Reviewed 1998)

ENVIRONMENTAL

E3010 **The ABCs of Clean-A Handwashing & Cleanliness Program for Early Childhood Programs**–For early childhood program employees. This tape illustrates how proper handwashing and clean hands can contribute to the infection control program in daycare centers and other early childhood programs. (The Soap & Detergent Association-1991)

E3020 **Acceptable Risks?**–(16 minute videotape). Accidents, deliberate misinformation, and the rapid proliferation of nuclear power plants have created increased fears of improper nuclear waste disposal, accidents during the transportation of waste, and the release of radioactive effluents from plants. The program shows the occurrence of statistically anomalous leukemia clusters; governmental testing of marine organisms and how they absorb radiation; charts the kinds and amounts of natural and man-made radiation to which man is subject; and suggests there is no easy solution to balancing our fears to nuclear power and our need for it. (Films for the Humanities & Sciences, Inc.-1993) (Reviewed 1998)

E3030 **Air Pollution: Indoor**–(26 minute videotape). Indoor air pollution is in many ways a self-induced problem...which makes it no easier to solve. Painting and other home improvements have introduced pollutants, thermal insulation and other energy-saving and water-proofing devices have trapped the pollutants inside. The result is that air pollution inside a modern home can be worse than inside a chemical plant. (Films for the Humanities & Sciences, Inc.) (Reviewed 1998)

E3040 **Asbestos Awareness**–(20 minute videotape). This videotape discusses the major types of asbestos and their current and past uses. Emphasis is given to the health risks associated with asbestos exposure and approved asbestos removal abatement techniques. (Industrial Training, Inc.-1988) (Reviewed 1998)

E3055 **Effective Handwashing-Preventing Cross-Contamination in the Food Service Industry**–(3 1/2 minute videotape). It is critical that all food service workers wash their hands often and correctly. This video discusses the double wash method and the single wash method and when to use each method. (Zep Manufacturing Company-1993)

E3060 **EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)**–(22 minute videotape). Demonstrates the Ceriodaphnia 7-Day Survival and Reproduction Toxicity Test and how it is used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. The tape covers the general procedures for the test including how it is set up, started, monitored, renewed and terminated. (1989) (Reviewed 1998)

E3070 **EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)**–(15 minute videotape). A training tape that teaches environmental professionals about the Fathead Minnow Larval Survival and Growth Toxicity Test. The method described is found in an EPA document entitled, "Short Term Methods for Estimating the Chronic Toxicity of Efflu-

ents & Receiving Waters to Freshwater Organisms." The tape demonstrates how fathead minnow toxicity tests can be used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. (1989) (Reviewed 1998)

E3075 **EPA: This is Super Fund**–(12 minute videotape). Produced by the United States Environmental Protection Agency (EPA) in Washington, D.C., this videotape focuses on reporting and handling hazardous waste sites in our environment. The agency emphasizes community involvement in identifying chemical waste sites and reporting contaminated areas to the authorities. The primary goal of the "Super Fund Site Process" is to protect human health and to prevent and eliminate hazardous chemicals in communities. The film outlines how to identify and report abandoned waste sites and how communities can participate in the process of cleaning up hazardous sites. The program also explains how federal, state and local governments, industry and residents can work together to develop and implement local emergency preparedness/response plans in case chemical waste is discovered in a community.

E3080 **Fit to Drink**–(20 minute videotape). This program traces the water cycle, beginning with the collection of rain-water in rivers and lakes, in great detail through a water treatment plant, to some of the places where water is used, and finally back into the atmosphere. Treatment of the water begins with the use of chlorine to destroy organisms; the water is then filtered through various sedimentation tanks to remove solid matter. Other treatments employ ozone, which oxidizes contaminants and makes them easier to remove; hydrated lime, which reduces the acidity of the water; sulfur dioxide, which removes any excess chlorine; and floculation, a process in which aluminum sulfate causes small particles to clump together and precipitate out. Throughout various stages of purification, the water is continuously tested for smell, taste, titration, and by fish. The treatment plant also monitors less common contaminants with the use of up-to-date techniques like flame spectrometers and gas liquefaction. (Films for the Humanities & Sciences, Inc.–1987)

E3110 **Garbage: The Movie**–(25 minute videotape). A fascinating look at the solid waste problem and its impact on the environment. Viewers are introduced to landfills, incinerators, recycling plants and composting operations as solid waste management solutions. Problems associated with modern landfills are identified and low-impact alternatives such as recycling, reuse, and source reduction are examined. (Churchill Films) (Reviewed 1998)

E3120 **Global Warming: Hot Times Ahead**–(23 minute videotape). An informative videotape program that explores the global warming phenomenon and some of the devastating changes it may cause. This program identifies greenhouse gases and how they are produced by human activities. Considered are: energy use in transportation, industry and home; effects of deforestation, planting of trees and recycling as means of slowing the build-up of greenhouse gases. (Churchill Films–1995)

E3130 **Kentucky Public Swimming Pool & Bathing Facilities**–(38 minute videotape). Developed by the Lincoln Trail District Health Department in Kentucky and includes all of their state regulations which may be different from other states, provinces and countries. This tape can be used to train those responsible for operating pools and waterfront bath facilities. All aspects are included of which we are aware, including checking water conditions and filtration methods. (1987). (Reviewed 1998)

E3135 **Plastics Recycling Today: A Growing Resource**–(11:35 minute videotape). Recycling is a growing segment of our nation's solid waste management program. This video shows how plastics are handled from curbside pickup through the recycling process to end-use by consumers. This video provides a basic understanding of recycling programs and how communities, companies and others can benefit from recycling. (The Society of the Plastics Industry, Inc.–1988)

E3140 **Putting Aside Pesticides**–(26 minute videotape). This program probes the long-term effects of pesticides and explores alternative pest-control efforts; biological pesticides, genetically-engineered microbes that kill objectionable insects, the use of natural insect predators, and the cross-breeding and genetic engineering of new plant strains that produce their own anti-pest toxins. (Films for the Humanities & Sciences, Inc.) (Reviewed 1999)

E3150 **Radon**–(26 minute videotape). This program looks at the possible health implications of radon pollution, methods home-owners can use to detect radon gas in their homes, and what can be done to minimize hazards once they are found.

E3160 **RCRA–Hazardous Waste**–(19 minute videotape). This videotape explains the dangers associated with hazardous chemical handling and discusses the major hazardous waste handling requirements presented in the Resource Conservation and Recovery Act. (Industrial Training, Inc.)

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

E3170 **Tape 1–Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements**–(62 minute videotape). A general overview of the Superfund Amendments

and Reauthorization Act (SARA) of 1986 and the challenge of its implementation. The remedy process – long-term and permanent clean-up is illustrated step-by-step, with emphasis on the new mandatory clean-up schedules, preliminary site assessment petition procedures and the hazard ranking system/National Priority List revisions. The major role of state and local government involvement and responsibility is stressed.

E3180 **Tape 2–Changes in the Removal Process: Removal and Additional Program Requirements**–(48 minute videotape). The removal process is a short-term action and usually an immediate response to accidents, fires and illegal dumped hazardous substances. This program explains the changes that expand removal authority and require procedures consistent with the goals of remedial action.

E3190 **Tape 3–Enforcement & Federal Facilities**–(52 minute videotape). Who is responsible for SARA clean-up costs? Principles of responsible party liability; the difference between strict, joint and several liability; and the issue of the innocent land owner are discussed. Superfund enforcement tools-mixed funding, De Minimis settlements and the new nonbinding preliminary allocations of responsibility (NBARs) are explained.

E3210 **Tape 4–Emergency Preparedness & Community Right-to-Know**–(48 minute videotape). A major part of SARA is a free-standing act known as Title III: The Emergency Planning and Community Right-to-Know Act of 1986, requiring federal, state, and local governments and industry to work together in developing local emergency preparedness/response plans. This program discusses local emergency planning committee requirements, emergency notification procedures, and specifications on community right-to-know reporting requirements such as using OSHA Material Safety Data Sheets, the emergency & hazardous chemical inventory and the toxic chemical release inventory.

E3220 **Tape 5–Underground Storage Tank Trust Fund & Response Program**–(21 minute videotape). Another addition to SARA is the Leaking Underground Storage Tank (LUST) Trust Fund. One half of the US population depends on ground water for drinking–and EPA estimates that as many as 200,000 underground storage tanks are corroding and leaking into our ground water. This program discusses how the LUST Trust Fund will be used by EPA and the states in responding quickly to contain and clean-up LUST releases. Also covered is state enforcement and action requirements, and owner/operator responsibility.

E3230 **Tape 6–Research & Development/ Closing Remarks**–(33 minute videotape). An important new mandate of the new Superfund is the technical provisions for research and development to create more permanent methods in handling and disposing of hazardous wastes and managing hazardous substances. This segment discusses the SITE (Superfund Innovative Technology Evaluation) program, the University Hazardous Substance Research Centers, hazardous substance health research and the DOD research, development and demonstration management of DOD wastes.

E3240 **Sink A Germ**–(10 minute videotape). A presentation on the rationale and techniques for effective handwashing in health care institutions. Uses strong imagery to educate hospital personnel that handwashing is the single most important means of preventing the spread of infection. (The Brevis Corp.–1986). (Reviewed 1998)

E3245 **Wash Your Hands**–(5 minute videotape). Handwashing is the single most important means of preventing the spread of infection. This video presents why handwashing is important and the correct way to wash your hands. (LWB Company–1995)

E3250 **Waste Not: Reducing Hazardous Waste**–(35 minute videotape). This tape looks at the progress and promise of efforts to reduce the generation of hazardous waste at the source. In a series of company profiles, it shows activities and programs within industry to minimize hazardous waste in the production process. Waste Not also looks at the obstacles to waste reduction, both within and outside of industry, and considers how society might further encourage the adoption of pollution prevention, rather than pollution control, as the primary approach to the problems posed by hazardous waste. (Umbrella films)

FOOD

F2260 **100 Degrees of Doom... The Time & Temperature Caper**–(14 minute videotape). Video portraying a private eye tracking down the cause of a *Salmonella* poisoning. Temperature control is emphasized as a key factor in preventing foodborne illness. (Educational Communications, Inc.–1987) (Reviewed 1998)

F2450 **A Guide to Making Safe Smoked Fish**–(21 minute videotape). Smoked fish can be a profitable product for aquaculturalists, but it can be lethal if not done correctly. This video guides you through the steps necessary to make safe smoked fish. It provides directions for brining, smoking, cooling, packaging and labeling, and cold storage to ensure safety. The video features footage of fish smoking being done using both traditional and modern equipment. (University of Wisconsin-Madison–Spring, 1999)

F2005 **A Lot on the Line**–(25 minute videotape). Through a riveting dramatization, "A Lot on the Line" is a powerful training tool for food manufacturing and food service employees. In the video, a food plant supervisor and his pregnant wife are eagerly awaiting the birth of their first child. Across town, a deli manager is taking his wife and young daughter away for a relaxing weekend. Both families, in a devastating twist of fate, will experience the pain, fear, and disruption caused by foodborne illness. This emotionally charged video will enthrall new and old employees alike and strongly reinforce the importance of incorporating GMPs into everyday work routines. Without question, "A Lot on the Line" will become an indispensable part of your company's training efforts. (Silliker Laboratories–2000)

F2440 **Cleaning & Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!**–(16 minute videotape) This training video shows how to safely and effectively clean and sanitize in a vegetable processing plant. It teaches how it is the same for processing plant as it is for washing dishes at home. (University of Wisconsin Extension–1996) (Available in Spanish)

F2010 **Close Encounters of the Bird Kind**–(18 minute videotape). A humorous but in-depth look at *Salmonella* bacteria, their sources, and their role in foodborne disease. A modern poultry processing plant is visited, and the primary processing steps and equipment are examined. Potential sources of *Salmonella* contamination are identified at the different stages of production along with the control techniques that are employed to insure safe poultry products. (Topek Products, Inc.) (Reviewed 1998)

F2015 **Controlling *Listeria*: A Team Approach**–(16 minute videotape). In this video, a small food company voluntarily shuts down following the implication of one of its products in devastating outbreak of *Listeria monocytogenes*. This recall dramatization is followed by actual in-plant footage highlighted key practices in controlling *Listeria*. This video provides workers with an overview of the organism, as well as practical steps that can be taken to control its growth in plant environments. Finally, the video leaves plant personnel with a powerful, resounding message: Teamwork and commitment are crucial in the production of safe, quality foods. (Silliker Laboratories–2000)

F2037 **Cooking and Cooling of Meat and Poultry Products**–(2 videotapes – 176 minutes). (See Part 1 Tape F2035 and Part 2 Tape F2036). This is session 3 of a 3-part Meat and Poultry Teleconference cosponsored by AFDO and the USDA Food Safety Inspection Service. Upon completion of viewing these videotapes, the viewer will be able to (1) recognize inadequate processes associated with the cooking and cooling of meat and poultry at the retail level; (2) Discuss the hazards associated with foods and the cooking and cooling processes with management at the retail level; (3) Determine the adequacy of control methods to prevent microbiological hazards in cooking and cooling at the retail level, and (4) Understand the principle for determining temperature with various temperature measuring devices. (AFDO/USDA–1999)

F2030 **"Egg Games" Foodservice Egg Handling and Safety**–(18 minute videotape). Develop an effective egg handling and safety program that is right for your operation. Ideal for manager training and foodservice educational programs, this video provides step-by-step information in an entertaining, visually-exciting format. (American Egg Board–1999)

F2020 **Egg Handling & Safety**–(11 minute videotape). Provides basic guidelines for handling fresh eggs which could be useful in training regulatory and industry personnel. (American Egg Board–1997)

F2036 **Emerging Pathogens and Grinding and Cooking Comminuted Beef**–(2 videotapes – 165 minutes.) (See Part 1 Tape F2035 and Part 3 Tape F2037.) This is session 2 of a 3-part Meat and Poultry Teleconference co-sponsored by AFDO and the USDA Food Safety Inspection Service. These videotapes present an action plan for federal, state, local authorities, industry, and trade associations in a foodborne outbreak. (AFDO/USDA–1998)

F2035 **Fabrication and Curing of Meat and Poultry Products**–(2 videotapes – 145 minutes). (See Part 2 Tape F2036 and Part 3 Tape F2037). This is session 1 of a 3-part Meat and Poultry Teleconference cosponsored by AFDO and the USDA Food Safety Inspection Service. Upon viewing, the sanitarian will be able to (1) Identify typical equipment used for meat and poultry fabrication at retail and understand their uses; (2) Define specific terms used in fabrication of meat and poultry products in retail establishments, and (3) Identify specific food safety hazards associated with fabrication and their controls. (AFDO/USDA–1997)

F2039 **Food for Thought–The GMP Quiz Show**–(16 minute videotape). In the grand tradition of television quiz shows, three food industry workers test their knowledge of GMP principles. As the contestants jockey to answer questions, the video provides a thorough and timely review of GMP principles. This video is a cost-effective tool to train new hires or sharpen the knowledge of vet-

eran employees. Topics covered include employee practices, including proper attire, contamination, stock rotation, pest control, conditions for microbial growth and employee traffic patterns. Food safety terms such as HACCP, microbial growth niche, temperature danger zone, FIFO and cross-contamination, are also defined. (Silliker Laboratories–2000)

F2040 **Food Irradiation**–(30 minute videotape). Introduces viewers to food irradiation as a new preservation technique. Illustrates how food irradiation can be used to prevent spoilage by microorganisms, destruction by insects, overripening, and to reduce the need for chemical food additives. The food irradiation process is explained and benefits of the process are highlighted. (Turnelle Productions, Inc.) (Reviewed 1998)

F2045 **Food Microbiological Control**–(6-videotapes – approximate time 12 hours). Designed to provide information and demonstrate the application of basic microbiology, the Good Manufacturing Practices (GMPs), retail Food Code, and sanitation practices when conducting food inspections at the processing and retail levels. Viewers will enhance their ability to identify potential food hazards and evaluate the adequacy of proper control methods for these hazards. (FDA–1998)

F2050 **Food Safe–Food Smart–HACCP & Its Application to the Food Industry**–(2-16 minute videotapes). (1)–Introduces the seven principles of HACCP and their application to the food industry. Viewers will learn about the HACCP system and how it is used in the food industry to provide a safe food supply. (2)–Provides guidance on how to design and implement a HACCP system. It is intended for individuals with the responsibility of setting up a HACCP system. (Alberta Agriculture, Food and Rural Development) (Reviewed 1998)

F2060 **Food Safe–Series I**–(4-10 minute videotapes). (1) "Receiving & Storing Food Safely," details for food-service workers the procedures for performing sight inspections for the general conditions of food, including a discussion of food labeling and government approval stamps. (2) "Food-service Facilities and Equipment," outlines the requirements for the proper cleaning and sanitizing of equipment used in food preparation areas. Describes the type of materials, design, and proper maintenance of this equipment. (3) "Microbiology for Foodservice Workers," provides a basic understanding of the microorganisms which cause food spoilage and foodborne illness. This program describes bacteria, viruses, protozoa, and parasites and the conditions which support their growth. (4) "Food-service Housekeeping and Pest Control," emphasizes cleanliness as the basis for all pest control. Viewers learn the habits and life cycles of flies, cockroaches, rats, and mice. (Perennial Education–1991) (Reviewed 1998)

F2070 **Food Safe–Series II**–(4-10 minute videotapes). Presents case histories of foodborne disease involving (1) *Staphylococcus aureus*, (sauces) (2) *Salmonella*, (eggs) (3) *Campylobacter*, and (4) *Clostridium botulinum*. Each tape demonstrates errors in preparation, holding or serving food; describes the consequences of those actions; reviews the procedures to reveal the cause of the illness; and illustrates the correct practices in a step-by-step demonstration. These are excellent tapes to use in conjunction with hazard analysis critical control point training programs. (Perennial Education–1991) (Reviewed 1998)

F2080 **Food Safe–Series III**–(4-10 minute videotapes). More case histories of foodborne disease. This set includes (1) Hepatitis "A", (2) *Staphylococcus aureus* (meats), (3) *Bacillus cereus*, and (4) *Salmonella* (meat). Viewers will learn typical errors in the preparation, holding and serving of food. Also included are examples of correct procedures which will reduce the risk of food contamination. (Perennial Education–1991) (Reviewed 1998)

F2133 **Food Safety First**–(50 minute videotape). This food safety training video presents causes of foodborne illness in foodservice and ways to prevent foodborne illness. Individual segments include personal hygiene and handwashing, cleaning and sanitizing, preventing cross contamination and avoiding time and temperature abuse. Foodhandling principles are presented through scenarios in a restaurant kitchen. (Glo-Germ 1998). Available in Spanish.

F2090 **Food Safety: An Educational Video for Institutional Food-Service Workers**–(10 minute videotape). Provides a general discussion on food safety principles with special emphasis on pathogen reductions in an institutional setting from child care centers to nursing homes. (US Department of Health & Human Services–1997)

Food Safety for Foodservice–An employee video series containing quick, 10-minute videos that teach food service employees how to prevent foodborne illness. This four video series examines sources of foodborne illness, plus explores prevention through awareness and recommendations for best practices for food safety. It also looks at how food safety affects the food service employee's job. (J. J. Keller & Associates, Neenah, WI–2000)

F2100 **Tape 1–Food Safety for Food Service: Cross Contamination** – (10 minute videotape). Provides the basic information needed to ensure integrity and safety in foodservice operations. Explains proper practices and procedures to prevent, detect and eliminate cross contamination.

F2101 **Tape 2–Food Safety for Food Service: HACCP** – (10 minute videotape). This video takes the mystery out of HACCP for your employees, and explains the importance of HACCP procedures in their work. Employees will come away feeling confident, knowing how to make

HACCP work. The seven steps of HACCP and how HACCP is used in foodservice are some of the topics discussed.

F2102 **Tape 3–Food Safety for Food Service: Personal Hygiene**–(10 minute videotape). This video establishes clear, understandable ground rules for good personal hygiene in the foodservice workplace and explains why personal hygiene is so important. Topics include: personal cleanliness; proper protective equipment; correct hand washing procedures; when to wash hands, hygiene with respect to cross contamination and prohibited practices and habits.

F2103 **Tape 4–Food Safety for Food Service: Time and Temperature Controls**–(10 minute videotape). This video examines storage and handling of raw and cooked ingredients, and explains how to ensure their safety. Employees learn how to spot potential problems and what to do when they find them. Topics include: correct thermometer use, cooling, thawing and heating procedures, food storage procedures, holding temperature requirements, and handling leftovers.

F2120 **Food Safety: For Goodness Sake, Keep Food Safe**–(15 minute videotape). Teaches foodhandlers the fundamentals of safe food handling. The tape features the key elements of cleanliness and sanitation, including: good personal hygiene, maintaining proper food product temperature, preventing time abuse, and potential sources of food contamination. (Iowa State University Extension–1990) (Reviewed 1998)

F2110 **Food Safety is No Mystery**–(34 minute videotape). This is an excellent training visual for food-service workers. It shows the proper ways to prepare, handle, serve and store food in actual restaurant, school and hospital situations. A policeman sick from food poisoning, a health department sanitarian, and a food-service worker with all the bad habits are featured. The latest recommendations on personal hygiene, temperatures, cross-contamination, and storage of foods are included. (USDA–1987). Also available in Spanish. – (Reviewed 1998)

F2130 **Food Safety: You Make the Difference**–(28 minute videotape). Through five food workers from differing backgrounds, this engaging and inspirational documentary style video illustrates the four basic food safety concepts: handwashing, preventing cross-contamination, moving foods quickly through the danger zone, and hot/cold holding (Seattle-King County Health Department–1995)

Food Safety Zone Video Series–A one-of-a-kind series that helps get your employees to take food safety issues seriously! These short, to-the-point videos can help make your employees aware of various food hazards, and how they can help promote food safety. The 4 topics are: Basic Microbiology, Cross Contamination, Personal Hygiene, and Sanitation. (J.J. Keller & Associates – 1999). (Also available in Spanish.)

F2125 **Tape 1–Food Safety Zone: Basic Microbiology**–(10 minute videotape). In this video, food service personnel will gain a deeper understanding of food safety issues and what they can do to prevent recalls and contamination. It describes the different types of bacteria that can be harmful to food, and tells how to minimize bacterial growth through time and temperature controls, personal hygiene practices, and sanitation.

F2126 **Tape 2–Food Safety Zone: Cross Contamination**–(10 minute videotape). Quickly teach your employees how they can help prevent cross contamination. Employees are educated on why contaminants can be extremely dangerous, cause serious injury, and even death, to consumers of their food products. This fast-paced video will give your employees a deeper understanding of the different types of cross contamination, how to prevent it, and how to detect it through visual inspections and equipment. The emphasis is that prevention is the key to eliminating cross contamination.

F2127 **Tape 3–Food Safety Zone: Personal Hygiene**–(10 minute videotape). After watching this video, your employees will understand why their personal hygiene is critical to the success of your business. This video teaches employees about four basic good personal hygiene practices: keeping themselves clean, wearing clean clothes, following specific hand washing procedures, and complying with all related work practices. Personnel are also taught that personal hygiene practices are designed to prevent them from accidentally introducing bacteria to food products, and are so important that there are federal laws that all food handlers must obey.

F2128 **Tape 4–Food Safety Zone: Sanitation**–(10 minute videotape). Don't just tell your employees why sanitation is important, show them! This training video teaches employees about the sanitation procedures that cover all practices to keep workplaces clean, and food produced free of contaminants and harmful bacteria. Four areas covered include personal hygiene, equipment and work areas, use and storage of cleaning chemicals and equipment, and pest control.

F2135 **Get with a Safe Food Attitude**–(40 minute videotape). Consisting of nine short segments which can be viewed individually or as a group, this video presents safe food handling for moms-to-be. Any illness a pregnant woman contracts can affect her unborn child whose immune system is too immature to fight back. The video follows four pregnant women as they learn about food safety and preventing foodborne illness. (US Department of Agriculture–1999)

F2137 **GMP Basics: Avoiding Microbial Cross-Contamination**–(15 minute videotape). This video takes a closer look at how harmful microorganisms, such as *Listeria*, can be transferred to finished products. Employees see numerous examples of how microbial cross-contamination can occur from improper traffic patterns, poor personal hygiene, soiled clothing, unsanitized tools and equipment. Employees need specific knowledge and practical training to avoid microbial cross-contamination in plants. This video aids in that training.–2000)

F2140 **GMP Basics – Employee Hygiene Practices**–(20 minute videotape). Through real-life examples and dramatization, this video demonstrates good manufacturing practices that relate to employee hygiene, particularly hand washing. This video includes a unique test section to help assess participants' understanding of common GMP violations. (Silliker Laboratories–1997)

F2143 **GMP Basics: Guidelines for Maintenance Personnel**–(21 minute videotape). Developed specifically for maintenance personnel working in a food processing environment, this video depicts a plant-wide training initiative following a product recall announcement. Maintenance personnel will learn how GMPs relate to their daily activities and how important their roles are in the production of safe food products. (Silliker Laboratories–1999)

F2148 **GMP–GSP Employee**–(38 minute videotape). This video was developed to teach food plant employees the importance of "Good Manufacturing Practices" and "Good Sanitation Practices." Law dictates that food must be clean and safe to eat. This video emphasizes the significance of each employee's role in protecting food against contamination. Tips on personal cleanliness and hygiene are also presented. (L.J. Bianco & Associates)

F2150 **GMP: Personal Hygiene & Practices in Food Manufacturing**–(14 minute videotape). This video focuses on the personal hygiene of food-manufacturing workers, and explores how poor hygiene habits can be responsible for the contamination of food in the manufacturing process. This is an instructional tool for new food-manufacturing line employees and supervisors. It was produced with "real" people in actual plant situations, with only one line of text included in the videotape. (Penn State–1993)–(Available in Spanish and Vietnamese)

F2147 **GMP Basics: Process Control Practices**–(16 minute videotape). In actual food processing environments, an on-camera host takes employees through a typical food plant as they learn the importance of monitoring and controlling key points in the manufacturing process. Beginning with receiving and storing, through production, and ending with packaging and distribution, control measures are introduced, demonstrated, and reviewed. Employees will see how their everyday activities in the plant have an impact on product safety. (Silliker Laboratories–1999)

F2160 **GMP: Sources & Control of Contamination during Processing**–(20 minute videotape). This program, designed as an instructional tool for new employees and for refresher training for current or reassigned workers, focuses on the sources and control of contamination in the food-manufacturing process. It was produced in actual food plant situations. A concise description of microbial contamination and growth and cross-contamination, a demonstration of food storage, and a review of aerosol contaminants are also included. (Penn State–1995)

F2180 **HACCP: Safe Food Handling Techniques**–(22 minute videotape). The video highlights the primary causes of food poisoning and emphasizes the importance of self-inspection. An explanation of potentially hazardous foods, cross-contamination, and temperature control is provided. The main focus is a detailed description of how to implement a Hazard Analysis Critical Control Point (HACCP) program in a food-service operation. A leader's guide is provided as an adjunct to the tape. (The Canadian Restaurant & Foodservices Association–1990) (Reviewed 1998)

F2169 **HACCP: Training for Employees**–(15 minute videotape). This video is a two-part, detailed training outline provided for the employee program. Included in the video is a synopsis of general federal regulations; HACCP plan development; incorporation of HACCP's seven principles; HACCP plan checklist, and an HACCP employee training program. (J. J. Keller & Associates, Neenah, WI—1999)

F2172 **HACCP: Training for Managers**–(17 minute videotape). Through industry-specific examples and case studies, this video addresses the seven HACCP steps, identifying critical control points, recordkeeping and documentation, auditing, and monitoring. It also explains how HACCP relates to other programs such as Good Manufacturing Practices and plant sanitation. (J. J. Keller & Associates, Inc.–2000)

F2170 **The Heart of HACCP**–(22 minute videotape). A training video designed to give plant personnel a clear understanding of the seven HACCP principles and practical guidance on how to apply these principles to their own work environment. This video emphasizes the principles

of primary concern to plant personnel such as critical limits, monitoring systems, and corrective actions that are vital to the success of a HACCP plan. (Silliker Laboratories Group–1994)

F2171 **HACCP: The Way to Food Safety**–(53 minute videotape). The video highlights the primary causes of food poisoning and stresses the importance of self-inspection. Potentially hazardous foods, cross-contamination and temperature control are explained. The video is designed to give a clear understanding of the seven HACCP principles and practical guidance on how to apply these principles to a work environment. Critical limits, monitoring systems and corrective action plans are emphasized. The video also provides an overview of foodborne pathogens, covering terminology, the impact of pathogens, and what employees must do to avoid problems. Also described are the sources, causes and dangers of contamination in the food industry. (Southern Illinois University–1997)

F2175 **Inspecting For Food Safety–Kentucky's Food Code**–(100 minute videotape). Kentucky's Food Code is patterned after the Federal Food Code. The concepts, definitions, procedures, and regulatory standards included in the code are based on the most current information about how to prevent foodborne diseases. This video is designed to prepare food safety inspectors to effectively use the new food code in the performance of their duties. (Department of Public Health Commonwealth of Kentucky–1997) (Reviewed 1999)

F2190 **Is What You Order What You Get? Seafood Integrity**–(18 minute videotape). Teaches seafood department employees about seafood safety and how they can help insure the integrity of seafood sold by retail food markets. Key points of interest are cross-contamination control, methods and criteria for receiving seafood and determining product quality, and knowing how to identify fish and seafood when unapproved substitutions have been made. (The Food Marketing Institute) (Reviewed 1998)

F2210 **Northern Delight–From Canada to the World**–(13 minute videotape). A promotional video that explores the wide variety of foods and beverages produced by the Canadian food industry. General in nature, this tape presents an overview of Canada's food industry and its contribution to the world's food supply. (Ternelle Production, Ltd.) (Reviewed 1998)

F2240 **On the Front Line**–(18 minute videotape). A training video pertaining to sanitation fundamentals for vending service personnel. Standard cleaning and serving procedures for cold food, hot beverage and cup drink vending machines are presented. The video emphasizes specific cleaning and serving practices which are important to food and beverage vending operations. (National Automatic Merchandising Association–1993) (Reviewed 1998)

F2250 **On the Line**–(30 minute videotape). This was developed by the Food Processors Institute for training food processing plant employees. It creates an awareness of quality control and regulations. Emphasis is on personal hygiene, equipment cleanliness and good housekeeping in a food plant. It is recommended for showing to both new and experienced workers. (Available in Spanish) The Food Processors Institute. 1993. (Reviewed 1998)

F2270 **Pest Control in Seafood Processing Plants**–(26 minute videotape). Videotape which covers procedures to control flies, roaches, mice, rats and other common pests associated with food processing operations. The tape will familiarize plant personnel with the basic characteristics of these pests and the potential hazards associated with their presence in food operations. (Reviewed 1998)

F2280 **Principles of Warehouse Sanitation**–(33 minute videotape). This videotape gives a clear, concise and complete illustration of the principles set down in the Food, Drug and Cosmetic Act and in the Good Manufacturing Practices, as well as supporting legislation by individual states. (American Institute of Baking–1993)

F2290 **Product Safety & Shelf Life**–(40 minute videotape). Developed by Borden Inc., this videotape was done in three sections with opportunity for review. Emphasis is on providing consumers with good products. One section covers off-flavors, another product problems caused by plant conditions, and a third the need to keep products cold and fresh. Procedures to assure this are outlined, as shown in a plant. Well done and directed to plant workers and supervisors. (Borden–1987) – (Reviewed 1997)

F2220 **Proper Handling of Peracidic Acid**–(15 minute videotape). Introduces paracidic acid as a chemical sanitizer and features the various precautions needed to use the product safely in the food industry.

F2230 **Purely Coincidental**–(20 minute videotape). A parody that shows how foodborne illness can adversely affect the lives of families that are involved. The movie compares improper handling of dog food in a manufacturing plant that causes the death of a family pet with improper handling of human food in a manufacturing plant that causes a child to become ill. Both cases illustrate how handling errors in food production can produce devastating outcomes. (The Quaker Oats Company–1993.) (Reviewed 1998)

F2310 **Safe Food: You Can Make a Difference**–(25 minute videotape). A training video for food-service workers which covers the fundamentals of food safety. An explanation of proper food temperature, food storage, cross-contamination control, cleaning and sanitizing, and handwashing as methods of foodborne illness control is provided. The video provides an orientation to food safety for professional foodhandlers. (Tacoma–Pierce County Health Department–1990). (Reviewed 1998)

F2320 **Safe Handwashing**-(15 minute videotape). Twenty-five percent of all foodborne illnesses are traced to improper handwashing. The problem is not just that handwashing is not done, the problem is that it's not done properly. This training video demonstrates the "double wash" technique developed by Dr. O. Peter Snyder of the Hospitality Institute for Technology and Management. Dr. Snyder demonstrates the procedure while reinforcing the microbiological reasons for keeping hands clean. (Hospitality Institute for Technology and Management-1991) (Reviewed 1998)

F2325 **Safe Practices for Sausage Production**-(3 hour videotape). This videotape is based on a series of educational broadcasts on meat and poultry inspections at retail food establishments produced by the Association of Food and Drug Officials (AFDO) and USDA's Food Safety and Inspection Service (FSIS), along with FDA's Center for Food Safety and Applied Nutrition. The purpose of the broadcast was to provide training to state, local, and tribal sanitarians on processes and procedures that are being utilized by retail stores and restaurants, especially those that were usually seen in USDA-inspected facilities. The program will cover the main production steps of sausage products, such as the processes of grinding, stuffing, and smoking, and typical equipment used will he depicted. Characteristics of different types of sausage (fresh, cooked and smoked, and dry/semi-dry) will be explained. Pathogens of concern and outhreaks associated with sausage will be discussed. The written manual for the program is available at www.fsis.usda.gov/ofo/hrds/STATE/RETAIL/manual.htm. (1999)

F2460 **Safer Processing of Sprouts**-(1 hour and 22 minute videotape). Sprouts are enjoyed by many consumers for their taste and nutritional value. However, recent outbreaks of illnesses associated with sprouts have demonstrated a potentially serious human health risk posed by this food. FDA and other public health officials are working with industry to identify and implement production practices that will assure that seed and sprouted seed are produced under safe conditions. This training video covers safe processing practices of sprouts including growing, harvesting, milling, transportation, storage, seed treatment, cleaning and sanitizing, sampling and microbiological testing. (CA Dept. of Health Services, Food and Drug Branch; U.S. Food and Drug Administration, and the Centers for Disease Control and Prevention - 2000)

F2330 **Sanitation for Seafood Processing Personnel**-(20 minute videotape). A training video suited for professional foodhandlers working in any type of food manufacturing plant. The film highlights Good Manufacturing Practices and their role in assuring food safety. The professional foodhandler is introduced to a variety of sanitation topics including: (1) foodhandlers as a source of food contamination, (2) personal hygiene as a means of preventing food contamination, (3) approved food storage techniques including safe storage temperatures, (4) sources of cross-contamination, (5) contamination of food by insects and rodents, (6) garbage handling and pest control, and (7) design and location of equipment and physical facilities to facilitate cleaning. (Reviewed 1998)

F2340 **Sanitizing for Safety**-(17 minute videotape). Provides an introduction to basic food safety for professional foodhandlers. A training pamphlet and quiz accompany the tape. Although produced by a chemical supplier, the tape contains minimal commercialism and may be a valuable tool for training new employees in the food industry. (Clorox-1990) (Reviewed 1998)

F2350 **ServSafe® Steps to Food Safety**-The ServSafe food safety series consists of six videos that illustrate and reinforce important food safety practices in an informative and entertaining manner. The videos provide realistic scenarios in multiple industry segments. English and Spanish are provided on each tape. (National Restaurant Association Education Foundation -2000)

Step One: Starting Out with Food Safety-(12 minute videotape). Defines what foodborne illness is and how it occurs; how foods become unsafe; and what safety practices to follow during the flow of food.

Step Two: Ensuring Proper Personal Hygiene-(10 minute videotape). Introduces employees to ways they might contaminate food; personal cleanliness practices that help protect food; and the procedure for thorough handwashing.

Step Three: Purchasing, Receiving and Storage-(12 minute videotape). Explains how to choose a supplier; calibrate and use a thermometer properly; accept or reject a delivery; and store food safely.

Step Four: Preparing, Cooking, and Serving-(11 minute videotape). Identifies proper practices for thawing, cooking, holding, serving, cooling and reheating food.

Step Five: Cleaning and Sanitizing-(11 minute videotape). Describes the difference between cleaning and sanitizing; manual and machine warewashing; how sanitizers work; how to store clean items and cleaning supplies; and how to setup a cleaning program.

Step Six: Take the Food Safety Challenge: Good Practices, Bad Practices — You Make the Call!-(35 minute videotape). Challenges viewers to identify good and bad practices presented in five short scenarios from different industry segments.

F2430 **Smart Sanitation: Principles & Practices for Effectively Cleaning Your Food Plant**-(20 minute videotape). A practical training tool for new sanitation employees or as a refresher for

veterans. Employees will understand the food safety impact of their day-to-day cleaning and sanitation activities and recognize the importance of their role in your company's food safety program. (Silliker Laboratories Group–1996)

F2370 **Supermarket Sanitation Program–"Cleaning & Sanitizing"**–(13 minute videotape). Contains a full range of cleaning and sanitizing information with minimal emphasis on product. Designed as a basic training program for supermarket managers and employees. (1989) (Reviewed 1998)

F2380 **Supermarket Sanitation Program–"Food Safety"**–(11 minute videotape). Contains a full range of basic sanitation information with minimal emphasis on product. Filmed in a supermarket, the video is designed as a basic program for manager training and a program to be used by managers to train employees. (1989) (Reviewed 1998)

F2390 **Take Aim at Sanitation**–(8 minute videotape). This video features tips on food safety and proper disposal of single service items. Also presented is an emphasis on food contact surfaces as well as the manufacture, storage and proper handling of these items. (Foodservice and Packaging Institute, Inc.–1995). (Available in Spanish)

F2410 **Wide World of Food-Service Brushes**–(18 minute videotape). Discusses the importance of cleaning and sanitizing as a means to prevent and control foodborne illness. Special emphasis is given to proper cleaning and sanitizing procedures and the importance of having properly designed and constructed equipment (brushes) for food preparation and equipment cleaning operations. (1989) (Reviewed 1998)

F2420 **Your Health in Our Hands–Our Health in Yours**–(8 minute videotape). For professional foodhandlers, the tape covers the do's and don'ts of foodhandling as they relate to personal hygiene, temperature control, safe storage and proper sanitation. (Jupiter Video Production–1993). (Reviewed 1998)

OTHER

M4010 **Diet, Nutrition & Cancer**–(20 minute videotape). Investigates the relationship between a person's diet and the risk of developing cancer. The film describes the cancer development process and identifies various types of food believed to promote and/or inhibit cancer. The film also provides recommended dietary guidelines to prevent or greatly reduce the risk of certain types of cancer.

M4020 **Eating Defensively: Food Safety Advice for Persons with AIDS**–(15 minute videotape). While HIV infection and AIDS are not acquired by eating foods or drinking liquids, persons infected with the AIDS virus need to be concerned about what they eat. Foods can transmit bacteria and viruses capable of causing life-threatening illness to persons infected with AIDS. This video provides information for persons with AIDS on what foods to avoid and how to better handle and prepare foods. (FDA/CDC–1989)

M4030 **Ice: The Forgotten Food**–(14 minute videotape). This training video describes how ice is made and where the critical control points are in its manufacture, both in ice plants and in on-premises locations (convenience stores, etc.); it documents the potential for illness from contaminated ice and calls on government to enforce good manufacturing practices, especially in on-premises operations where sanitation deficiencies are common. (Packaged Ice Association–1993)

M4040 **Legal Aspects of the Tampering Case**–(25 minute videotape). This was presented by Mr. James T. O'Reilly, University of Cincinnati School of Law at the fall 1986 Central States Association of Food and Drug Officials Conference. He emphasizes three factors from his police and legal experience–know your case, nail your case on the perpetrator, and spread the word. He outlines specifics under each factor. This should be of the greatest interest to regulatory sanitarians, in federal, state and local agencies. (1987)

M4050 **Personal Hygiene & Sanitation for Food Processing Employees**–(15 minute videotape). Illustrates and describes the importance of good personal hygiene and sanitary practices for people working in a food processing plant. (Iowa State–1993)

M4060 **Psychiatric Aspects of Product Tampering**–(25 minute videotape). This was presented by Emanuel Tanay, M.D. from Detroit, at the fall 1986 conference of CSAFDA. He reviewed a few cases and then indicated that abnormal behavior is like a contagious disease. Media stories lead to up to 1,000 similar alleged cases, nearly all of which are false. Tamper-proof packaging and recalls are essential. Tampering and poisoning are characterized by variable motivation, fraud and greed. Law enforcement agencies have the final responsibilities. Tamper proof containers are not the ultimate answer. (1987)

M4070 **Tampering: The Issue Examined**–(37 minute videotape). Developed by Culbro Machine Systems, this videotape is well done. It is directed to food processors and not regulatory sanitarians or consumers. A number of industry and regulatory agency management explain why food and drug containers should be made tamper evident. (Culbro–1987)

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- ❒ D1150 Processing Fluid Milk (slides)

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- ❒ E3010 The ABCs of Clean - A Handwashing & Cleanliness Program for Early Childhood Programs
- ❒ E3020 Acceptable Risks?
- ❒ E3030 Air Pollution: Indoor
- ❒ E3040 Asbestos Awareness
- ❒ E3055 Effective Handwashing-Preventing Cross-Contamination in the Food Service Industry
- ❒ E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- ❒ E3070 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)
- ❒ E3075 EPA: This is Super Fund
- ❒ E3080 Fit to Drink
- ❒ E3110 Garbage: The Movie
- ❒ E3120 Global Warming: Hot Times Ahead
- ❒ E3130 Kentucky Public Swimming Pool & Bathing Facilities
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- ❒ E3140 Putting Aside Pesticides
- ❒ E3150 Radon
- ❒ E3160 RCRA - Hazardous Waste
- ❒ E3170 The New Superfund: What It is & How It Works-(1) Changes in the Remedial Process: Clean-up Standards & State Involvement Requirements
- ❒ E3180 The New Superfund: What It is & How It Works-(2) Changes in the Removal Process: Removal & Additional Program Requirements
- ❒ E3190 The New Superfund: What It is & How It Works - (3) Enforcement and Federal Facilities
- ❒ E3210 The New Superfund: What It is & How It Works - (4) Emergency Preparedness & Community Right-to-Know
- ❒ E3220 The New Superfund: What It is & How It Works - (5) Underground Storage Tank Trust Fund & Response Program
- ❒ E3230 The New Superfund: What It is & How It Works - (6) Research & Development/Closing Remarks
- ❒ E3240 Sink a Germ
- ❒ E3245 Wash Your Hands
- ❒ E3250 Waste Not: Reducing Hazardous Waste

FOOD

- ❒ F2260 100 Degrees of Doom...The Time & Temperature Caper
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- ❒ F2005 A Lot on the Line
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- ❒ F2010 Close Encounters of the Bird Kind
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- ❒ F2037 Cooking and Cooling of Meat and Poultry Products
- ❒ F2030 "Egg Games" Foodservice Egg Handling and Safety
- ❒ F2020 Egg Handling & Safety
- ❒ F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef
- ❒ F2035 Fabrication and Curing of Meat and Poultry Products
- ❒ F2039 Food for Thought – The GMP Quiz Show
- ❒ F2040 Food Irradiation
- ❒ F2045 Food Microbiological Control
- ❒ F2050 Food Safe - Food Smart - HACCP & Its Application to the Food Industry (Part 1&2)
- ❒ F2060 Food Safe - Series I (4 Videos)
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- ❒ F2103 Tape 4-Food Safety for Food Service: Time and Temperature Controls
- ❒ F2120 Food Safety: For Goodness Sake, Keep Food Safe
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- ❒ F2125 Food Safety Zone: Basic Microbiology
- ❒ F2126 Food Safety Zone: Cross Contamination
- ❒ F2127 Food Safety Zone: Personal Hygiene
- ❒ F2128 Food Safety Zone: Sanitation
- ❒ F2135 Get with a Safe Food Attitude
- ❒ F2137 GMP Basics: Avoiding Microbial Cross-Contamination
- ❒ F2140 GMP Basics: Employee Hygiene Practices
- ❒ F2143 GMP Basics: Guidelines for Maintenance Personnel
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- ❒ F2390 Take Aim at Sanitation
- ❒ F2410 Wide World of Food Service Brushes
- ❒ F2420 Your Health in Our Hands - Our Health in Yours

OTHER

- ❒ M4010 Diet, Nutrition & Cancer
- ❒ M4020 Eating Defensively: Food Safety Advice for Persons with AIDS
- ❒ M4030 Ice: The Forgotten Food
- ❒ M4040 Legal Aspects of the Tampering Case
- ❒ M4050 Personal Hygiene & Sanitation for Food Processing Employees
- ❒ M4060 Psychiatric Aspects of Product Tampering
- ❒ M4070 Tampering: The Issue Examined

Visit our Web site at www.foodprotection.org for detailed tape descriptions

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MEMBERSHIP ACHIEVEMENT FOR AFFILIATES

Highest Number Increase:
California Association of Dairy and Milk Sanitarians
and
Georgia Association of Food and Environmental Sanitarians

Highest Percentage Increase:
Mexico Association for Food Protection

Ivan Parkin Lecture

Sunday Evening — August 5, 2001
7:00 p.m.

Dr. Linda A. Detwiler

Senior Staff Veterinarian
USDA/APHIS, Veterinary Services
Robbinsville, New Jersey

Bovine Spongiform Encephalopathy: An Update

Dr. Linda A. Detwiler will present the Ivan Parkin Lecture titled "Bovine Spongiform Encephalopathy: An Update" at the Sunday Evening Opening Session of IAFP 2001 – the Association's 88th Annual Meeting.

Dr. Detwiler is the Senior Staff Veterinarian with the United States Department of Agriculture (USDA) in Robbinsville, New Jersey. She works in the Animal and Plant Health Inspection Service (APHIS) Veterinary Services, Emergency Program where she coordinates APHIS surveillance, prevention and education activities for Bovine Spongiform Encephalopathy (BSE). Dr. Detwiler provides technical advice on Transmissible Spongiform Encephalopathies (TSEs) for USDA, the public, industry groups, foreign governments, and other entities. She acts as media spokesperson for APHIS activities in regards to TSEs in national and international arenas. In addition, Dr. Detwiler serves on national and international TSE advisory committees and coordinated the development of a national BSE response plan. She has authored publications, articles, and decision memos on TSEs.

Dr. Detwiler obtained her BS degree in Dairy Science at the Delaware Valley College of Science and Agriculture and completed her DVM at Ohio State University College of Veterinary Medicine. She previously held positions as the Veterinary Medical Officer for Ohio, the Assistant Veterinarian in Charge for the New England States, the Veterinarian in Charge for New Jersey and currently is the Senior Staff Veterinarian for Small Ruminants with USDA. She is an active member and present coordinator of USDA, APHIS' TSE Working Group since 1990. Dr. Detwiler serves on the TSE Advisory Committee / Working Groups to the European Union, Argentina, the United Kingdom and the FDA. She also served on the combined industry / government BSE committee in the early 1990s.

Dr. Detwiler also has been involved with the sheep industry in their efforts to control scrapie since 1985 and served as one of the APHIS representatives on the Scrapie Negotiated Rulemaking Committee.

Be sure to join us for Dr. Detwiler's Lecture, "Bovine Spongiform Encephalopathy: An Update" at the Opening Session, 7:00 p.m. Sunday, August 5, 2001.

August 5-8, 2001

Hilton Minneapolis
Minneapolis, Minnesota

Preliminary Program

P – Posters; S – Symposia; T – Technicals

Program subject to change

SUNDAY EVENING — AUGUST 5, 2001
7:00 p.m. — 8:00 p.m.

Opening Session

- Presentation of the International Association for Food Protection Fellows Awards
- Ivan Parkin Lecture – **Bovine Spongiform Encephalopathy: An Update,** Dr. Linda Detwiler, Senior Staff Veterinarian, USDA/ Animal and Plant Health Inspection Service, Robbinsville, New Jersey

Cheese and Wine Reception will follow in the Exhibit Hall

MONDAY MORNING — AUGUST 6, 2001
8:30 a.m. — 12:00 p.m.

S01 Moving Beyond HACCP — Risk Management and Food Safety Objectives, Session I
(Sponsored by ILSI-NA)

8:30 ♦ Introduction: International Commission on Microbiological Specifications for Foods (ICMSF) Framework for Managing the Safety of Foods – TERRY A. ROBERTS, ICMSF, Reading, UK

8:50 ♦ Assessing Risks and Establishing Food Safety Objectives – ROBERT L. BUCHANAN, FDA-CFSAN, Washington, D.C., USA

9:20 ♦ On-the-line: Process and Performance Criteria – MARTIN COLE, Food Science Australia, North Ryde, New South Wales, Australia

9:50 ♦ Break

10:20 ♦ Use and Misuses of Microcriteria for Foods –MICHIEL VAN SCHOTHORST, Nestlé, S.A., Vevey, Switzerland

10:50 ♦ Applying ICMSF Processes for Foods – R. BRUCE TOMPKIN, ConAgra Refrigerated Prepared Food, Downers Grove, IL, USA

11:20 ♦ Panel Discussion

S02 Impact of Water Quality on Food Safety
(Sponsored by IAFP Foundation Fund)

8:30 ♦ Safety of Potable Water from Municipal Treatment Plants/Distribution Systems – MARK W. LECHEVALLIER, American Water Works Service Company, Inc., Voorhees, NJ, USA

9:00 ♦ The Walkerton Water Disaster: Our Changing Environment Water Advisory: The Walkerton Experience – MURRAY S. MCQUIGGE, Bruce-Grey-Owen Sound Health Unit, Owen Sound, Ontario, Canada

9:30 ♦ Food Production and Processing Risks Using Recycled Water – DEAN O. CLIVER, University of California-Davis, Davis, CA, USA

10:00 ♦ Break

10:30 ♦ Public Health Risks in the Food Industry Associated with Viral Contamination of Potable Water – LEE-ANN JAYKUS, North Carolina State University, Raleigh, NC, USA

11:00 ♦ Public Health Risks in the Food Industry Associated with Parasitic Contamination of Potable Water: Outbreaks and Detection – HUW V. SMITH, Scottish Parasite Diagnostic Laboratory, Glasgow, UK

11:20 ♦ Public Health Risks in the Food Industry Associated with Parasitic Contamination of Potable Water: Risk Assessent and Control Methods – NIGEL COOK, Central Science Laboratory, York, UK

11:45 ♦ Panel Discussion

S03 Improving Laboratory Quality Assurance in the Real World

8:30 ♦ Laboratory QA: Basic Challenges and Issues – RUSSELL FLOWERS, Silliker Laboratories, Homewood, IL, USA

9:15 ♦ Industry Perspectives on Lab Quality Assurance – LORALYN LEDENBACH, Kraft Foods Inc., Glenview, IL, USA

10:00 ♦ Break

10:30 ♦ The Role of Proficiency Testing in Laboratory Quality Assurance – ARLENE FOX, AOAC International, Gaithersburg, MD, USA

11:00 ♦ International Perspectives on Laboratory Quality Assurance – MICHAEL BRODSKY, Brodsky Consultants, Thornhill, Ontario, Canada

11:30 ♦ Good Laboratory Practices: The Foundation of an Effective Quality Assurance Program – SUZANNE TORTORELLI, Campbell Soup Company, Camden, NJ, USA

S04 Food Allergens — Current Issues and Concerns

(Sponsored by IAFP Foundation Fund)

8:30 ♦ Consumer Issues – ANN MUNOZ-FURLONG, Food Allergy Network, Fairfax, VA, USA

9:00 ♦ Analytical Information – Methods and Findings – STEVE TAYLOR, University of Nebraska-Lincoln, Lincoln, NE, USA

9:30 ♦ Supplier Issues – KEVIN FARNUM, General Mills, Inc., Minneapolis, MN, USA

10:00 ♦ Break

10:30 ♦ In-plant Practices – KEVIN FARNUM, General Mills, Inc., Minneapolis, MN, USA

11:00 ♦ Regulatory Perspective – KEN FALCI, FDA, Washington, D.C., USA

11:30 ♦ Legal Issues and Perspective – MARTIN HAHN, Hozan and Hartson, Washington, D.C., USA

T01 Meat Microbiology

8:30 T1 ♦ Evaluation of Methods for Sampling Rectal Colonal Feces, Hides, and Carcasses to Test for Presence of *Escherichia coli* O157:H7 and *Salmonella* spp. – J. R. RANSOM, R. T. Bacon, K. E. Belk, J. N. Sofos, J. A. Scanga, and G. C. Smith, Colorado State University, Fort Collins, CO, USA

8:45 T2 ♦ Rapid Detection of *Escherichia coli* O157:H7 in Raw Ground Beef via PCR Using a 375 g Sample Composite and Short Enrichment – C. E. Miller, E. R. Richter, and W. M. BARBOUR, Qualicon, Inc., Wilmington, DE, USA

9:00 T3 ♦ Withdrawn

9:15 T4 ♦ Combined Treatments of 2% Lactic Acid (80°C) and Microwaves for the Reduction of Natural Microflora and *Escherichia coli* O157:H7 on Vacuum-packaged Beef Subprimals – BETH A. CROZIER-DODSON, Daniel Y. C. Fung, Jin-Man Kim, and Leslie K. Thompson, Kansas State University, Manhattan, KS, USA

9:30 T5 ♦ Inhibition of *Listeria monocytogenes* on Hot Dogs Using Antimicrobial Whey Protein-based Edible Casings – A. CAGRI, Z. Ustunol, W. N. Osburn, and E. T. Ryser, Michigan State University, East Lansing, MI, USA

9:45 T6 ♦ Effects of Dried Prune Purees on Suppression of Growth of Foodborne Pathogens in Ground Beef – LESLIE K. THOMPSON and Daniel Y. C. Fung, Kansas State University, Manhattan, KS, USA

10:00 ♦ Break

10:30 T7 ♦ Application of Potassium Sorbate and Other Antimicrobial Ingredients to Control *Listeria monocytogenes* in Ready-to-eat Meat and Poultry Products – W. PAYTON PRUETT, JR., Robin Kalinowski, and Jennifer Schmelder, ConAgra Refrigerated Prepared Foods, Downers Grove, IL, USA

10:45 T8 ♦ Serotype Tracking of *Salmonella* through Integrated Broiler Chicken Operations – J. S. BAILEY, N. A. Cox, N. J. Stern, and S. E. Craven, USDA-ARS, Athens, GA, USA

11:00 T9 ♦ Microbiological Risk Assessment on Raw Pork Carcasses in Ontario Abattoirs – PAT JOHNSON, Joseph Odumeru, Abdullahi Mahdi, Tom Baker, Christine Power, and Frank Pollari, Ontario Ministry of Agriculture, Food and Rural Affairs, Guelph, Ontario, Canada

11:15 T10 ♦ Evaluations of Acidified Sodium Chlorite for Use on Red Meats – T. Rourke, M. Guerra, G. K. Kemp, B. C. TINSLEY, C. C. Warf, T. G. Richardson, P. L. Baxter, and K. R. Schneider, Alcide Corporation, Redmond, WA, USA

11:30 T11 ♦ Comparative Studies of the Microbial-Vac™, a Non-destructive Wet-vacuum Microbial Collection System on Beef Carcasses – BRUCE J. BRADLEY, Filomena S. Saddler, and Danielle J. Prescott, Rocky Mountain Resource Labs, Inc., Jerome, ID, USA

11:45 T12 ♦ Real Time Detection of Pathogenic *Vibrio parahaemolyticus* in Oysters – ANGELO DEPAOLA, George Blackstone, Jessica Jones, Michael Bowen, and Richard Meyer, FDA, Dauphin Island, AL, USA

P01 Produce Microbiology

10:00 a.m. – 1:00 p.m.
(Authors present 10:30 a.m. – 12:30 p.m.)

P1 ♦ Comparative Study of *Toxoplasma gondii* Oocysts on Raspberries and Blueberries – K. K. PHELPS, S. S. Sumner, D. S. Lindsay, J. P. Dubey, and M. D. Pierson, Virginia Tech., Blacksburg, VA, USA

P2 ♦ Development of a Standard Method to Detect *Giardia* on Fresh Fruit and Vegetables – NOREEN WILKINSON, K. L. Barker, C. A. Paton, R. A. B. Nichols, H. V. Smith, and N. Cook, Central Science Laboratory, York, N. Yorks, UK

P3 ♦ Isolation of Potential Microbial Competitors of Foodborne Pathogens for Use on Fresh and Minimally-processed Produce – KAREN M. CRAMP and Mark A. Harrison, University of Georgia, Athens, GA, USA

P4 ♦ Consumer Handling of Fresh Produce – AMY E. LI and Christine M. Bruhn, University of California-Davis, Davis, CA, USA

P5 ♦ Withdrawn

P6 ♦ Evaluation of Postharvest Survival and Growth of *Salmonella*, *Escherichia coli*, and *Listeria* on Peaches – R. Cifuentes, S. Goerge, A. Hernandez, T. Parnell, L. J. Harris, and T. SUSLOW, University of California-Davis, Davis, CA, USA

P7 ♦ *Salmonella* Inactivation from the Surface of Whole and Cut Produce by Gaseous Ozone – JOSEPH EIFERT, Parameswarakumar Mallikarjunan, and Fletcher Arritt, Virginia Tech., Blacksburg, VA, USA

P8 ♦ Is *Salmonella enterica* a Good Colonizer of Plant Surfaces? – MARIA BRANDL and Robert Mandrell, USDA-ARS-WRRC, Albany, CA, USA

P9 ♦ Reducing *Salmonella* on the Surface of Apples Using Wash Practices Commonly Used by Consumers – TRACY L. PARNELL and Linda J. Harris, University of California-Davis, Davis, CA, USA

P10 ♦ Isolation and Characterization of a *Lactobacillus plantarum* Bacteriophage from Cucumber Fermentation – ZHONGJING LU, Fred Breidt, Jr., and Henry P. Fleming, USDA-ARS, Raleigh, NC, USA

P11 ♦ Effect of Glycine Betaine on Survival of *Lactococcus lactis* in Fresh, Refrigerated, Spicy Cucumbers – LAURA D. REINA, Fred Breidt, Jr., and Henry P. Fleming, USDA-ARS, Raleigh, NC, USA

P12 ♦ Reduction of *Listeria monocytogenes* on Green Peppers (*Capsicum annuum*) by Gaseous and Aqueous Chlorine Dioxide and Water Washing, and Its Growth at Refrigerated Temperature – Y. HAN, R. H. Linton, P. E. Nelson, and S. S. Nielsen, Purdue University, West Lafayette, IN, USA

P13 ♦ Mold and Yeast Flora in Fresh Fruits – VALERIE TOURNAS, FDA, Washington, D.C., USA

P14 ♦ Improved Quality and Fumonisin Levels in Mexican Corn – H. Calderón, R. Márquez, A. Arias, S. D. PENA-BETANCOURT, and J. Saltijeral, Universidad Autonoma Metropolitana, Mexico City, Distrito Federal, Mexico

P15 ♦ Spread of *Listeria monocytogenes* during Preparation of Freshly Squeezed Orange Juice – N. E. MARTINEZ-GONZALES, A. Hernandez-Herrera, L. Martinez-Chavez, L. Mota de la Garza, and A. Castillo, University of Guadalajara, Guadalajara, Jalisco, Mexico

P16 ♦ Effects of pH and Temperature on Inactivation of *Escherichia coli* O157:H7 in a Model Apple Cider System – DIANNE R. RIPBERGER, Richard H. Linton, and John D. Floros, Purdue University, West Lafayette, IN, USA

P17 ♦ A Survey of Production Practices and Microbial Contamination in Iowa Apple Cider – ALECIA CUMMINS and Bonita Glatz, Iowa State University, Ames, IA, USA

P18 ♦ Elimination of *Escherichia coli* O157:H7 in Apple Cider by Electron Beam Irradiation – HUI WANG, Cheryll Reitmeier, and Bonita Glatz, Iowa State University, Ames, IA, USA

P19 ♦ Influence of Temperature on Inactivation of *Escherichia coli* O157:H7 and *Salmonella* in Apple Cider and Orange Juice Treated with Ozone – R. C. WILLIAMS, C. A. Lakins, D. A. Golden, and S. S. Sumner, University of Tennessee, Knoxville, TN, USA

P20 ♦ Chemical Inactivation of *Escherichia coli* O157:H7 and *Salmonella* spp. in Apple Cider and Orange Juice – C. A. LAKINS, D. A. Golden, and S. S. Sumner, University of Tennessee, Knoxville, TN, USA

P21 ♦ Survival of *Salmonella* in Calcium-fortified Orange Juice at Refrigeration Temperature – M. SHARMA, L. R. Beuchat, M. P. Doyle, and J. Chen, University of Georgia, Griffin, GA, USA

P22 ♦ Survival Differences of Enterohemorrhagic *Escherichia coli* O157:H7 Strains in Three Apple Varieties at 25° and 4°C – MARLENE E. JANES, Tajhma Cobbs, and Mike G. Johnson, University of Arkansas, Fayetteville, AR, USA

P23 ♦ Effect of Low-temperature, High-pressure Treatment on the Survival of *Escherichia coli* O157:H7 and *Salmonella* in Unpasteurized Fruit Juices – Alex Yeow-Lim Teo, SADHANA RAVISHANKAR, and Charles E. Sizer, The National Center for Food Safety and Technology, Summit-Argo, IL, USA

P24 ♦ Validation of Thermal Pasteurization Treatments for Commercial Apple Ciders Using *Escherichia coli* O157:H7 – P. MAK, S. C. Ingham, and B. H. Ingham, University of Wisconsin-Madison, Madison, WI, USA

P25 ♦ Inactivation of *Listeria monocytogenes* in Cinnamon-added Apple Juice – Josep Yuste and DANIEL Y. C. FUNG, Kansas State University, Manhattan, KS, USA

P26 ♦ Transmission and Internalization of *Escherichia coli* O157:H7 from Contaminated Cow Manure into Lettuce Tissue as Monitored by Laser Scanning Confocal Microscopy – ETHAN B. SOLOMON, Sima Yaron, and Karl R. Matthews, Rutgers University, Cook College, New Brunswick, NJ, USA

P27 ♦ Evaluation of Various Household Sanitizers for Eliminating *Escherichia coli* on Lettuce –CHITRA VIJAYAKUMAR and Charlene Wolf-Hall, North Dakota State University, Fargo, ND, USA

P28 ♦ Effectiveness of Water Rinse as a Means for Pathogen Recovery in Lettuce – TONG-JEN FU and Olif Vanpelt, FDA, Summit-Argo, IL, USA

P29 ♦ Simulation of an *Escherichia coli* O157:H7 Lettuce Outbreak in a Restaurant Setting: Survival of *E. coli* O157:H7 on and Contamination of Shredded Lettuce – MARIAN R. WACHTEL and Amy O. Charkowski, USDA-ARS-BARC-W-PQSL, Beltsville, MD, USA

P30 ♦ Changes in Appearance and Natural Microflora on Iceberg Lettuce Treated in Warm Chlorinated Water and Then Stored at Refrigeration Temperature – Y. LI, R. E. Brackett, R. L. Shewfelt, and L. R. Beuchat, University of Georgia, Griffin, GA, USA

P31 ♦ Comparison of Commercial Cleaners for Effectiveness in Removing *Salmonella* and *Escherichia coli* O157:H7 from the Surface of Apples – STEPHEN J. KENNEY and Larry R. Beuchat, University of Georgia, Griffin, GA, USA

P32 ♦ Destruction of *Escherichia coli* O157:H7 on Apples of Different Varieties Treated with Citric Acid before Drying – S. LAKKAKULA, P. A. Kendall, J. Samelis, and J. N. Sofos, Colorado State University, Fort Collins, CO, USA

P33 ♦ Destruction of *Escherichia coli* O157:H7 during Drying of Apple Slices Pre-treated with Acidic Solutions after Inoculation – E. L. DERRICKSON, P. A. Kendall, and J. N. Sofos, Colorado State University, Fort Collins, CO, USA

P34 ♦ The Localization and Persistence of Bacterial and Viral Contaminants on the Surface of Inoculated Cantaloupe and Their Response to Disinfection Treatments – MICHAEL L. BRADLEY, Jerzy Lukasik, Mark L. Tamplin, and Samuel R. Farrah, University of Florida, Gainesville, FL, USA

P35 ♦ Minimum Bacteriostatic and Bactericidal Concentrations of Various Household Sanitizers for *Escherichia coli* – CHITRA VIJAYAKUMAR and Charlene Wolf-Hall, North Dakota State University, Fargo, ND, USA

P36 ♦ The Bactericidal Effect of Chlorine Dioxide Treatment against *Salmonella* spp., *Escherichia coli* O157:H7, and *Listeria monocytogenes* Inoculated on Tomatoes and Carrots – I-HSUAN CHEN, J. Kim, T. S. Huang, D. E. Conner, S. J. Weese, F. M. Woods, and C. I. Wei, Auburn University, Auburn, AL, USA

P37 ♦ Enhancement of the Microbiological Quality of Selected Ready-to-eat Vegetables Disinfected by Chloramine, Chlorine, Ethanol, and Ozone – T. T. TRAN, J. I. Uwaleke, R. L. Thunberg, C. R. Warner, and S. J. Chirtel, FDA, Washington, D.C., USA

P38 ♦ Assessment of the Antibacterial Efficacy of Fruit and Vegetable Washes Using In-vitro and In-situ Methods – CHARLES A. PETTIGREW, Andrea B. Burnett, Larry R. Beuchat, E. Fernandez Escartín, Theresa M. Kajs, Russ D. Poehner, and Charles H. Taylor, The Procter & Gamble Company, Cincinnati, OH, USA

P39 ♦ Inactivation of Pathogenic Bacteria on Lettuce by Hydrogen Peroxide and Mild Heat – CHIA-MIN LIN, Sarah S. Moon, Kay H. McWatters, and Michael P. Doyle, University of Georgia, Griffin, GA, USA

P40 ♦ Comparison of Peptone Water and Dey-Engley Neutralizing Broth in Recovering Bacteria from the Surface of Fresh Produce Treated with Lactic Acid and Hydrogen Peroxide – CHIA-MIN LIN, Hannalore Bailey, Sarah S. Moon, and Michael P. Doyle, University of Georgia, Griffin, GA, USA

P41 ♦ Evaluation of Volatile Chemical Treatments for Lethality to *Salmonella* on Seeds and Sprouts – W. R. Weissinger, K. H. McWatters, and L. R. BEUCHAT, University of Georgia, Griffin, GA, USA

MONDAY AFTERNOON — AUGUST 6, 2001
1:30 p.m. — 5:00 p.m.

S05 Moving Beyond HACCP — Risk Management and Food Safety Objectives, Session II

(Sponsored by ILSI-N.A.)

1:30 ♦ What are Food Safety Objectives and How do They Relate to Public Health Objectives? – R. BRUCE TOMPKIN, ConAgra Refrigerated Prepared Food, Downers Grove, IL, USA

2:00 ♦ What Role Should Food Safety Objectives Play in the United States Food Industry and How Will They Affect the Way Industry Does HACCP? – DON L. ZINK, Future Beef Operations, LLC, Thousand Oaks, CA, USA

2:30 ♦ What Role Should Food Safety Objectives Play in the Regulatory Process? – ROBERT L. BUCHANAN, FDA-CFSAN, Washington, D.C., USA

3:00 ♦ Break

3:30 ♦ An International Perspective on Food Safety Objectives – STEVE C. HATHAWAY, MAF Food Assurance Authority, Gisborne, New Zealand

4:00 ♦ How Can We Educate the Public about Tolerable Level of Risk/Acceptable Level of Protection? – DOUG POWELL, University of Guelph, Guelph, Ontario, Canada

4:30 ♦ Panel Discussion

S06 USDA Competitive Grants in Food Safety and the Awards Process

1:30 ♦ Enhancing Food Safety and Epidemiological Approaches to Food Safety (NRI) – ETTA SALTOS, USDA-CSREES, Washington, D.C., USA

2:00 ♦ National Integrated Food Safety Initiative Grants (406) – JAN SINGLETON, USDA-CSREES, Washington, D.C., USA

2:30 ♦ Initiative for Future Agriculture and Food Systems (401), RFP Formulation and Stakeholder's Input – DAMANNA RAMKISHAN RAO, USDA-CSREES, Washington, D.C., USA

3:00 ♦ Break

3:30 ♦ Awards Process: A Panel Manager's Perspective – SUSAN S. SUMNER, Virginia Tech., Blacksburg, VA, USA

4:00 ♦ Winning Integrated Proposals: A Winner's Perspective – PATRICIA A. KENDALL, Colorado State University, Fort Collins, CO, USA

4:30 ♦ Panel Discussion

S07 Food Safety in the Digital Age

1:30 ♦ From Data to Knowledge Management – KAREN MULLERY, 3M Microbiology, St. Paul, MN, USA

1:40 ♦ New and Emerging Information Technologies – JOHN GRIGGS, GSC Mobile Solutions, East Lansing, MI, USA

2:00 ♦ From EpiInfo to FoodNet: Improving Surveillance and Outbreak Response – ARTHUR P. LIANG, CDC, Atlanta, GA, USA

2:30 ♦ Meeting Regulatory Requirements for Electronic Record Keeping and Electronic Signatures (21 CFR 11) – JOHN LARKIN, FDA, Summit-Argo, IL, USA

3:00 ♦ Break

3:30 ♦ Emerging Technologies to Map and Mitigate Biocontaminants – RICK BRENNER, USDA-ARS-CMAVE, Gainesville, FL, USA

4:00 ♦ Using Information Technology to Make Better Business Decisions – MARK CARTER, McKee Foods, Collegedale, TN, USA

4:30 ♦ Kraft Takes a Byte Out of Food Safety – LORI LEDENBACH, Kraft Foods, Glenview, IL, USA

S08 Dairy Plant HACCP — Where are We and Where are We Going?

(Sponsored by Foss North America)

1:30 ♦ Outline of HACCP Pilot Program – WILLIAM SVEUM, Kraft Foods, Madison, WI, USA

2:00 ♦ Evaluation of Pilot at Present and Long-term Goals – SUSAN CRAWFORD, Michigan Dept. of Agriculture, East Lansing, MI, USA

2:45 ♦ Overview of HACCP Pilot Results – JOHN RUSHING, North Carolina State University, Raleigh, NC, USA

3:15 ♦ Break

3:30 ♦ First Hand HACCP Pilot Experience – REBECCA PISTON, Garelick Farms, Division of Suiza Foods, Bangor, ME, USA

4:00 ♦ What Happens to PMO with HACCP (SSOP's and HACCP Pilot) – STEVE SIMS, FDA, Milk Safety Branch, Washington, D.C., USA

4:30 ♦ FDA Juice HACCP Regulations Versus NCIMS Dairy Pilot Program – KATHY GOMBAS, FDA, Division of HACCP, Washington, D.C., USA

T02 General Food Microbiology

1:30 T13 ♦ A Microbial Survey of Toilet Paper and Associated Performance Variables Related to Its Role in Reducing Communicable Disease Transmission – BARRY MICHAELS, Marlene Celis, Troy Ayers, and Vidhya Gangar, Georgia-Pacific Corporation, Palatka, FL, USA

1:45 T14 ♦ Evaluation of the Combined Effects of Selective Handwashing Water Temperatures and Antimicrobial Soaps on Microbial Reduction Efficacy and Skin Irritation – BARRY MICHAELS, James Budd, Troy Ayers, Christopher Beausoliel, and Daryl Paulson, Georgia-Pacific Corporation, Palatka, FL, USA

2:00 T15 ♦ Application of Real Time Temperature Monitoring for Food Safety and Quality Manangement in Food Retail – ALAN CAMERICK HELLER, Bruce Cords, and Meto Raha, FreshLoc Technologies, Inc., Plano, TX, USA

2:15 T16 ♦ A Microbial Survey of Household Can Openers, Food and Beverage Can Tops, and Cleaning Methodology Effectiveness – Barry Michaels, Vidhya Gangar, Ann Schultz, Michael S. Curiale, and TROY AYERS, Ayers Hygiene Consulting, Gainesville, FL, USA

2:30 T17 ♦ Inhibitory Activity of Honey against Foodborne Pathogens as Influenced by the Presence of Hydrogen Peroxide and Level of Antioxidant Power – PETER J. TAORMINA, Brendan A. Niemira, and Larry R. Beuchat, University of Georgia, Griffin, GA, USA

2:45 T18 ♦ Sensitization of Gram-negative Bacteria for Antimicrobial Peptides under High Hydrostatic Pressure: Role of Cell Surface Characteristics – BARBARA MASSCHALCK and Christiaan W. Michiels, Catholic University of Leuven, Leuven, Belgium

3:00 ♦ Break

3:30 T19 ♦ Protective Effect of Colanic Acid of *Escherichia coli* O157:H7 to Environmental Stress – Y. Mao, S. M. Lee, J. G. Adams, M. P. Doyle, and J. CHEN, University of Georgia, Griffin, GA, USA

3:45 T20 ♦ Bactericidal Activity of Oleate Towards Vegetative Cells and Endospores of *Clostridium perfringens* – ARTHUR HINTON, JR. and Kimberly D. Ingram, USDA-RRC, Athens, GA, USA

4:00 T21 ♦ Validating Sanitation Regimes in Drink Vending and Post-mix Systems – J. BARON, L. F. Fielding, and A. Peters, University of Wales Institute, Cardiff, Cardiff, UK

4:15 T22 ♦ Providing Safe Food for the Homeless and Destitute: An Educational Program for Soup Kitchen Workers – DONNA L. SCOTT and Robert B. Gravani, Cornell University, Ithaca, NY, USA

4:30 T23 ♦ Microbiological Survey of Hot-air Hand Dryers from Various Locations – BARRY MICHAELS, Armondo D'Onorio, Maria Arenas, Marlene Cellis, and Vidhya Gangar, Georgia-Pacific Corporation, Palatka, FL, USA

4:45 T24 ♦ Pathogenic and Indicator Bacteria Associated with Handwashing and Drying Contact Surfaces – BARRY MICHAELS, Brian Smith, and Merle Pierson, Georgia-Pacific Corporation, Palatka, FL, USA

P02 Meat Microbiology

3:00 p.m. – 6:00 p.m.
(Authors present 3:30 p.m. – 5:30 p.m.)

P42 ♦ Inhibition of *Listeria monocytogenes* on Turkey Frankfurters by Carbon Dioxide and Chemical Additives – J. A. GOODE, M. D. Pierson, S. S. Sumner, and J. E. Marcy, Virginia Tech., Blacksburg, VA, USA

P43 ♦ Inhibition of *Listeria monocytogenes* by Sodium Diacetate and Sodium Lactate on Wieners and Cooked Bratwurst – KATHLEEN A. GLASS, Dawn A. Granberg, Angelique L. Smith, and Eric A. Johnson, University of Wisconsin-Madison, Madison, WI, USA

P44 ♦ Radiation Resistance of *Listeria monocytogenes* Isolated from Frankfurters – CHRISTOPHER H. SOMMERS, USDA-ARS-NAA-ERRC-FS, Wyndmoor, PA, USA

P45 ♦ Control of *Listeria monocytogenes* on Turkey Frankfurters by GRAS Preservatives – MAHBUB ISLAM, Michael P. Doyle, Jinru Chen, and Manjeet Chinnan, University of Georgia, Griffin, GA, USA

P46 ♦ Effect of Antimicrobials in the Formulation and Post-packaging Thermal Pasteurization on *Listeria monocytogenes* Inoculated on Frankfurters after Peeling – G. BEDIE, J. Samelis, J. N. Sofos, K. E. Belk, J. A. Scanga, and G. C. Smith, Colorado State University, Fort Collins, CO, USA

P47 ♦ Treatments to Control Post-processing Contamination by *Listeria monocytogenes* on Sliced Pork Bologna Stored at 4°C in Vacuum Packages – M. L. Kain, J. Samelis, J. N. SOFOS, K. E. Belk, J. A. Scanga, and G. C. Smith, Colorado State University, Fort Collins, CO, USA

P48 ♦ Combinations of Nisin with Organic Acids or Salts to Control Post-processing Contamination of *Listeria monocytogenes* on Sliced, Vacuum Packaged Pork Bologna at 4°C – J. SAMELIS, M. L. Kain, J. N. Sofos, J. A. Scanga, K. E. Belk, and G. C. Smith, Colorado State University, Fort Collins, CO, USA

P49 ♦ Fate of Acid-adapted and Non-adapted *Listeria monocytogenes* on Fresh Beef Following Acid and Non-acid Decontamination Treatments – J. S. IKEDA, J. Samelis, P. A. Kendall, G. C. Smith, and J. N. Sofos, Colorado State University, Fort Collins, CO, USA

P50 ♦ Lactic Acid Sensitization of *Salmonella* Typhimurium DT 104 and *Listeria monocytogenes* in Non-acid (Water) Meat Decontamination Fluids at 10°C – J. SAMELIS, J. N. Sofos, P. A. Kendall, and G. C. Smith, Colorado State University, Fort Collins, CO, USA

P51 ♦ Biofilm Formation by Acid-adapted and Non-adapted *Listeria monocytogenes* in Fresh Meat Decontamination Washings and Its Destruction by Sanitizers – J. D. STROPFORTH, J. Samelis, J. N. Sofos, P. A. Kendall, G. C. Smith, Colorado State University, Fort Collins, CO, USA

P52 ♦ Inactivation of *Listeria monocytogenes* in Packaged Hot Dogs and Luncheon Meats by High Pressure Processing (HPP) – P. J. Slade, C. Martino, S. Ravishankar, N. MAKS, C. Rodriguez, O. Martin, and V. M. (Bala) Balasubramaniam, Illinois Institute of Technology, Summit-Argo, IL, USA

P53 ♦ Survival of *Salmonella* spp. and *Listeria monocytogenes* during Manufacture of Italian Salami – K. D. KERR, H. Thippareddi, R. K. Phebus, J. L. Marsden, and C. L. Kastner, Kansas State University, Manhattan, KS, USA

P54 ♦ *Salmonella* spp. Risk Assessment for Production and Cooking of Non-intact Pork Products – D.L. LAMBERT, R. K. Phebus, H. Thippareddi, J. L. Marsden, and C. L. Kastner, Kansas State University, Manhattan, KS, USA

P55 ♦ Biofilm Development by *Listeria monocytogenes* under Ready-to-eat Meat Processing Conditions and a Control Strategy Using Cold Plasma Technology – EILEEN B. SOMERS and Amy C. L. Wong, University of Wisconsin-Madison, Madison, WI, USA

P56 ♦ Enhanced Inhibition of *Listeria monocytogenes* and *Salmonella enterica* Serovar Enteritidis in Beef Bologna by Combinations of Lactate and Diacetate – EVELYNE MBANDI and Leora A. Shelef, Wayne State University, Detroit, MI, USA

P57 ♦ Survival and Recovery of *Listeria monocytogenes* on Ready-to-eat Meats Inoculated Using Desiccated and Nutritionally Depleted Vectors – M. A. DE ROIN, S. C. C. Foong, and J. S. Dickson, Iowa State University, Ames, IA, USA

P58 ♦ Post-process Pasteurization of Packaged Ham, Roast Beef, and Turkey Breast Surfaces to Reduce *Listeria monocytogenes* – VINEET S. GILL, H. Thippareddi, R. K. Phebus, J. L. Marsden, and C. L. Kastner, Kansas State University, Manhattan, KS, USA

P59 ♦ Post-process Pasteurization of Kielbasa (Full and Half) and Salami to Reduce Surface *Listeria monocytogenes* – VINEET S. GILL, H. Thippareddi, R. K. Phebus, J. L. Marsden, and C. L. Kastner, Kansas State University, Manhattan, KS, USA

P60 ♦ Inhibition of *Listeria monocytogenes* by Sodium Diacetate and Potassium Lactate in Cured, Ready-to-eat Processed Meat Products at Refrigerated Temperatures – D. L. Seman, A. C. BORGER, J. D. Meyer, A. L. Milkowski, and P. A. Hall, Kraft Foods/Oscar Mayer Div., Madison, WI, USA

P61 ♦ Application of the Bacteriocinogenic *Lactobacillus sake* 2a to Prevent Growth of *Listeria monocytogenes* in Brazilian Sausage (Lingüiça Frescal) Packed with Different Atmospheres – Alcina M. Liserre and BERNADETTE D. G. FRANCO, Universidade de Sao Paulo, São Paulo, São Paulo, Brazil

P62 ♦ The Presence of *Campylobacter* and *Salmonella* in Retail Poultry and Packaging – WENDY HARRISON, Chris Griffith, David Tennant, and Adrian Peters, University of Wales Institute, Cardiff, Cardiff, Wales, UK

P63 ♦ PCR-based Fluorescent Method for Rapid Detection of *Campylobacter jejuni* and *Salmonella* Typhimurium in Poultry Samples – HONG WANG, Yanbin Li, Michael Slavik, and Jianming Ye, University of Arkansas, Fayetteville, AR, USA

P64 ♦ Determination of Critical Control Points (CCPs) at Poultry Slaughterhouses in Korea – WONKI BAE, Ji Yeon Kim, Keun Seok Seo, Hye Cheong Koo, Soo Jin Yang, So Hyun Kim, Nam Hoon Kwon, Ji Yeun Lim, and Yong Ho Park, Seoul National University, Suwon, Republic of Korea

P65 ♦ Antimicrobial Effect of Electrolyzed Water for Inactivating *Campylobacter jejuni* during Poultry Washing – HOON PARK, Yen-Con Hung, and Robert E. Brackett, University of Georgia, Griffin, GA, USA

P66 ♦ Mucosal Humoral Immunity to Experimental *Salmonella* Enteritidis Infection in Chickens – K. H. SEO, P. S. Holt, H. D. Stone, C. Green, and R. K. Gast, USDA-ARS, Southeast Poultry Research Laboratory, Athens, GA, USA

P67 ♦ Bacterial Survival, Moisture Content, and Soluble Proteins in Chicken Patties Processed by an Air Impingement Oven – R. Y. MURPHY, L. K. Duncan, E. R. Johnson, and M. D. Davis, University of Arkansas, Fayetteville, AR, USA

P68 ♦ Kinetic Parameters for Thermal Inactivation of *Salmonella* spp. in Commercially Formulated Chicken Patties and Franks – R. Y. MURPHY, E. R. Johnson, and M. D. Davis, University of Arkansas, Fayetteville, AR, USA

P69 ♦ Incidence of *Clostridium perfringens* in an Integrated Broiler Chicken Operation from Breeder Farm to the Fully-processed Product – S. E. CRAVEN, N. A. Cox, N. J. Stern, and J. S. Bailey, USDA-ARS-RRC, Athens, GA, USA

P70 ♦ *Clostridium perfringens* Levels in Cooked and Uncooked Meat and Poultry Products – ROBIN M. KALINOWSKI, Peter Bodnaruk, and R. Bruce Tompkin, ConAgra Refrigerated Prepared Foods, Downers Grove, IL, USA

P71 ♦ Evaluation of the MicroFoss System for Enumeration of Total Viable Organisms, *Escherichia coli*, and Coliforms in Ground Beef – JOSEPH ODUMERU and Jennifer Belvedere, University of Guelph, Guelph, Ontario, Canada

P72 ♦ Gel Peroxygens as Barrier and Treatment Systems for Beef Carcasses – Charles J. Giambrone and CRYSTAL J. NESBITT, FMC Corp., Princeton, NJ, USA

P73 ♦ Comparison of Methods for the Isolation of *Escherichia coli* O157:H7 from Ground Beef – WENDY LEEPER, Ann Schultz, Katie Vandre, Carol Gravens, Ronald Johnson, and Pat Rule, Silliker Laboratories Research, South Holland, IL, USA

P74 ♦ *Escherichia coli* O157:H7 Risk Assessment for the Production and Cooking of Restructured Beef Steaks – M.T. ORTEGA VALENZUELA, R. K. Phebus, H.Thippareddi, J. L. Marsden, and C.L. Kastner, Kansas State University, Manhattan, KS, USA

P75 ♦ *Escherichia coli* O157:H7 Maintains Acid Tolerance in Acid-containing but not in Nonacid-containing Fresh Meat Decontamination Waste Fluids – J. SAMELIS, J. N. Sofos, P. A. Kendall, and G. C. Smith, Colorado State University, Fort Collins, CO, USA

P76 ♦ Food Safety: Consumer Views of Public Versus Private Interventions Related to Meat Processing – Christiane Schroeter, KAREN P. PENNER, and Sean Fox, Kansas State University, Manhattan, KS, USA

P77 ♦ The Incidence of *Salmonella* spp. and Biotype 1 *Escherichia coli* on Swine Carcasses Processed under the HACCP-based Inspection Models Project – MARK L. TAMPLIN, Ingrid Feder, Samuel A. Palumbo, Alan Oser, Lisa Yoder, and John B. Luchansky, USDA-ARS-ERRC, Wyndmoor, PA, USA

P78 ♦ Vero Cell Assay for Detection of Cytoplasmic Vacuolation by *Arcobacter* spp. Isolated from Meat – A. Villarruel-Lopez, L. Garay-Martinez, R. Torres-Vitela, E. CABRERA-DIAZ, E. Murano, and L. Mota de la Garza, Universidad de Guadalajara, Guadalajara, Jalisco, Mexico

P79 ♦ Validation and Use of Alkaline Phosphatase Reduction as an Indicator for Meat Cooking Efficiency – E. C. REDMOND, C. J. Griffith, and A. C. Peters, University of Wales Institute, Cardiff, Cardiff, South Wales, UK

P80 ♦ Isolation of Shiga Toxin-producing *Escherichia coli* in Cattle Manure after a Passive Treatment – E. CABRERA-DIAZ, M. Marquez-Gonzalez, F. Sandoval-Garcia, H. M. Zepeda-Lopez, and M. R. Torres-Vitela, University of Guadalajara, Guadalajara, Jalisco, Mexico

P81 ♦ Survival of *Escherichia coli* O157:H7 in Cow Manure-amended Soil – X. P. JIANG, J. M. Morgan, and M. P. Doyle, University of Georgia, Griffin, GA, USA

P82 ♦ Seasonal Occurrence of *Campylobacter* in Dairy Cattle and Their Environment – WILLIE TAYLOR, Ann Draughon, David Golden, Stephen Oliver, and Michelle Saul, University of Tennessee, Knoxville, TN, USA

P83 ♦ Sampling of the Dairy Farm Environment for *Listeria monocytogenes* – VALERIE W. LING, Matthew R. Evans, F. Ann Draughon, and Stephen P. Oliver, University of Tennessee, Knoxville, TN, USA

P84 ♦ Comparison of Multiplex, ELISA and 5' Nuclease PCR Assays for Detection of Plasmid-bearing Virulent *Yersinia enterocolitica* in Pig Feces – SAUMYA BHADURI and Bryan Cottrell, USDA-ARS-ERRC, Wyndmoor, PA, USA

TUESDAY MORNING — AUGUST 7, 2001
8:30 a.m. — 12:00 p.m.

S09 Joint FAO/WHO Initiative on Microbial Risk Assessment
(Sponsored by IAFP Foundation Fund)

8:30 ♦ Overview of the FAO/WHO Process – JORGEN SCHLUNDT, WHO, Food Safety Program, Geneva, Switzerland

8:45 ♦ Exposure Assessment of *Salmonella* spp. in Broilers – LOUISE KELLY, Veterinary Laboratories Agency, Weybridge, Surry, UK

9:10 ♦ Exposure Assessment of *Salmonella* Enteritidis in Eggs – FUMIKO KUSUGA, National Institute of Infectious Diseases, Shinjuku-Ku, Tokyo, Japan

9:35 ♦ Hazard and Risk Characterization of *Salmonella* – AAMIR FAZIL, Health Canada, Guelph, Ontario, Canada

10:00 ♦ Break

10:30 ♦ Exposure Assessment of *Listeria monocytogenes* in Ready-to-eat Meat and Fish – TOM ROSS, University of Tasmania, Hobart, Tasmania, Australia

10:55 ♦ Exposure Assessment of *Listeria monocytogenes* in Dairy Products – EWEN TODD, Michigan State University, East Lansing, MI, USA

11:20 ♦ Hazard and Risk Characterization of *Listeria monocytogenes* – ROBERT L. BUCHANAN, FDA-CFSAN, Washington, D.C., USA

11:45 ♦ Panel discussion

S10 Organic Foods: Unique Characteristics and Growth Potential
(Sponsored by IAFP Foundation Fund)

8:30 ♦ The Unique Characteristics of Organic Production – JIM RIDDLE, Organic Inspection Association, Winona, MN, USA

9:00 ♦ What Organic Means in the Produce Industry – CRAIG WEAKLEY, Small Planet Foods, Sedro Woolley, WA, USA

9:30 ♦ Organic Dairy Products, Production and Quality Characteristics – PAM RIESGRAF, Organic Valley, Jordan, MN, USA

10:00 ♦ Break

10:30 ♦ Chemical Safety Issues in Organic Production – CARL WINTER, University of California-Davis, Davis, CA, USA

11:00 ♦ Microbiological Safety Issues in Organic Production – MICHAEL P. DOYLE, University of Georgia, Griffin, GA, USA

11:30 ♦ International Organic Market: Standards and Potential – DIANE BOWEN, Crop Improvement Association, International, Milwaukee, WI, USA

S11 Indicator Microorganisms — What do They Indicate, and is It of Any Use?

8:30 ♦ Practical Applications of Indicator Organisms in Poultry Processing – MIKE ROBACH, Wayne Farms LLC, Gainesville, GA, USA

9:00 ♦ Use of Indicator Organism Testing in the Food Industry: Rationale and Examples – ANN MARIE MCNAMARA, Sara Lee Foods, Cordova, TN, USA

9:30 ♦ FDA and Indicator Organisms: Which, Where, and Why? – ROBERT E. BRACKETT, FDA, Washington, D.C., USA

10:00 ♦ Break

10:30 ♦ The New Zealand National Microbiological Database HACCP Verification Program – ROGER COOK, Ministry of Agriculture and Forestry, Wellington, New Zealand

11:00 ♦ Is There a Relationship between Microbial and Non-microbial Indicators of Fecal Contamination and Fecal Bacteria – GREG SIRAGUSA, USDA-ARS-RRC, Athens, GA, USA

11:30 ♦ How Much is That Sample in the Window? Application of Value-of-information Techniques to Evaluate and Compare Sampling Strategies – GREG PAOLI, Decisionalysis Risk Consultants, Inc., Ottawa, Ontario, Canada

S12 Ensuring the Quality and Safety of Extended Sheif-Life Milk Products

8:30 ♦ The Essentials of Extended Shelf-Life (ESL) Processing – CHUCK SIZER, National Center for Food Safety and Technology, Summit-Argo, IL, USA

9:00 ♦ Validation and Monitoring of ESL Packaging Systems – JEAN DELISI, Tetra Rex, Inc., Minneapolis, MN, USA

9:30 ♦ Quality Assurance of ESL Products – From Plant to Consumer – ROGER HOOI, Dean Foods, Rockford, IL, USA

10:00 ♦ Break

10:30 ♦ Regulatory Perspective of ESL Processing and Products – STEVEN T. SIMS, FDA, Milk Safety Branch, Washington, D.C., USA

11:00 ♦ Overview of NCFST's ESL Dairy Products Task Force – PETER J. SLADE, National Center for Food Safety and Technology, Summit-Argo, IL, USA

11:30 ♦ International Perspective of ESL Processing and Products – CHUCK SIZER, National Center for Food Safety and Technology, Summit-Argo, IL, USA

T03 Microbiological Methods

8:30 T25 ♦ An Improved Transport Medium for the Preservation and Recovery of *Listeria monocytogenes* in Plant Environmental Samples – MICHAEL C. CIRIGLIANO and Raymond T. McKenna, Lipton, Cresskill, NJ, USA

8:45 T26 ♦ Comparison of a New ELISA-based Method and a Molecular Method for the Detection of *Listeria monocytogenes* in Food – PATRICE ARBAULT, Marie-Laure Sorin, Pascal Faraut, and Arnaud Carlotti, Diffchamb S.A., Lyon, France

9:00 T27 ♦ Evaluation of a Next-day PCR Method for Detection of *Listeria monocytogenes* in Foods – George Tice, W. MARK BARBOUR, Willie Hudson, Bridgette Andaloro, and Angeline Stoltzfus, Qualicon, Inc., Wilmington, DE, USA

9:15 T28 ♦ *Campylobacter* Detection in Food Using Tan ELISA-based Method – Marie-Laure Sorin, Sandrine Rougier, Cécile Wicker, Magali Giordano, and PATRICE ARBAULT, Diffchamb S.A., Lyon, France

9:30 T29 ♦ A Comparison of the Survival Rates of *Campylobacter jejuni* under Varying Organic Loads and Food Contact Surfaces – Alessandra De Cesare, BRIAN W. SHELDON, and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

9:45 T30 ♦ Comparison of Polymerase Chain Reaction Primer Sets Designed to Detect *Salmonella* Enterica – AMY O. CHARKOWSKI, Eric S. Jackson, Jeri Barak, Robert E. Mandrell, and Michael Delwiche, USDA-ARS, Albany, CA, USA

10:00 ♦ Break

10:30 T31 ♦ Factors That Influence the Recovery of *Escherichia coli* O157:H7 after an Acid Shock – Yildiz Karaibrahimoglu and FRANCISCO DIEZ-GONZALEZ, University of Minnesota, St. Paul, MN, USA

10:45 T32 ♦ Development of a Digital Database of Lactic Acid Bacteria in Europe – Maija-Liisa Suihko, Erko Stackebrandt, Bruno Pot, Martine Alliot, Timothy R. Dambaugh, JAMES L. BRUCE, and Annick Mercenier, Qualicon, Inc., Wilmington, DE, USA

11:00 T33 ♦ The Risks of Using Data Loggers to Monitor Average Temperature Exposures – JOHN A. SPEVACEK, 3M Microbiology Products, St. Paul, MN, USA

11:15 T34 ♦ An Evaluation of Surface Hygiene Monitoring Techniques for Use in the Food Industry – GINNY MOORE, Chris Griffith, and Louise Fielding, University of Wales Institute, Cardiff, Cardiff, UK

11:30 T35 ♦ Detection of Hepatitis A Virus in a Complex Food: Strawberry Frosting Mix – THERESA L. CROMEANS, Mark D. Sobsey, and Harold S. Margolis, CDC, Atlanta, GA, USA

11:45 T36 ♦ Development of PCR Primers for Detection of Prolific Histamine Former, *Morganella morganii* – SHIN-HEE KIM, Haejung An, Cheng-I Wei, and Thomas P. Pitta, Auburn University, Auburn, AL, USA

P03 General Food Microbiology and Methods

10:00 a.m. – 1:00 p.m.
(Authors present 10:30 a.m. – 12:30 p.m.)

P85 ♦ Antimicrobial Spectrum of Thymol, Eugenol, Potassium Sorbate and Sodium Benzoate at Selected pHs – R. Astorga-Solari, A. Santiesteban-López, E. Palou, and A. LOPEZ-MALO, Universidad de las Americas-Puebla, Cholula, Puebla, Mexico

P86 ♦ Rope Spoilage in Bread and Its Control by Natural Antimicrobials – Tracey-Lee Botes and ALEX VON HOLY, University of the Witwatersrand, Johannesburg, South Africa

P87 ♦ Antimycotic Activity of Vanillin in Combination with Selected Antimicrobial Agents – A. LOPEZ-MALO, S. M. Alzamora, and E. Palou, Universidad de las Américas-Puebla, Cholula, Puebla, Mexico

P88 ♦ Reduction of Aflatoxins by Korean Soybean Paste and Its Effect on Cytotoxicity and Reproductive Toxicity: Antigenotoxic Effect of the Methanol Extract of Korean Soybean Paste on Aflatoxin B1-induced Bacterial Reverse Mutation and Chromosome Aberration – KIM JONG-GYU, Lee Yong-Wook, and Shintani Hideharu, Keimyung University, Dalseo-gu, Taegu, Korea

P89 ♦ Performance of Mycological Media for Supporting Colony Formation by Desiccated Food Spoilage Yeasts: An Inter-laboratory Study – L. R. BEUCHAT, E. Frandberg, T. Deak, S. M. Alzamora, J. Chen, S. Guerrero, A. Lopez-Malo, I. Ohlsson, M. Olsen, J. M. Pienado, J. Schnurer, M. I. de Siloniz, and J. Tornai-Lehoczhi, University of Georgia, Griffin, GA, USA

P90 ♦ SimPlate for Yeast and Mold – Color Indicator: A New Method for Rapid Enumeration of Fungi in Food – DAVID E. TOWNSEND, Linda Mui, Drew Lienau, Stephanie Leung, Donna Gallagher, and Phil Feldsine, BioControl Systems, Inc., Bellevue, WA, USA

P91 ♦ Detection of Antifungal Activity of *Lactobacillus rhamnosus* and *Bacillus pumilus* Using a Milk Agar Plate Assay – JITKA STILES, Shilpa Penkar, Milada Plockova, Jana Chumchalova, and Lloyd B. Bullerman, University of Nebraska-Lincoln, Lincoln, NE, USA

P92 ♦ Reduction of Aflatoxins by Korean Soybean Paste and Its Effect on Cytotoxicity and Reproductive Toxicity: Inhibitory Effect of Korean Soybean Paste on the Aflatoxin Toxicity in Laying Hens – JONG-GYU KIM, Yong-Wook Lee, Pan-Gyi Kim, Woo-Sup Roh and Hideharu Shintani, Keimyung University, Dalseo-gu, Taegu, Korea

P93 ♦ *Aspergillus flavus* Radial Growth Rate and Lag Time as Affected by Natural and Synthetic Antimicrobial Agent Concentrations – A. López-Malo, E. Palou, and S. M. ALZAMORA, Universidad de Buenos Aires, Capital Federal, Buenos Aires, Argentina

P94 ♦ Hurdle Technology and *Aspergillus flavus* Time-to-growth – A. López-Malo, E. PALOU, S. M. Alzamora, and P. M. Davidson, Universidad de las Americas-Puebla, Cholula, Puebla, Mexico

P95 ♦ Survival and Growth of *Salmonella* in Reconstituted Infant Cereal Hydrated with Water, Milk, or Apple Juice – A. A. ABUSHELAIBI, J. Samelis, P. A. Kendall, and J. N. Sofos, Colorado State University, Fort Collins, CO, USA

P96 ♦ Evaluation of Liquid Egg White Pasteurization Guidelines for *Salmonella* – DIANNE L. PETERS, Glenn W. Froning, and Mindy M. Brashears, University of Nebraska-Lincoln, Lincoln, NE, USA

P97 ♦ New Easy-to-read, Quantitative Method for *Escherichia coli* Testing in Foods – KAREN HESSELROTH, Francoise Horriere, Barbara Horter, and Katheryn Lindberg, 3M Microbiology Products Department, St. Paul, MN, USA

P98 ♦ Inhibitory Activity of *Bifidobacterium longum* HY8001 against Verocytotoxin of *Escherichia coli* O157:H7 – S. H. KIM, S. J. Yang, H. C. Koo, W. K. Bae, J. Y. Kim, J. H. Park, Y. J. Back, and Y. H. Park, Seoul National University, Suwon, Republic of Korea

P99 ♦ Effect of Glucose Supplementation on Growth and Acid Tolerance of *Escherichia coli* O157:H7 in Pure and Mixed Cultures with a *Pseudomonas* spp. at 10°C – J. SAMELIS, J. N. Sofos, J. S. Ikeda, P. A. Kendall, and G. C. Smith, Colorado State University, Fort Collins, CO, USA

P100 ♦ Influence of Process Parameters on the Lethality of *Escherichia coli* O157:H7 during Pulsed Electric Fields Processing – K. THANT, V. M. Balasubramaniam, and S. Ravishankar, Illinois Institute of Technology, Summit-Argo, IL, USA

P101 ♦ Detex for Detection of *Escherichia coli* O157 in Raw Ground Beef and Raw Ground Poultry – Wendy F. Lauer, Nandini Natrajan, and YVETTE M. HENRY, Molecular Circuitry, Inc, King of Prussia, PA, USA

P102 ♦ Resuscitation and Growth of Heat- and Freeze-injured *Escherichia coli* O157:H7 in Selective Enrichment Broths – LAWRENCE RESTAINO, Elon W. Frampton, and Hans Spitz, R & F Laboratories, West Chicago, IL, USA

P103 ♦ Changes in Thermal Sensitivity Resulting from pH and Nutritional Shifts of Acid-adapted and Non-acid-adapted *Listeria monocytogenes* Scott A, a Serotype 4b Strain – DARRELL O. BAYLES and Stacy R. Raleigh, USDA-ARS-ERRC, Wyndmoor, PA, USA

P104 ♦ Comparison of Predictive Models for a 4-log Thermal Reduction of *Listeria monocytogenes* when Growth Conditions Differed – A. T. Chhabra, R. H. Linton, W. H. Carter, and M. A. COUSIN, Purdue University, West Lafayette, IN, USA

P105 ♦ Thermal Inactivation Studies of *Listeria monocytogenes* Strains Belonging to Three Distinct Genotypic Lineages – A. J. DE JESUS and R. C. Whiting, FDA-CFSAN, Washington, D.C., USA

P106 ♦ Cycloheximide Replacement in Campy-line Agar for *Campylobacter* Enumeration – J. ERIC LINE, USDA-ARS-RRC, Athens, GA, USA

P107 ♦ Detex for the Detection of *Campylobacter* in Raw and Cooked Poultry – YVETTE M. HENRY, Wendy F. Lauer, and Sharon L. Brunelle, Molecular Circuitry Inc., King of Prussia, PA, USA

P108 ♦ Survival and Thermotolerance of *Campylobacter jejuni* in Liquid Foods: Effects of Temperature and Presence of *Escherichia coli* and *Pseudomonas fluorescens* – ORLA M. CLOAK and Pina M. Fratamico, USDA-ARS-ERRC, Wyndmoor, PA, USA

P109 ♦ Effectiveness of Selected Chemical Sanitizers against *Campylobacter jejuni* Containing Biofilms – NATHANON TRACHOO and Joseph F. Frank, University of Georgia, Athens, GA, USA

P110 ♦ Heat Shock Enhances Acid Tolerance of *Shigella flexneri* – GLORIA L. TETTEH and Larry R. Beuchat, University of Georgia, Griffin, GA, USA

P111 ♦ Effect of Organic Acids and Temperature on Survival of *Shigella flexneri* in Broth – LAURA L. ZAIKA, USDA-ARS-ERRC, Wyndmoor, PA, USA

P112 ♦ Response of Food Spoilage *Bacillus* spp. to Three Acid-based Sanitizers – M. Esther Peta, Denise Lindsay, Volker S. Brozel, and ALEX VON HOLY, University of the Witwatersrand, Johannesburg, South Africa

P113 ♦ Presence of Toxigenic *Bacillus* in Cup Drinks from Automatic Vending Machines on the Street – JONG-HYUN PARK, J. Y. Shin, S. J. Lee, Y. A. Kwon, and C. Mok, Kyungwon University, Songnam-shi, Kyonggi-Do, Republic of Korea

P114 ♦ Monte Carlo Simulation of the Influence of Spore Inoculum Size on *Clostridium botulinum* Germination and Growth – LIHUI ZHAO, Thomas J. Montville, and Donald W. Schaffner, Rutgers University, New Brunswick, NJ, USA

P115 ♦ Estimation of Bacterial Cell Counts in Foods Using an Oxygen Electrode Sensor – YOSHIHISA AMANO, Junichiro Arai, Shunsuke Yamanaka, Kenji Isshiki, Daikin Environmental Laboratory, Ltd., Tsukuba-shi, Ibaraki, Japan

P116 ♦ Rapid Detection of *Listeria monocytogenes* without DNA Extraction from Foods Using Polymerase Chain Reaction – D. H. OH, S. Y. Cho, Y. C. Choi, and B. K. Park, Kangwon National University, Chunchon, Kangwon, Korea

P117 ♦ PCR Detection of *Listeria monocytogenes* on Hot Dog Using Oligonucleotide Primers Targeting the Genes Encoding Internalin AB – Y. S. JUNG, J. F. Frank, R. E. Brackett, and J. Chen, University of Georgia, Griffin, GA, USA

P118 ♦ Inactivation of Hepatitis A Virus by a Dynamic High Pressure Treatment – JULIE JEAN, Jean-François Vachon, André Darveau, and Ismaïl Fliss, Laval University, Quebec, Quebec, Canada

P119 ♦ Handwashing Practices in United Kingdom Nursing Homes – DEBORAH CLAYTON, Christopher Griffith, Adrian Peters, and Patricia Price, University of Wales Institute, Cardiff, Cardiff, South Wales, UK

P120 ♦ Assessment and Variability of Cleaning Practices of United Kingdom Consumers, Using Observation, ATP, and Microbiological Assessment – E. C. REDMOND, C. J. Griffith, and A. C. Peters, University of Wales Institute, Cardiff, Cardiff, South Wales, UK

P121 ♦ Kansas Food*A*Syst: Self-assessment Tools for Determining Risks to Food Safety during Production and Home Preparation – JUDY M. WILLINGHAM and Karen P. Penner, Kansas State University, Manhattan, KS, USA

P122 ♦ Effect of Ozonated Water on the Assimilable Organic Carbon and Coliform Growth Response Values and on Pathogenic Bacteria Survival – KATHLEEN T. RAJKOWSKI and Eugene Rice, USDA-ARS-ERRC, Wyndmoor, PA, USA

P123 ♦ Adaptative Acid Tolerance Response in *Vibrio parahaemolyticus* and *V. vulnificus* – JAHEON KOO and Michael Jahncke, Virginia Seafood Agricultural Research and Extension Center, Hampton, VA, USA

P124 ♦ Thermotolerance of Coagulase-negative *Staphylococci* and Their Potential Use as Indicators of Cheese Plant Sanitation – KOLE A. EWOLDT and Steven C. Ingham, University of Wisconsin-Madison, Madison, WI, USA

P125 ♦ Protecting the United States Food Supply in a Global Economy: An Expert Gap Analysis – PAUL A. HALL, La Salle University, Mundelein, IL, USA

TUESDAY AFTERNOON — AUGUST 7, 2001
1:30 p.m. — 5:00 p.m.

General Session — (1:30 p.m. — 3:30 p.m.)

S13 Irradiation Pasteurization: Realizing the Food Safety Potential
(Sponsored by IAFP Foundation Fund)

1:30 ♦ Potential Impact of Irradiation on Reducing Foodborne Illness in the United States – ROB TAUXE, CDC, Atlanta, GA, USA

1:50 ♦ Safety, Nutritional Adequacy and the Status of Irradiated Foods: International Perspective – FRITZ KAFERSTEIN, FDA-USDA, Washington, D.C., USA

2:10 ♦ Food Irradiation – The Clear and Simple Facts – PAT ADAMS, IBA Advanced Applications, Memphis, TN, USA

2:25 ♦ Expanding Consumers Food Safety Choices – The Minnesota Experience – ROD CHURCH, Minnesota Dept. of Health, Minneapolis, MN, USA

2:40 ♦ Putting Irradiated Food on Supermarket Shelves – Experiences of a Leader in the Retail Industry – MICHAEL WRIGHT, Supervalu and Cub Food Stores, Minneapolis, MN, USA

3:00 ♦ Legal Issues with Foods in General and Irradiated Food Specifically – WILLIAM MARLER, Marler Clark Attorneys at Law, Seattle, WA, USA

Business Meeting (4:00 p.m. — 5:00 p.m.)

WEDNESDAY MORNING — AUGUST 8, 2001
8:30 a.m. — 12:00 p.m.

S14 *Mycobacterium paratuberculosis* — Villain or Bystander?
(Sponsored by ILSI-N.A.)

8:30 ♦ The Evidence for and against the Association of *Mycobacterium paratuberculosis* with Human Crohn's Disease – R. BALFOUR SARTOR, University of North Carolina, Chapel Hill, NC, USA

9:00 ♦ The Etiology of Bovine Paratuberculosis and On-farm Management Strategies – SCOTT J. WELLS, University of Minnesota, St. Paul, MN, USA

9:30 ♦ Ecological and Physical Characteristics of *Mycobacterium paratuberculosis* – MICHAEL COLLINS, University of Wisconsin-Madison, Madison, WI, USA

10:00 ♦ Break

10:30 ♦ Methodology for Detecting *Mycobacterium paratuberculosis* in Food Products – JUDITH R. STABEL, USDA-ARS, Ames, IA, USA

11:00 ♦ Detection of *Mycobacterium paratuberculosis* in Retail Milk in the United Kingdom: Analysis and Perspectives – NORMAN A. SIMMONS, Guy's and St. Thomas' Hospital Trust, London, UK

11:30 ♦ Panel Discussion

S15 Zero Tolerance: Boon or Bust?

8:30 ♦ An Overview of Zero Tolerance as a Regulatory Policy – LYNN MCMULLEN, University of Alberta, Edmonton, Alberta, Canada

8:50 ♦ An Industry View of Zero Tolerance – DANE BERNARD, Keystone Foods, Bala Cynwyd, PA, USA

9:10 ♦ Applications and Problems Associated with Zero Tolerance for *Escherichia coli* O157:H7 in Beef Products – DEAN DANIELSON, IBP World Headquarters, Dakota Dunes, SD, USA

9:35 ♦ Public Health and Regulatory Perspectives on Zero Tolerance – I. KAYE WACHSMUTH, USDA-FSIS, Washington, D.C., USA

10:00 ♦ Break

10:30 ♦ A Canadian Perspective on Zero Tolerance – JEFF FARBER, Health Canada, Ottawa, Ontario, Canada

11:00 ♦ An International Perspective on Zero Tolerance – PAUL TEUFEL, Institute for Hygiene and Food Safety, Kiel, Germany

11:30 ♦ A Consumer Perspective on Benefits and Application – CAROLINE SMITH-DEWAAL, Center for Science in the Public Interest, Washington, D.C., USA

S16 Communicating Science Effectively

(Sponsored by IAFP Foundation Fund)

8:30 ♦ Listening, the First Step in Effective Communication to the Public – CHRISTINE M. BRUHN, University of California-Davis, Davis, CA, USA

9:00 ♦ How to Communicate Food Science to Produce Grant Dollars – SUSAN S. SUMNER, Virginia Tech., Blacksburg, VA, USA

9:30 ♦ The Role of the Trade Association in Effectively Communicating "Understandable" Science to Consumers – RHONA S. APPLEBAUM, National Food Processors Association, Washington, D.C., USA

10:00 ♦ Break

10:30 ♦ Communicating with the Public: Making a Hard Sell a Success – NANCY PETERSON, Kansas State University, Manhattan, KS, USA

11:00 ♦ Communicating Hot Topics: Consumer and Producer Response to Genetically Engineered and Conventional Sweetcorn and Potatoes – DOUG POWELL, University of Guelph, Guelph, Ontario, Canada

11:30 ♦ Panel Discussion

S17 Educating Food Service Workers

8:30 ♦ Social Marketing: A Strategy for Effective Food Service Education – CLARA LAWHEAD, Pasco Co. Health Dept., New Port Richey, FL, USA

9:00 ♦ FDA Retail Food Program Database of Foodborne Illness Risk Factors (August 2000) – Suggested Interventions for Dealing with the Three Risk Factors in Need of Great Attention – RICHARD BARNES, FDA, Rockville, MD, USA

9:30 ♦ The Power of Partnering – ANGELA FRASER, North Carolina State University, Raleigh, NC, USA

10:00 ♦ Break

10:30 ♦ Training in the Quick Service Environment – LISA WRIGHT, Foodmaker, Inc., San Diego, CA, USA

11:00 ♦ Keeping It Upbeat! A University of South Florida Food Safety Workshop Based on Fight BAC™! – ROY COSTA, Sanitary Environmental Monitoring Labs, (Semco Labs) Deerfield Beach, FL, USA

11:30 ♦ The Teachable Moment – Training Temporary Event Paid and Volunteer Foodservice Workers – MARTHA SMITH PATNOAD, University of Rhode Island, Kingston, RI, USA

POSTER SYMPOSIUM

S18 Detection and Control of Human Pathogens in Fresh Fruit and Vegetables

10:00 a.m. – 1:00 p.m.
(Authors present 10:30 a.m. – 12:30 p.m.)

♦ Sampling and Detection of Bacterial Pathogens in Fresh Produce – PINA M. FRATAMICO, USDA-ARS-ERRC, Wyndmoor, PA, USA

♦ Potential Sources of *Escherichia coli* O157:H7 Contamination of Apples during Growth, Harvesting, Distribution, and Processing – BASSAM A. ANNOUS, USDA-ARS-ERRC, Wyndmoor, PA, USA

♦ Microbial Safety of Sprouts – WILLIAM F. FETT, USDA-ARS-ERRC, Wyndmoor, PA, USA

♦ Surface Characteristics and Adhesion of *Salmonella stanley*, *Listeria monocytogenes*, and *Escherichia coli* on Cantaloupe Surfaces Treated with Chlorine or Hydrogen Peroxide – DIKE O. UKUKU, USDA-ARS-ERRC, Wyndmoor, PA, USA

♦ Human Pathogens on Produce: Attachment, Biofilms and Ecology – ROBERT E. MANDRELL, USDA-ARS-WRRC, Albany, CA, USA

♦ Methods in Decontaminating Fruits and Vegetables – LARRY R. BEUCHAT, University of Georgia, Griffin, GA, USA

T04 Produce Microbiology

8:30 T37 ♦ Food Safety Begins on the Farm: A National Education and Extension Program for Growers and Packers – Elizabeth A. Bihn and ROBERT B. GRAVANI, Cornell University, Ithaca, NY, USA

8:45 T38 ♦ Efficacy of Disinfection Methods against Caliciviruses on Fresh Fruits, Vegetables, and Food-contact Surfaces – B. R. GULATI, P. B. Allwood, C. W. Hedberg, and S. M. Goyal, University of Minnesota, St. Paul, MN, USA

9:00 T39 ♦ Concentration and Detection of Viruses from Fresh Produce and Food-contact Surfaces – A. K. TAKU, B. R. Gulati, P. B. Allwood, C. W. Hedberg, and S. M. Goyal, University of Minnesota, St. Paul, MN, USA

9:15 T40 ♦ Inactivation of *Cryptosporidium parvum* in Apple Cider Using Ultraviolet Light – N. BASARAN, J. Churey, and R. W. Worobo, Cornell University, Geneva, NY, USA

9:30 T41 ♦ Effects of Hydrogen Peroxide on the Survival of *Cryptosporidium parvum* Oocysts in Unpasteurized Fruit Juices – K. K. PHELPS, D. S. Lindsay, R. Fayer, D. A. Golden, and S. S. Sumner, Virginia Tech., Blacksburg, VA, USA

9:45 T42 ♦ Inactivation of *Escherichia coli* O157:H7 and *Salmonella* in Apple Cider and Orange Juice by Combination Treatments of Ozone and Chemical Preservatives – R. C. WILLIAMS, D. A. Golden, and S. S. Sumner, University of Tennessee, Knoxville, TN, USA

10:00 ♦ Break

10:30 T43 ♦ Hydrogen Peroxide and Organic Acids as Antimicrobials in Fruit Juices – J. SCHURMAN, S. S. Sumner, D. A. Golden, M. D. Pierson, J. D. Eifert, and J. E. Marcy, Virginia Tech., Blacksburg, VA, USA

10:45 T44 ♦ Growth of *Listeria monocytogenes* and *Escherichia coli* O157:H7 is Enhanced in Ready-to-eat Lettuce Washed in Warm Water – P. J. DELAQUIS, P. M. Toivonen, and S. Stewart, AAFC, Pacific Agri-Food Research Centre, Summerland, British Columbia, Canada

11:00 T45 ♦ Application of Vapor Heat to the Exocarp of Cantaloupe for the Reduction of *Salmonella* and *Escherichia coli* Prior to Minimal Processing – TREVOR SUSLOW and Marcella Zúñiga, University of California-Davis, Davis, CA, USA

11:15 T46 ♦ Effect of Hot Water and Heated Hydrogen Peroxide Treatments in Reducing Transfer of *Salmonella* and *Escherichia coli* from Cantaloupe Surfaces to Fresh-cut Tissues – D. O. UKUKU, V. Pilizota, G. M. Sapers, and P. H. Cooke, USDA-ARS-ERRC, Wyndmoor, PA, USA

11:30 T47 ♦ Lethality of 5 MeV e-Beam to *Staphylococcus Salmonella* and *Listeria* in Sliced Cantaloupe and Tomato – ANN DRAUGHON, Amelia Evans, Greg Hulbert, and John Mount, University of Tennessee, Knoxville, TN, USA

11:45 T48 ♦ Isolation, Identification, and Selection of Lactic Acid Bacteria from Alfalfa Sprouts for Competitive Inhibition of Foodborne Pathogens – M. R. HARRIS, M. M. Brashears, and D. Smith, University of Nebraska-Lincoln, Lincoln, NE, USA

P04 Meat, Dairy, and General Food Microbiology

10:00 a.m. – 1:00 p.m.
(Authors present 10:30 a.m. – 12:30 p.m.)

P126 ♦ Dairy-associated *Bacillus cereus* Growing as a Biofilm Has a Distinct Proteome – Marinda Oosthuizen, Bridgitta Steyn, Volker Brözel, Denise Lindsay, and ALEX VON HOLY, University of the Witwatersrand, Johannesburg, South Africa

P127 ♦ Growth of *Bacillus cereus* and *Pseudomonas fluorescens* Binary Biofilms and Response to a Chlorine Dioxide-containing Sanitizer in a Model Flow System – Denise Lindsay, Volker Brözel, and ALEX VON HOLY, University of the Witwatersrand, Johannesburg, South Africa

P128 ♦ Heat Inactivation of *Listeria* Biofilm – R. CHMIELEWSKI and J. Frank, University of Georgia, Athens, GA, USA

P129 ♦ Microbial Growth in Transgenic Pork – P. C. NEDOLUHA, M. B. Solomon, V. G. Pursel, and A. D. Mitchell, USDA-ARS, Beltsville, MD, USA

P130 ♦ Recovery of Injured *Yersinia enterocolitica* from Swine Production Sites – MINA SHEHEE and Mark Sobsey, University of North Carolina, Chapel Hill, NC, USA

P131 ♦ Microbiological and Sensory Quality of New York State Fluid Milk Products: 1990-1999 – NANCY R. CAREY, Kathryn W. Chapman, Shirley M. Kozlowski, Steven C. Murphy, David K. Bandler, and Kathryn J. Boor, Cornell University, Ithaca, NY, USA

P132 ♦ Survival of *Listeria monocytogenes* in Refrigerated, Nisin-treated, Skim, 2%, and Whole Milk during Storage at 5°C – APAMA VEERAMACHANENI and Leora A. Shelef, Wayne State University, Detroit, MI, USA

P133 ♦ Effect of Residual Sanitizers on Cultured Dairy Products – TIMOTHY HARRIED, Chr. Hansen, Inc., Milwaukee, WI, USA

P134 ♦ The Effect of Osmotic Stress Adaptation on Heat Resistance of *Listeria monocytogenes* Scott A in Pork Slurry – MAKUBA A. LIHONO, Aubrey F. Mendonca, and Edward E. Fetzer, Iowa State University, Ames, IA, USA

P135 ♦ Inhibition of Pathogens on Process Cheese Slices at Abuse Temperature – KATHLEEN A. GLASS, Dawn A. Granberg, Ann E. Larson, and Eric A. Johnson, University of Wisconsin-Madison, Madison, WI, USA

P136 ♦ Recovery of *Salmonella* from Dairy Cattle and Their Environment – PHILIPUS PANGLOLI, Ann Draughon, Stephen Oliver, David Golden, and Yobouet Dje, University of Tennessee, Knoxville, TN, USA

P137 ♦ *Escherichia coli* O157:H7 in Dairy Cows and Their Environment – PHILIPUS PANGLOLI, Ann Draughon, Stephen Oliver, David Golden, and Yobouet Dje, University of Tennessee, Knoxville, TN, USA

P138 ♦ GIS and Epidemiology of *Salmonella* on Dairy Farms – KIMBERLY D. LAMAR, F. Ann Draughon, Philipus Pangloli, Stephen P. Oliver, and David Golden, University of Tennessee, Knoxville, TN, USA

P139 ♦ Assessment of *Salmonella*, *Listeria* and *Escherichia coli* O157 in Biosolids and Streams Associated with a Dairy Farm – TERESA ERVIN, Ron Yoder, Ann Draughon, Robert Burns, and Raj. Raman, University of Tennessee, Knoxville, TN, USA

P140 ♦ Microbial Safety of Pasture Versus Free-range Chickens Using Organic and Traditional Feed – TRISH WELCH, Jeannette Endres, and Bill Banz, Southern Illinois University, Carbondale, IL, USA

P141 ♦ Survival of Fecal Indicator Bacteria in Bovine Manure Incorporated into Soil – MARIA M. LAU and Steven C. Ingham, University of Wisconsin-Madison, Madison, WI, USA

P142 ♦ A Rapid Method for the Detection of *Listeria* in the Dairy Factory Environment – JILL GEBLER and Sharon Savory, Murray Goulburn Co-op Co. Ltd., Yarram, Victoria, Australia

P143 ♦ Rapid Detection of Microorganisms in Dairy Products Using an Automated Optical System – RUTH FIRSTENBERG-EDEN, Debra L. Foti, and Susan T. McDougal, BioSys Inc., Ann Arbor, MI, USA

P144 ♦ Dead *Listeria monocytogenes* Cells are Detected in Cooked Meat and Smoked Fish with a Commercial PCR-based Kit – ARNAUD CARLOTTI, Pascal Faraut, Marie-Laure Sorin, and Patrice Arbault, IDmyk S.A., Limonest, France

P145 ♦ Assessment of Protein Fingerprinting Method for Species Verification of Meats – J. A. ODUMERU, J. Siwik, K. Lee, M. Marcone, and R. Robinson, University of Guelph, Guelph, Ontario, Canada

P146 ♦ Validation of CCPs in HACCP Systems in Small Meat and Poultry Processing Plants in Nebraska – JASON E. MANN, Mindy M. Brashears, Dennis E. Burson, and Erin S. Dormedy, University of Nebraska-Lincoln, Lincoln, NE, USA

P147 ♦ Determining Exposure Assessment and Modelling Risks Associated with the Preparation of Poultry Products in the Home in the United Kingdom – WENDY HARRISON, Chris Griffith, David Tennant, and Adrian Peters, University of Wales Institute, Cardiff, Cardiff, Wales, UK

P148 ♦ Validation of the Use of Antibiotic-resistant Strains of *Escherichia coli* O157:H7 and *Salmonella* spp. for Recovery of Injured Cells Subjected to Stress Conditions Encountered during Competitive Inhibition – M. M. BRASHEARS, J. S. Stratton, and A. Amezquita, University of Nebraska-Lincoln, Lincoln, NE, USA

P149 ♦ Ochratoxin A Production by Black *Aspergillus* Species and Significance to the Food Industry – AILSA D. HOCKING, Sulin Leong, and John I. Pitt, Food Science Australia, CSIRO, North Ryde, NSW, Australia

P150 ♦ Evaluation of Electrochemiluminescent Assays for the Rapid Detection of Foodborne Pathogens on Environmental Surfaces – RICHARD OBISCO, Chuck Yound, and Jill White, IGEN International, Inc., Gaithersburg, MD, USA

P151 ♦ Development and Evaluation of a Multiplex PCR Assay for Specific Detection of *Campylobacter jejuni*, *Escherichia coli* O157:H7, *Listeria monocytogenes*, and *Salmonella* in Contaminated Food – M. F. SLAVIK, Debby Winters, and Awilda O'Leary, University of Arkansas, Fayetteville, AR, USA

P152 ♦ Microbial Efficacy and Organoleptic Impact of X-ray Irradiation on Ready-to-eat Hot Dogs Inoculated with *Listeria monocytogenes* – THOMAS HARRIS, and Sally Swart, Ecolab, Inc., St. Paul, MN, USA

P153 ♦ Ester Peracids: New Antimicrobial Compositions – BRUCE CORDS and Madeline French, Ecolab, Inc., St. Paul, MN, USA

WEDNESDAY AFTERNOON — AUGUST 8, 2001
1:30 p.m. — 5:00 p.m.

S19 HACCP: How to Evaluate Success

1:30 ♦ USDA HACCP: How to Evaluate Success – THOMAS BILLY, USDA-FSIS, Washington, D.C., USA

2:15 ♦ FDA Seafood and Juice HACCP: Microbial Testing and Other Tools to Measure Success – ROBERT L. BUCHANAN, FDA-CFSAN, Washington, D.C., USA

3:00 ♦ Break

3:30 ♦ CDC: Using Epidemiology to Evaluate HACCP – ROBERT V. TAUXE, CDC, Atlanta, GA, USA

4:00 ♦ Industry Perspective: Is HACCP Working for the Food Industries? – R. BRUCE TOMPKIN, ConAgra Refrigerated Prepared Food, Downer's Grove, IL, USA

4:30 ♦ Consumer Perspective: Is HACCP Improving Food Safety? – CAROLINE SMITH-DEWAAL, Center for Science in the Public Interest, Washington, D.C., USA

S20 ILSI North America-sponsored Research Updates

(Sponsored by ILSI-NA)

1:30 ♦ Engineering Vegetative Buffer Strips for Removal of *Cryptosporidium parvum* from Runoff from Dairies and Grazed Agricultural Land – EDWARD R. ATWILL, University of California-Davis, Tulare, CA, USA

2:00 ♦ Optimization of Conditions to Kill *Escherichia coli* O157:H7 in Manure – MICHAEL P. DOYLE, University of Georgia, Griffin, GA, USA

2:30 ♦ Effect of Organic Acid Content of Silages on the Growth of *Escherichia coli* O157:H7 and *Salmonella* Typhimurium DT104 on Total Mixed Rations – DALE D. HANCOCK, Washington State University, Pullman, WA, USA

3:00 ♦ Break

3:30 ♦ Molecular Tools for Identification of *Listeria monocytogenes* Serotype 4b Strains – SOPHIA KATHARIOU, North Carolina State University, Raleigh, NC, USA

4:00 ♦ Effects of Environment and Management on Persistence of Antibiotic Resistance in Bacteria from Swine – ALAN G. MATHEW, University of Tennessee, Knoxville, TN, USA

4:30 ♦ Factors Affecting Transfer of Genes Encoding Multiple Antibiotic Resistance to *Salmonella* Typhimurium DT104 – CORNELIUS POPPE, Health Canada, Guelph, Ontario, Canada

S21 The Benefits of Better Government and Industry Relations in Assuring Food Safety

1:30 ♦ Current State of Federal Government/ Industry Food Safety Relations: FSIS Perspective – RON HICKS, USDA-FSIS, Washington, D.C., USA

2:00 ♦ Current State of Federal Government/ Industry Food Safety Relations: FDA/ CFSAN Perspective – JOHN KVENBERG, FDA-CFSAN, Washington, D.C., USA

2:30 ♦ Current State of Federal Government/ Industry Food Safety Relations: Industry Perspective – MARK DOPP, American Meat Institute, Arlington, VA, USA

3:00 ♦ Break

3:30 ♦ Current State of Federal Government/ Industry Food Safety Relations: State Perspective – MARTHA ROBERTS, Florida Dept. of Agriculture and Consumer Affairs, Tallahassee, FL, USA

4:00 ♦ Current State of Federal Government/ Industry Food Safety Relations: Food Service Perspective – STEVEN GROVER, National Restaurant Association, Washington, D.C., USA

4:30 ♦ Panel Discussion

T05 General Food Microbiology

1:30 T49 ♦ Death Kinetics of *Listeria monocytogenes* in Margarine, Yellow Fat Spreads, and Toppings – MICHAEL C. CIRIGLIANO and Andreas M. Keller, Lipton, Cresskill, NJ, USA

1:45 T50 ♦ Survey of Pasteurized Milk at Retail in the United States for *Listeria monocytogenes* – CARY P. FRYE, Milk Industry Foundation/International Foods Association, Washington, D.C., USA

2:00 T51 ♦ The Thermal Resistance of *Listeria monocytogenes* as Affected by the pH and Water Activity of the Heating Menstruum – S. G. EDELSON-MAMMEL, R. L. Buchanan, and R. C. Whiting, FDA-CFSAN, Washington, D.C., USA

2:15 T52 ♦ Foodworkers as a Source for Salmonellosis – C. MEDUS, J. B. Bender, K. E. Smith, F. T. Leano, J. Besser, and C. H. Hedberg, Minnesota Dept. of Health, Minneapolis, MN, USA

2:30 T53 ♦ Yeast Inactivation Kinetics during Thermoultrasonication Treatments – A. LOPEZ-MALO, E. Palou, and A. Franco-Corzo, Universidad de las Americas-Puebla, Cholula, Puebla, Mexico

2:45 T54 ♦ The Biocidal Efficacy of High Retention Gel Oxidant Sanitizers on Vertical and Irregular Surfaces – CHARLES J. GIAMBRONE and Crystal Nesbitt, FMC Corp., Princeton, NJ, USA

3:00 ♦ Break

3:30 T55 ♦ Assessing and Reducing the Risk of Cross Contamination in Food Service – CHRIS GRIFFITH, Carys Davies, Jane Breverton, and Adrian Peters, University of Wales Institute Cardiff, Cardiff, UK

3:45 T56 ♦ Exposure Assessment for Human Pathogens Transmitted by Poor Handling Practices of Ready-to-eat (RTE) Foods – HEEJEONG LATIMER, Lee-Ann Jaykus, Roberta Morales, and Peter Cowen, North Carolina State University, Raleigh, NC, USA

4:00 T57 ♦ Physicians' Attitudes toward Food Safety Education – Anthony Flood, DAVID SCHMIDT, Gillian Steele, and Christie White, International Food Information Council, Washington, D.C., USA

4:15 T58 ♦ Effect of Peroxy Acid Sanitizers against Bacteriophage Associated with Cultured Dairy Products – JEROME KELLER, Ecolab Inc., Mendota Heights, MN, USA

4:30 T59 ♦ Molecular Epidemiology of Norwalk-like Virus Outbreaks in Minnesota – E. SWANSON, J. Bartkus, L. Carroll, K. Smith, J. Hunt, J. Besser, and C. Hedberg, Minnesota Dept. of Health, Minneapolis, MN, USA

4:45 T60 ♦ Technology Requirements and Technology Transfer in the Welsh Food Industry – DAVID LLOYD, Emma Norman, and Chris Griffith, University of Wales Institute Cardiff, Cardiff, UK

August 5-8, 2001

Hilton Minneapolis

Minneapolis, Minnesota

EVENT INFORMATION

Evening Events

Cheese and Wine Reception

Sunday, August 5, 2001 (8:00 p.m. - 10:00 p.m.)

Attendees and guests will experience Midwestern hospitality at this traditional Sunday evening reception in the exhibit hall.

Exhibit Hall Reception

Monday, August 6, 2001 (5:00 p.m. - 6:30 p.m.)

Network with fellow food safety professionals during this informal reception while seeing the latest developments in the industry.

Monday Night Social — Mississippi River Dinner Cruise

Monday, August 6, 2001 (6:00 p.m. - 10:00 p.m.)

The mighty Mississippi River is the reason Minneapolis and St. Paul exist today. Feel the history of the Mississippi River on this spectacular dinner cruise. You will quickly escape into an island of nature in the midst of this major metropolitan area with old St. Anthony, where Minneapolis began, on one side and the spectacular downtown skyline on the other. At your leisure you may dine, socialize with friends and colleagues, or walk around the riverboat and experience the view from the upper deck. The riverboat travels through the Upper St. Anthony Falls Lock, the northern most lock of 29 on the Mississippi River and the deepest – it descends 50 feet! You pass under both the historic James J. Hill Stone Arch Bridge and the new Hennepin Avenue suspension bridge. This will be a river experience you will long remember.

Chanhassen Dinner Theater

Tuesday, August 7, 2001 (5:30 p.m. - 11:00 p.m.)

Food and entertainment – what a perfect combination! The people at Chanhassen Dinner Theater know this and have been working hard since 1968 to perfect this concept. Quoted as "the Cadillac of Dinner Theaters," it is the nation's largest professional dinner theater complex. Your ticket includes roundtrip transportation, dinner, and theater ticket to the performance of "My Fair Lady". Limited tickets are available.

Minnesota Twins Baseball Game

Tuesday, August 7, 2001 (6:00 p.m. - 10:00 p.m.)

Go Twins! Cheer on the Minnesota Twins as they take on the Cleveland Indians in the Hubert H. Humphrey Metrodome. The Metrodome was the third domed facility in baseball and remains the only air-supported structure of the 30 ballparks. Join your friends and colleagues for a night at the ballpark. Price includes transportation to and from the Metrodome and a reserved seat for the game.

Awards Banquet

Wednesday, August 8, 2001 (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.

Daytime Tours

Lunch included in all daytime tours

Expanded descriptions available at www.foodprotection.org

Twin Cities Highlights Tour

Sunday, August 5, 2001 (9:30 a.m. - 2:30 p.m.)

The fantastic diversity of the Greater Twin Cities Metro Area often catches first-time visitors by surprise. This tour includes both downtowns of St. Paul and Minneapolis. While in Minneapolis

you will experience the famous Nicollet Mall, the skyway network of downtown Minneapolis and the Minneapolis Sculpture Garden. The journey will continue through the Kenwood residential area to see the television home of Mary Tyler Moore, around sparkling lakes and lagoons, and make a short stop at the legendary Minnehaha Falls. Then it is on past Fort Snelling and into St. Paul. A guide will provide commentary on many sites including the trip along stately Summit Avenue, showcasing the best-preserved Victorian mansions in the country. The final stop is at the Minnesota History Center. The Center showcases and preserves the state's historical resources. Lunch will be provided at the History Center. The tour concludes with a drive past the University of Minnesota and an excursion into the St. Anthony Falls area – the birthplace of Minneapolis.

Historic Stillwater
Monday, August 6, 2001 (9:30 a.m. - 3:30 p.m.)

A trip to Stillwater is a trip to Minnesota's yesteryear. Located on the sparkling blue St. Croix River, Stillwater lays claim to being Minnesota's oldest town and the birthplace of the Minnesota Territory in 1849. The tour guide will provide a riding tour of this enchanting old river-town and takes you behind the scenes of history. Anecdotes and incidents from bygone years will illuminate the lives of immigrants and entrepreneurs as you view mansions built by wealthy lumber barons and beautiful old churches on the "Street of Spires." You will stop at the Warden's Home Museum, an 1853 home for 11 wardens who managed the first territorial prison in that part of the country. Next, enjoy a delicious lunch at the famed Lowell Inn. Since 1927 this famous "Mount Vernon of the Midwest" has been a hotel known to serve the very finest food. You will have time after lunch to explore the many boutiques, galleries and shops that line Stillwater's historic streets.

Mansions & Museums Tour
Tuesday, August 7, 2001 (9:30 a.m. - 3:30 p.m.)

The first stop of the day will be the James J. Hill House on Summit Avenue in St. Paul. James J. Hill, the "Empire Builder," purchased a bankrupt railroad in St. Paul in the late 1800s and masterminded its success by building the Great Northern Railway. Completed in 1891, the house has 36,000 square feet, including 32 rooms, 13 bathrooms, and 22 fireplaces. With its carved woodwork, stained glass, and skylit art gallery, it is one of the most impressive residences ever constructed in the Midwest. Next, you will stop at the Cathedral of St. Paul. Modeled after St. Peter's in Rome, it is one of the largest church buildings in North America. Among its many points of interest are the six chapels called the Shrine of Nations in which stand statues of the patron saints carved out of marble. Following the stop at the Cathedral, you will have lunch at Forepaugh's Restaurant, an elegant Victorian mansion complete with a French chef and staff in period costumes. After lunch, your final stop is at the Minneapolis Institute of Arts. The permanent collection includes American, European, Asian, African, Oceanic ancient and Oriental objects. Masterpieces from every age and culture await your discovery.

New Member Reception and Orientation

New Member Reception and Orientation
Saturday, August 4, 2001 (4:30 p.m. - 5:30 p.m.)

If you recently joined the Association or if this is your first time attending an IAFP Annual Meeting, welcome! Attend this informal reception to learn how to get the most out of attending the Meeting. Meet some of today's leaders and gain knowledge on how you too can become a leader in your Association.

Affiliate Reception

Affiliate Reception
Saturday, August 4, 2001 (5:30 p.m. - 7:00 p.m.)

Affiliate officers and delegates plan to arrive in time to participate in this educational reception. Watch your mail for additional details.

Committee Meetings

Committee Meetings
Sunday, August 5, 2001 (7:00 a.m. - 5:00 p.m.)

Committees and Professional Development Groups (PDGs) plan, develop and institute many of the Association's projects, including workshops, publications, and educational sessions. Share your expertise by volunteering to serve on any number of committees or PDGs.

Student Luncheon

Student Luncheon
Sunday, August 5, 2001 (12:00 p.m. - 1:30 p.m.)

Attention students, are you a Member of the Student Professional Development Group (PDG)? Join by signing up for the student luncheon to help you start building your professional network.The mission of the Student PDG is to provide students of food safety with a platform to enrich their experience as Members of IAFP.

International Association for Food Protection®

88th Annual Meeting

6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863, USA
Phone: 800.369.6337 • 515.276.3344
Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

August 5-8, 2001
Minneapolis, Minnesota

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
- Program and Abstract Book

4 Easy Ways to Register

To register, complete the Attendee Registration Form and submit it to the International Association for Food Protection by:

Phone: 800.369.6337; 515.276.3344

Fax: 515.276.8655

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

Web site: www.foodprotection.org

The early registration deadline is July 6, 2001. After July 6, 2001 late registration fees are in effect. Pick up registration materials on site at the Hilton Minneapolis.

Refund/Cancellation Policy

Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by July 13, 2001. No refunds will be made after July 13, 2001; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 13, 2001. Additional tickets purchased are nonrefundable.

Exhibit Hours

Sunday, August 5, 2001 — 8:00 p.m. – 10:00 p.m.

Monday, August 6, 2001 — 9:30 a.m. – 1:30 p.m.
3:00 p.m. – 6:30 p.m.

Tuesday, August 7, 2001 — 9:30 a.m. – 1:30 p.m.

Hotel Information

For reservations, contact the hotel directly and identify yourself as an International Association for Food Protection Annual Meeting attendee to receive a special rate of $129 per night, single or double. Make your reservations as soon as possible; this special rate is available only until July 6, 2001

Hilton Minneapolis
1001 Marquette Avenue
Minneapolis, Minnesota 55403
612.376.1000
1.800.HILTONS

Evening Events

Sunday, August 5, 2001

Opening Session (7:00 p.m. – 8:00 p.m.)

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

Monday, August 6, 2001

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

Monday Night Social, **Mississippi Dinner Cruise** (6:00 p.m. – 10:00 p.m.)

Tuesday, August 7, 2001

Chanhassen Dinner Theatre (5:30 p.m. – 11:00 p.m.)

Minnesota Twins Baseball Game (6:00 p.m. – 10:00 p.m.)

Wednesday, August 8, 2001

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

Daytime Tours

(Lunch included in all daytime tours)

Sunday, August 5, 2001

Twin Cities Highlights (9:30 a.m. – 2:30 p.m.)

Monday, August 6, 2001

Historic Stillwater (9:30 a.m. – 3:30 p.m.)

Tuesday, August 7, 2001

Mansions & Museums (9:30 a.m. – 3:30 p.m.)

International Association for
Food Protection®
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863, USA
Phone: 800.369.6337 • 515.276.3344
Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

Attendee Registration Form

August 5-8, 2001
Minneapolis, Minnesota

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

Title _____ Employer _____

Mailing Address (Please specify: ❒ Home ❒ Work) _____

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

Telephone _____ Fax _____ E-mail _____

❒ First time attending meeting Member since: _____

❒ Regarding the ADA, please attach a brief description of special requirements you may have.

❒ IAFP occasionally provides Attendees' addresses (excluding phone and E-mail) to vendors and exhibitors supplying products and services for the food safety industry. If you prefer NOT to be included in these lists, please check the box.

PAYMENT MUST BE RECEIVED BY JULY 6, 2001 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES:	MEMBERS	NONMEMBERS	TOTAL
Registration (Awards Banquet included)	$ 275 ($325 late)	$415 ($465 late)	_____
Association Student Member*	$ 45 ($ 55 late)	Not Available	_____
Retired Association Member*	$ 45 ($ 55 late)	Not Available	_____
One Day Registration: ❒ Mon. ❒ Tues. ❒ Wed.	$ 155 ($180 late)	$210 ($235 late)	_____
Spouse/Companion* (Name): _____	$ 45 ($ 45 late)	$ 45 ($ 45 late)	_____
Children 15 & Over* (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			

EVENTS:		# OF TICKETS	
Student Luncheon (Sunday, 8/5)	$ 5 ($ 10 late)	_____	_____
Monday Night Social, Mississippi Dinner Cruise (Monday, 8/6)	$ 39 ($ 44 late)	_____	_____
Children 14 and under	$ 34 ($ 39 late)	_____	_____
Chanhassen Dinner Theatre (Tuesday, 8/7)	$ 75 ($ 80 late)	_____	_____
Minnesota Twins Baseball Game (Tuesday, 8/7)	$ 21 ($ 26 late)	_____	_____
Awards Banquet (Wednesday, 8/8)	$ 45 ($ 50 late)	_____	_____
DAYTIME TOURS: (Lunch included in all daytime tours)			
Twin Cities Highlights (Sunday, 8/5)	$ 40 ($ 45 late)	_____	_____
Historic Stillwater (Monday, 8/6)	$ 47 ($ 52 late)	_____	_____
Mansions & Museums (Tuesday, 8/7)	$ 49 ($ 54 late)	_____	_____

Payment Options:

❒ Check Enclosed ❒ VISA ❒ MasterCard ❒ Discover

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

JOIN TODAY AND SAVE!!!
(Attach a completed Membership application)
(See page 664 of this issue for a membership application)

Name on Card _____

Signature _____ Expiration Date _____

EXHIBITORS DO NOT USE THIS FORM

Hilton Minneapolis

Minneapolis, Minnesota

Sponsored by

International Association for Food Protection®

WORKSHOPS

Workshop I
Critical Steps in Laboratory Methods for the Detection of *Listeria monocytogenes*

This workshop offers information on the potential pitfalls or errors associated with the detection of *Listeria monocytogenes* in foods. The methods examined will include cultural (FDA/USDA), Immunological, Nucleic Acid, Subtyping, and Pulse Field Electrophoresis. Participants will be introduced to the limitations of each method, and possible modifications to insure the accuracy and effectiveness of your analysis. The workshop includes a laboratory section at the University of Minnesota allowing participants to view many of the common mistakes associated with *Listeria* analysis. Participants will also join in a round table discussion to share problems and ideas.

Workshop Topics

- Development and Validation of Methodologies for the Detection of *L. monocytogenes*
- Critical Steps in the Detection of *L. monocytogenes* Using Immunological Methods
- Critical Steps in the Detection of *L. monocytogenes* Using Nucleic Acid Methods
- Critical Steps in the Detection of *L. monocytogenes* Using RAPD and PFE
- Critical Steps in the Detection of *L. monocytogenes* Using Cultural Methods
- The Regulatory Perspective on *L. monocytogenes* Testing

Instructors

James R. Agin, Ohio Department of Agriculture, Reynoldsburg, OH

Jeffrey M. Farber, Ph.D., Health Canada, Ottawa, Ontario, Canada

Judy Fraser-Heaps, Pillsbury Company, Apple Valley, MN

Anthony D. Hitchins, Ph.D., FDA, Washington, D.C.

Timothy C. Jackson, Ph.D., Nestlé USA, Dublin, OH

Melissa C. Newman, Ph.D., University of Kentucky, Lexington, KY

W. Payton Pruett, Ph.D., ConAgra Refrigerated Prepared Foods, Downers Grove, IL

Who Should Attend?

Individuals working in food microbiology laboratories currently performing or planning to perform *Listeria* analysis.

Hours for Workshop

Friday August 3, 2001	Saturday August 4, 2001
Registration — 7:30 a.m. Continental Breakfast	7:30 a.m. Continental Breakfast
Workshop — 8:00 a.m. - 5:00 p.m. (Lunch Provided)	**Workshop —** 8:00 a.m. - 4:00 p.m. (Lunch Provided)

Workshop II
Applying Advanced Techniques to HACCP Systems

(Co-sponsored by the US Poultry and Egg Association)

The purpose of this workshop is to provide an overview of business tools that can be applied to HACCP systems for process evaluation and improvement. This is not an introductory HACCP course. Rather, attendees will be expected to have a basic understanding of HACCP, and should have experience in working with an implemented HACCP system. A further processed poultry model serves as a focal point upon which other workshop topics are presented and discussed.

Workshop Topics

- The Process Model – Further Processed Poultry
- Data Collection, Interpretation, and Response
- Auditing
- Recall Management

Instructors

S. F. Bilgili, Ph.D., Auburn University, Auburn, AL

Don Conner, Ph.D., Auburn University, Auburn, AL

Steve Knight, US Poultry & Egg Association, Tucker, GA

Who Should Attend?

HACCP, quality, production, and management personnel of food processing plants using HACCP in their facilities. In particular, meat and poultry processors operating under mandatory HACCP, however, the principles and applications presented in this workshop are applicable to all segments of the food industry.

Hours for Workshop

Friday August 3, 2001	Saturday August 4, 2001
Registration – 7:30 a.m. Continental Breakfast	7:30 a.m. Continental Breakfast
Workshop – 8:00 a.m. - 5:00 p.m. (Lunch Provided)	**Workshop –** 8:00 a.m. - 4:00 p.m. (Lunch Provided)

Workshop III
Crisis! Recall Management in the Food Industry

The legal aspects of dealing with crisis will be discussed as well as how to assess your risk and exposure before a crisis occurs. The nuts and bolts of dealing with crisis will be reviewed as well as a comprehensive discussion of how to deal with all aspects of the media.

Workshop Topics

- Legal Ramifications of a Food Recall
- How to Prevent a Crisis
- The Anatomy and Physiology of a Crisis
- Media/Interview in Times of Crisis
- Establishment of a Crisis Team and Plan

Instructors

William Marler, Marler Clark Attorneys at Law, Seattle, WA

Gale Prince, The Kroger Co., Cincinnati, OH

Larry L. Smith, Institute of Crisis Management, Louisville, KY

Jim Spata, Ph.D., New-Tech Consulting, Cincinnati, OH

Robert Strong, Ph.D., DiverseyLever Consulting, Liberty Town, OH

Who Should Attend?

Management personnel responsible for writing or implementing a crisis management plan.

Hours for Workshop

Saturday August 4, 2001
Registration – 7:30 a.m. Continental Breakfast
Workshop – 8:00 a.m. - 5:00 p.m. (Lunch Provided)

(Workshop registration form on page 652).

Annual Meeting Workshops

• Registration Form •

Hilton Minneapolis

Minneapolis, Minnesota

Friday-Saturday, August 3-4, 2001

❑ **Workshop I:** Critical Steps in Laboratory Methods for the Detection of *Listeria monocytogenes*

❑ **Workshop II:** Applying Advanced Techniques to HACCP Systems

Saturday, August 4, 2001

❑ **Workshop III:** Crisis! Recall Management in the Food Industry

First Name (will appear on badge) _____

Last Name _____

Company _____ Job Title _____

Address _____ City _____

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

Area Code & Telephone _____ Fax _____

E-mail _____ Member # _____

❑ Check Enclosed ❑ VISA ❑ ❑

Total Amount Enclosed (US Funds on US Bank) $ _____

Signature _____ **Expiration date** _____

Register by July 13, 2001 to avoid late registration fees

• Registration •

WORKSHOP I: Critical Steps in Laboratory Methods for the Detection of *Listeria monocytogenes*

	Early Rate	Late Rate
IAFP Member	$475	$550
NonMember	$575	$650

WORKSHOP II: Applying Advanced Techniques to HACCP Systems

	Early Rate	Late Rate
IAFP Member	$450	$525
NonMember	$550	$625

WORKSHOP III: Crisis! Recall Management in the Food Industry

	Early Rate	Late Rate
IAFP Member	$285	$360
NonMember	$385	$460

GROUP DISCOUNT:
Register 3 or more people from your company and receive a 15% discount. Registrations must be received as a group.

Refund/Cancellation Policy

Registration fees, less a $50 administrative charge, will be refunded for written cancellations received by July 20, 2001. No refunds will be made after that date; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 13, 2001. The workshop may be cancelled if sufficient enrollment is not received by July 13, 2001.

For further information, please contact the Association office at 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@foodprotection.org.

• 4 Easy Ways to Register •

To register, complete the Workshop Registration Form and submit it to the International Association for Food Protection by:

Phone: 800.369.6337; 515.276.3344

Fax: 515.276.8655

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

Web site: www.foodprotection.org

Exhibitors of IAFP 2001

Companies scheduled to exhibit as of June 10, 2001

3-A Sanitary Standards Symbol Administrative Council
1500 2nd Ave. S.E., Suite 209
Cedar Rapids, IA 52403
Phone: 319.286.9221 Fax: 319.286.9290
Web site: zeus.ia.net/~aaasansb

3M Microbiology Products
3M Center, Bldg. 275-5W-05
St. Paul, MN 55144-1000
Phone: 800.228.3958 Fax: 651.737.1994
Web site: www.3m.com/microbiology

ABC Research Corporation
3437 S.W. 24th Ave.
Gainesville, FL 32607
Phone: 352.372.0436 Fax: 352.378.6483
Web site: www.abcr.com

Advanced Analytical Technologies, Inc. (AATI)
2901 S. Loop Drive, Suite 3300
Ames, IA 50010
Phone: 515.296.6600 Fax: 515.296.6789
Web site: www.aati-us.com

Alcide Food Safety, Inc.
8561 154th Ave. N.E.
Redmond, WA 98052
Phone: 800.543.2133 Fax: 425.861.0173
Web site: www.alcide.com

American Proficiency Institute
1159 Business Park Drive
Traverse City, MI 49686
Phone: 800.333.0958 Fax: 231.941.7287
Web site: www.foodpt.com

Aquionics, Inc.
21 Kenton Lands Road
Erlanger, KY 41018
Phone: 800.925.0440 Fax: 859.341.0350
Web site: www.aquionics.com

ASI Food Safety Consultants, Inc.
7625 Page Blvd.
St. Louis, MO 63133
Phone: 800.477.0778 Fax: 314.725.2555
Web site: www.asifood.com

BD Diagnostic Systems
7 Loveton Circle
Sparks, MD 21152
Phone: 410.316.4000 Fax: 410.316.4906
Web site: www.bd.com

BioControl Systems, Inc.
12822 S.E. 32nd St.
Bellevue, WA 98005
Phone: 425.603.1123 Fax: 425.603.0080
Web site: www.rapidmethods.com

bioMérieux, Inc.
595 Anglum Road
Hazelwood, MO 63042-2320
Phone: 314.506.8052 Fax: 314.731.8678
Web site: www.biomerieux.com

Bioscience International, Inc.
11607 Magruder Lane
Rockville, MD 20852-4365
Phone: 301.230.0072 Fax: 301.230.1418
Web site: www.biosci-intl.com

BioSys, Inc.
93 Hines Road #5
Kanata, Ontario K2K 2M5 Canada
Phone: 613.271.1144 Fax: 613.271.1148

Biotest Diagnostics Corporation
66 Ford Road, Suite 131
Denville, NJ 07834
Phone: 973.625.1300 Fax: 973.625.5882
Web site: www.biotestusa.com

Brain Wave Technologies, Inc.
124 Owen Road
Madison, WI 53716
Phone: 608.204.7440 Fax: 608.204.7445
Web site: www.tboughtforfood.org

Capitol Vial, Inc.
151 Riverside Drive, P.O. Box 446
Fultonville, NY 12072
Phone: 800.772.8871 Fax: 518.853.3409
Web site: www.capitolvial.com

Cepheid
1178 Bordeaux Drive
Sunnyvale, CA 94089
Phone: 408.541.4191 Fax: 408.734.1260
Web site: www.cepheid.com

Charm Sciences, Inc.
659 Andover St.
Lawrence, MA 01841
Phone: 800.343.2170 Fax: 978.687.9216
Web site: www.charm.com

Chemunex SA
Immeuble Paryseine
3, allee de la Seine
Ivry-sur-Seine cedex F-94854 France
Phone: 33.1.4959.2000 Fax: 33.1.4959.2001
Web site: www.chemunex.com

Cogent Technologies, Ltd.
11140 Luebek Drive
Cincinnati, OH 45241
Phone: 513.469.6800 Fax: 513.469.6811

Copan Diagnostics, Inc.
2175 Sampson Ave. #124
Corona, CA 92879
Phone: 800.216.4016 Fax: 909.549.8850
Web site: www.copanusa.com

Daikin Environmental Laboratory, Ltd.
3 Miyukigaoka
Tsukuba-shi, Ibaraki 3050841 Japan
Phone: 81.298.58.5010 Fax: 81.298.58.5082

Decagon Devices, Inc.
950 N.E. Nelson Court
Pullman, WA 99163
Phone: 800.755.2751 Fax: 509.332.5158
Web site: www.decagon.com

Deibel Laboratories, Inc.
7120 N. Ridgeway Ave.
Lincolnwood, IL 60712
Phone: 847.329.9900 Fax: 847.329.9903

DQCI Services, Inc.
5205 Quincy St.
Mounds View, MN 55112
Phone: 763.785.0484 Fax: 763.785.0584
Web site: www.dqci.com

DSM Food Specialties
N89 W14475 Patrita Drive
Menomonee Falls, WI 53051
Phone: 262.255.7955 Fax: 262.255.7732
Web site: www.dsm.com

DuPont Qualicon
3531 Silverside Road, Bedford Bldg.
Wilmington, DE 19810
Phone: 302.695.5300 Fax: 302.695.5301
Web site: www.qualicon.com

Dynal Biotech, Inc.
5 Delaware Drive
Lake Success, NY 11042
Phone: 800.638.9416 Fax: 516.326.3298
Web site: www.dynalbiotech.com

Ecolab, Inc.
370 Wabasha St. N.
St. Paul, MN 55102
Phone: 651.293.2233 Fax: 651.293.2260
Web site: www.ecolab.com

Elsevier Science
655 Ave. of the Americas
New York, NY 10010
Phone: 212.633.3756 Fax: 212.633.3112
Web site: www.elsevier.com

EM Science
480 S. Democrat Road
Gibbstown, NJ 08027
Phone: 856.423.6300 x453 Fax: 856.423.6313
Web site: www.emscience.com

FDA – Center for Food Safey and Applied Nutrition
200 C St. S.W.
Washington, D.C. 20204
Phone: 888.SAFEFOOD Fax: 202.401.3532
Web site: www.cfsan.fda.gov

FMC Corporation
P.O. Box 8
Princeton, NJ 08543
Phone: 609.951.3651 Fax: 609.951.3668
Web site: www.fmc.com

Food Processors Institute
1350 I St. N.W., Suite 300
Washington, D.C. 20005
Phone: 800.355.0983 Fax: 202.639.5932
Web site: www.fpi-food.org

Food Quality Magazine
208 Floral Vale Blvd.
Yardley, PA 19067
Phone: 215.860.7800 Fax: 215.860.7900
Web site: www.foodquality.com

Food Safety Magazine
P.O. Box 5244
Glendale, CA 91221-1081
Phone: 818.842.4777 Fax: 818.769.2939

Food Safety Net Services, Ltd.
221 W. Rhapsody
San Antonio, TX 78216
Phone: 888.525.9788 Fax: 210.308.8730
Web site: www.food-safetynet.com

FoodHandler, Inc.
514 Grand Blvd.
Westbury, NY 11590
Phone: 516.338.4433 Fax: 516.338.5486
Web site: www.foodhandler.com

Foss North America, Inc.
7682 Executive Drive
Eden Prairie, MN 55344
Phone: 952.974.9892 Fax: 952.974.9823
Web site: www.fossnorthamerica.com

GENE-TRAK Systems
94 South St.
Hopkinton, MA 01748
Phone: 800.338.8725 Fax: 508.435.0025
Web site: www.genetraksys.com

GSC Mobile Solutions
4660 S. Hagadorn Road
East Lansing, MI 48823
Phone: 800.333.9366 Fax: 517.337.2868
Web site: www.gscmobilesolutions.com

Hygiena
941 Avenida Acaso
Camarillo, CA 93012
Phone: 805.388.2383 Fax: 805.388.5531

IBA Food Safety Division
6000 Poplar Ave., Suite 426
Memphis, TN 38119
Phone: 800.777.9012 Fax: 901.681.9007
Web site: www.iba-guardion.com

International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2863
Phone: 800.369.6337 Fax: 515.276.8655
Web site: www.foodprotection.org

International Association for Food Protection – Student PDG
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2863
Phone: 515.276.3344 Fax: 515.276.8655
Web site: www.foodprotection.org

International BioProducts
P.O. Box 0746
Bothell, WA 98041-0746
Phone: 800.729.7611 Fax: 425.398.7973
Web site: www.intlbioproducts.com

International Food Hygiene
P.O. Box 4
Driffield, East Yorkshire YO25 9DJ United Kingdom
Phone: 44.13.7724.1724 Fax: 44.13.7725.3640
Web site: www.positiveaction.co.uk

International Food Information Council Foundation
1100 Connecticut Ave. N.W., Suite 430
Washington, D.C. 20036
Phone: 202.296.6540 Fax: 202.296.6547
Web site: www.ific.org

Johnson Diversified Products, Inc.
1408 Northland Drive, Suite 407
Mendota Heights, MN 55120-1013
Phone: 800.676.8488 Fax: 651.686.7670
Web site: www.jdpinc.com

Laboratory Services, University of Guelph
95 Stone Road W., P.O. Box 3650
Guelph, Ontario N1H 8J7 Canada
Phone: 519.767.6299 Fax: 519.767.6240
Web site: www.uoguelph.ca/labserv

LABPLAS, Inc.
1950 Bombardier
Ste-Julie, Quebec J3E 2J9 Canada
Phone: 450.649.7343 Fax: 450.649.3113
Web site: www.labplas.com

Medallion Laboratories
9000 Plymouth Ave. N.
Minneapolis, MN 55427
Phone: 800.245.5615 Fax: 763.764.4010

MicroBioLogics, Inc.
217 Osseo Ave. N.
Saint Cloud, MN 56303
Phone: 800.599.2847 Fax: 320.253.6250
Web site: www.mbl2000.com

Microbiology International
97H Monocacy Blvd.
Frederick, MD 21701
Phone: 301.662.6835 Fax: 301.662.8096
Web site: www.kr-technologies.com

Molecular Circuitry, Inc.
3400 Horizon Drive, Suite 400
King of Prussia, PA 19406
Phone: 877.773.3839 Fax: 610.313.9604
Web site: www.molc.net

Nasco International, Inc.
901 Janesville Ave.
Fort Atkinson, WI 53538
Phone: 800.558.9595 Fax: 920.563.8296
Web site: www.enasco.com

The National Food Laboratory, Inc.
6363 Clark Ave.
Dublin, CA 94568
Phone: 925.828.1440 Fax: 925.833.9239
Web site: www.thenfl.com

National Restaurant Association Educational Foundation
250 S. Wacker Drive, Suite 1400
Chicago, IL 60606
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Journal of Food Protection

ISSN: 0362-028X
Official Publication

International Association for Food Protection

Reg. U.S. Pat. Off.

Vol. 64 July 2001 No. 7

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Coming Events

AUGUST

·**2-3, Silliker Advanced HACCP Course,** Huntington Beach, CA. For further information, contact Silliker at 708.957.7878.

·**3, 3-A Third Party Accreditation Meeting,** Minneapolis, Hilton, Minneapolis, MN. To register, contact Philomena Short or Tom Gilmore at 703.761.2600; E-mail: pshort@iafis.org, or tgilmore@iafis.org.

·**3-4, IAFP Workshops,** Minneapolis, MN.

- Workshop I "Critical Steps in Laboratory Methods for the Detection of *Listeria monocytogenes*."
- Workshop II "Applying Advanced Techniques to HACCP Systems."
- Workshop III "Crisis! Recall Management in the Food Industry."

Additional workshop information available in this issue of *DFES* on page 652.

·**5-8, IAFP 2001, the Association's 88th Annual Meeting,** Minneapolis, MN. Registration materials available in this issue of *DFES* on page 649 or contact Julie Cattanach at 800.369.6337; 515.276.3344; fax: 515.276.8655; E-mail: jcattanach@foodprotection.org. Visit our Web site at **www.foodprotection.org** for the most current Annual Meeting information.

·**22-26, The National Society for Healthcare Foodservice Management (HFM) Annual Conference,** The Saddlebrook Resort in Tampa, FL. For additional information, contact Sheila Crowley at 202.546.7236; E-mail: smc@hfm.org.

SEPTEMBER

·**5, Managing Dairy Food Safety Workshop,** Madison, WI. For additional information, contact W. L. Wendorff at 608.263.2015; E-mail: wlwendor@facstaff.wisc.edu.

·**11, International Inflight Food Service Association Second Annual Food Safety Summit,** Atlanta, CA. The meeting brochure and agenda are available at www.ifsanet.com or call 502.583.3788.

·**11, The International Inflight Food Service Association (IFSA) Second Annual Food Safety Summit,** Renaissance Concourse Hotel, Atlanta, GA. For additional information, contact IFSA at 502.583.3788.

·**12-14, 3rd International Whey Conference,** Munich, Germany, sponsored by the American Dairy Products Institute (ADPI), and the European Whey Products Assn. (EWPA). For additional information, contact Warren S. Clark, Jr., at 312.782.4888; fax: 312.782.5299; E-mail: adpi@flash.net.

·**13-15, 2nd International Mastitis & Milk Quality Symposium,** Vancouver, British Columbia, Canada. For additional information, contact National Mastitis Council, 608.224.0622; fax: 608.224.0644; E-mail: nmc@nmconline.org.

·**17-21, Thermal Process Development and Thermal Processing Deviations Workshops,** Dublin, CA. For more information, contact Lilly Mitchell at 800.355.0983, or E-mail: lmitchell@nfpafood.org.

·**18-20, New York State Association of Milk and Food Sanitarians Annual Meeting,** Holiday Inn, Syracuse/Liverpool. For additional information, contact Janene Lucia at 607.255.2892.

·**19-21, Microbiology and Engineering of Sterilization Processes Course,** University of Minnesota, St. Paul, MN. For more information, contact Ms. Ann Rath at 612.626.1278; fax: 612.625.5272.

·**21-25, 129th APHA Annual Meeting,** Atlanta, GA. For more information, call 202.777.2470; fax: 202.777.2531.

·**24-26, Indiana Environmental Health Association, Inc., Fall Conference,** Holidome, Columbus, IN. For further information, contact Helene Uhlman at 219.853.6358.

·**25-26, Wisconsin Milk and Food Sanitarians Association 2001 Joint Conference,** Chula Vista Resort and Conference Center, Wisconsin Dells, WI. For further information, contact Kathy Glass at 608.263.6935.

·**26-28, Washington Association for Food Protection Annual Conference,** Campbell's Lake Chelan Resort and Conference Center, Chelan, WA. For further information, contact Bill Brewer at 206.363.5411.

OCTOBER

·**10-11, Iowa Association for Food Protection Annual Meeting,** Starlite Village, Ames, IA. For further information, contact Monica Streicher at 712.324.0163.

·**13-17, Anuga 2001, The Entire World of Food,** Cologne, Germany. For additional information, call 212.974.8835; fax: 212.974.8838; E-mail: info@citf.com.

·**15-17, European Hygienic Equipment Design Group (EHEDG) with AINIA 11th Annual Conference and Workshop, Food in Europe: Building in Safety,** Valencia, Spain. For further information, visit www.ainia.es/safetycongress.

·15-18, North Dakota Environmental Health Association Fall Meeting, Best Western Doublewood Inn, Bismarck, ND. For further information, contact Deb Larson at 701.328.1292.

·16-18,1st International Symposium on the Spray Drying of Milk Products, Rennes, France. For additional information, E-mail: sympo2001@rennes.inra.fr.

·18-21, Worldwide Food Expo, McCormick Place, Chicago, IL. For additional information, call 202.371.9243.

·21-25, 129th American Public Health Association Annual Meeting, Atlanta, GA. For further information, contact Ashell Alston at 202.777.2470; Fax: 202.777.2531.

·24-25, Associated Illinois Milk, Food and Environmental Sanitarians Annual Meeting, Stoney Creek Inn, East Peoria, IL. For further information, contact Pat Callahan at 217.854.2547.

NOVEMBER

·7-8, Alabama Association for Food Protection Annual Meeting, Homewood Holiday Inn, Birmingham, AL. For further information, contact Karen Crawford at 205.554.4546.

·14-16, Florida Association for Food Protection Annual Education Conference, FFA Leadership Training Center, Haines City, FL. For further information, contact Frank Yiannas at 407.397.6060.

·14-17, Agritrade 2001, Hyatt Regency Convention Center, Guatemala City, Mexico. For additional information, call 502.362.2002 ext. 163; Fax: 502.362.1950; E-mail: agritrade@agexpront.org.gt.

·15, Ontario Food Protection Association Annual Meeting, Delta Meadowvale Hotel, Mississauga, Ontario. For further information, contact Glenna Haller at 519.823.8015.

·21-24, 3rd International Dairy and Food Technology Expo 2001, Mumbai, India. For further information, call 49.0.221.8210; Fax: 49.0.221.821.2092; E-mail: idftexpo@kmi.koelnmesse.de.

·21-24, Food Technology Expo 2001, Xiamen International Conference & Exhibition Center, Fujian, China. For further information, contact Mr. Louis Leung at 852.2865.2633; Fax: 852.2866.1770; E-mail: enquiry@bitf.com.hk.

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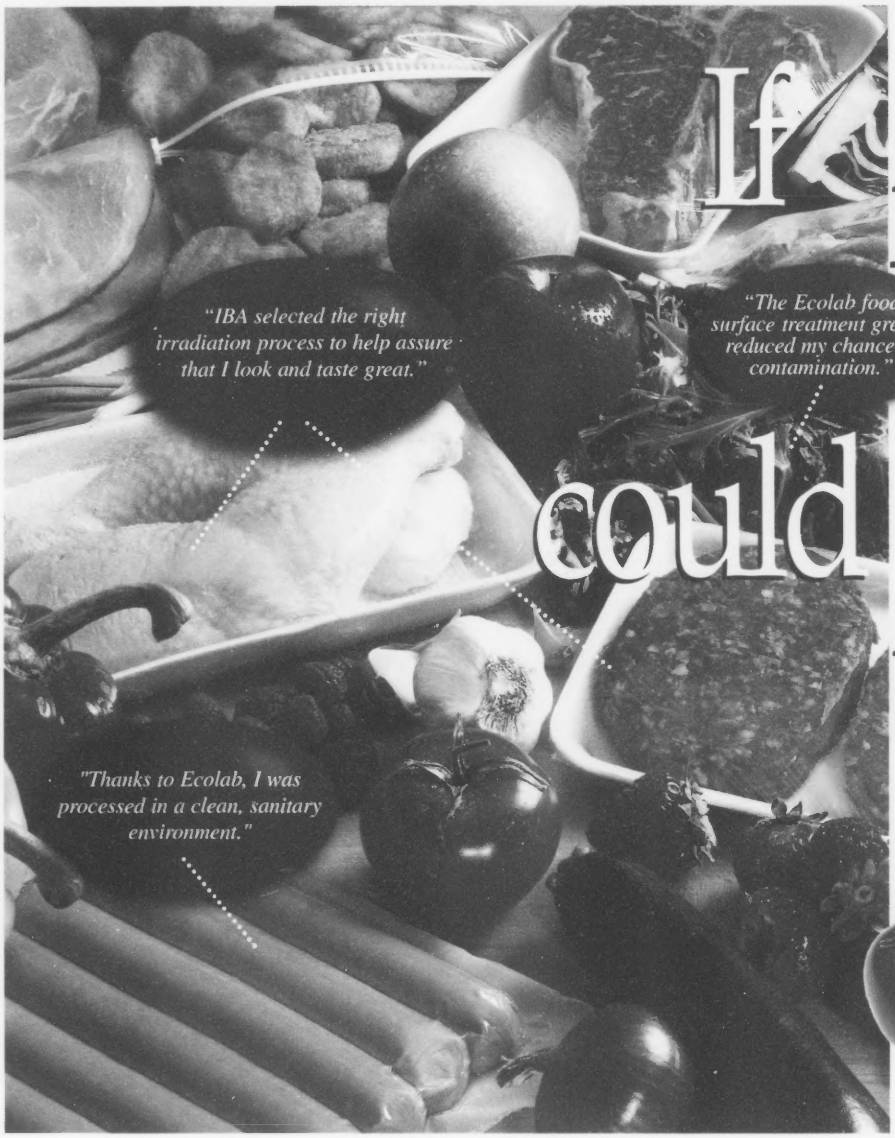

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