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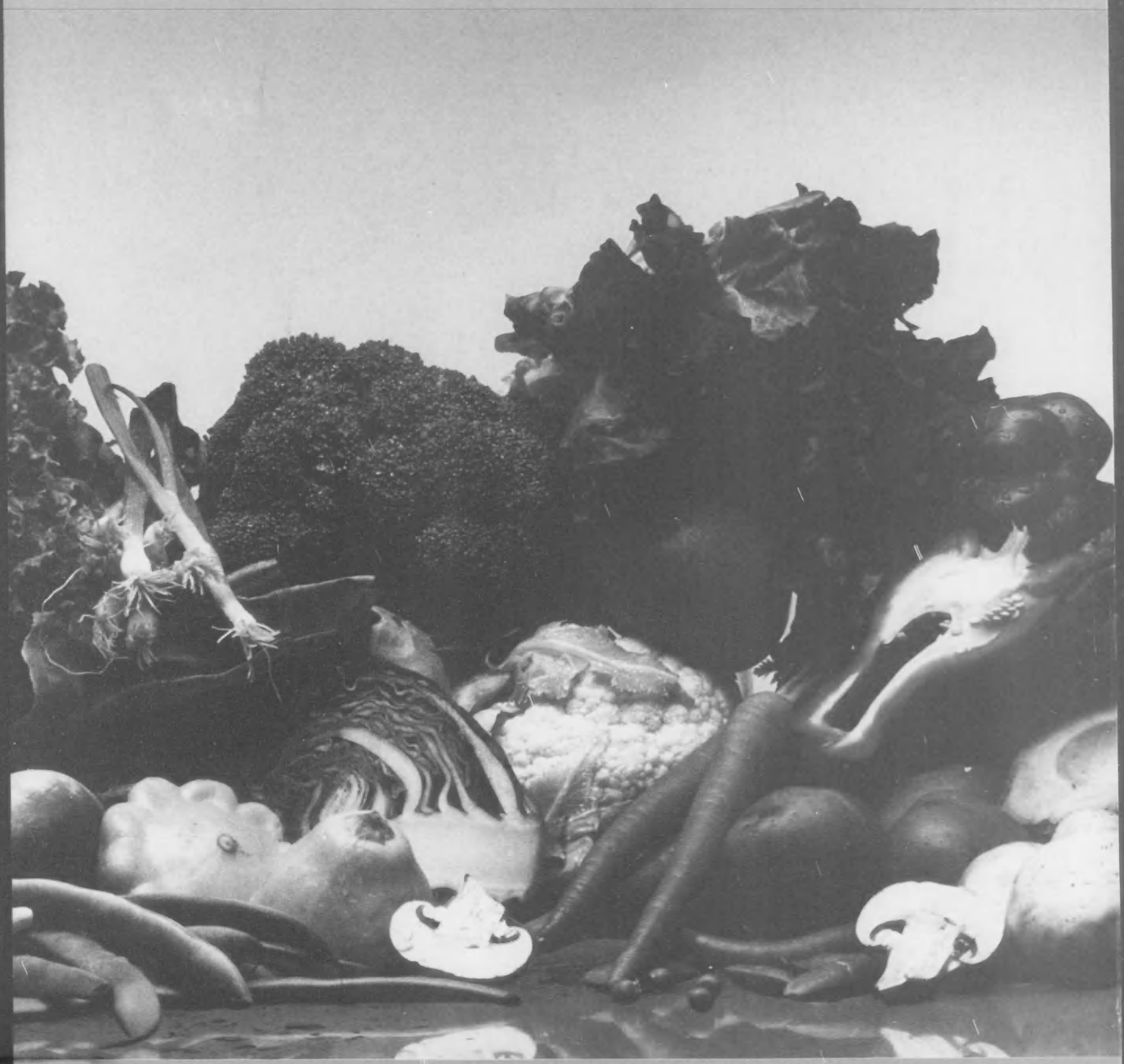
FOOD PROTECTION TRENDS

SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

AUGUST 2006



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International Association for Food Protection

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FOOD PROTECTION TRENDS

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"PERSPECTIVES FROM NORTH OF THE 49TH"

By JEFFREY FARBER
PRESIDENT

"I have been privileged to have gained special insight into what IAFP needs to continue doing in the future to keep on a successful track"

It is very hard for me to believe that a whole year has gone by since I was handed the gavel and started to serve as your President. It certainly has been one of the most rewarding years of my life. I wanted to thank you for allowing me to serve as your President. It has been a great honor for me. First, I would like to thank our great extended Executive Board, Frank, Stan, Gary, Kathy, Terry, Vickie, and Maria Teresa. I have learned something from each and every one of you and I truly appreciate the great support you have given me this year. I would also like to thank all the Affiliate Board of Directors, Delegates, and their members for also being so supportive. My deepest gratitude goes to the IAFP staff, namely Julie, Donna, Pam, Tamara, Donna G., Didi, Farrah, Nancy, Karla, and Dave L., for all their hard work, dedication and professionalism. A very special and heartfelt thank you to Lisa and David, who have been great mentors to me, especially David, and I cannot say enough about how important these two individuals have been and will continue to be the future success of our organization.

I write this column at the end of June, 2006. With extreme sadness, this month we lost a great friend and colleague, Dr. Elmer Marth. Those of us who were fortunate enough to know or have worked with Elmer will always have fond memories of this truly wonderful person – a consummate professional and gentleman in every sense of the word.

Some of the things that will stand out in my mind as IAFP President this past year was playing a leading role in the organization of our first ever European symposium, visiting and getting to know better some of our Affiliates, interacting with the students in a web-based discussion form, moving ahead with our new dues re-structuring along with an electronic newsletter and beginning our agreement with the WHO along the road to becoming an NGO. The Brazilian Association for Food Protection (BAFP or ABRAPA in Portuguese) meeting that I attended was held in São Paulo, Brazil in June. It was held in conjunction with the Brazilian Society for Microbiology, and was very well attended with close to 150 attendees. This is truly amazing since the BAFP has only been in existence since 2002. At the meeting, there was topical and interesting scientific content, which included talks on *Listeria*, *E. sakazakii*, emerging food safety trends, a whole session on allergens, current-future risk management tools and food toxicology. The two-day meeting was certainly a great success and was due to the hard work and efforts of Maria Teresa Destro and Marisa Landgraf, who did an outstanding job and should be highly commended. As you know, our Affiliates are a very important part of our organization and I was really heartened by the attendance at the meeting and the interest in learning about IAFP. BAFP has shown that in only a few years an Affiliate can really grow and be vibrant and viable.

I have been privileged to have gained special insight into what IAFP needs to continue doing in the future to keep on a successful track (in no specific order). We need to do our best to:

- Maintain or increase student participation in IAFP – keeping them excited and interested, "getting them hooked into our great Association" is one of our keys to the future
- Keep our wonderful IAFP staff intact
- Expand our Affiliate community by providing them value for their membership – so that they will spread the word and attract new Members and Affiliates into the organization
- Keep growing internationally not only in developed countries, but also in developing countries
- Organize high-quality Annual Meetings, as well as pro-

viding other benefits to Members throughout the year – hot topic symposia delivered to all parts of the globe, timely white papers, job postings, food safety advice and information – be the "go-to organization for food safety"

- Add "cutting-edge" and novel topics to our Annual Meeting program, such as biotechnology, food allergens, food safety disaster preparedness, food defense, and more applied programming aimed at the plant QA/managerial level
- Continue to grow our membership base and have "good attendance" at our Annual Meeting, but not so "good" that we lose the closeness and intimacy that is the hallmark of IAFP
- Be more proactive with our PDG groups and meet more often throughout the year to take advantage of the great expertise and diversity that exists

In terms of food safety, while in North America our food supply has never been safer, foodborne illness is still a very significant problem and we will need to remain extremely vigilant in the years ahead. This will definitely keep our Members busy and not wanting for jobs. Some of the key issues that will keep all of us busy include:

- Increasing push for a wider variety of foods year-round, especially those that are fresh and that have a long shelf life
- Increasingly elderly population with greater susceptibilities to infections
- Food defense issues
- Emerging pathogens, including the viruses and protozoan parasites as well as TSEs
- Increased travel, including cruise ships, etc.
- New inactivation technologies which may put selective pressures on the emergence of new hardy and resistant strains
- New knowledge which will link foodborne pathogens more closely with chronic diseases

As I have said several times in this column, this is a very exciting period in the history of our Association. We have now turned the corner financially and the sky is the limit in terms of how far IAFP can reach out to truly become the premier international food safety association. We have a great team behind us, and a fabulously committed and dedicated membership to guide us to where we want to be. We are in the driver's seat and it is up to all of us to steer the ship in the right direction. I am very certain that as I hand over the gavel to our incoming President, Frank Yiannas, followed by Gary Acuff, Stan Bailey and Vickie Lewandowski, that we will be sailing in the right direction for a very long time. Thanks again for all the great memories and for your great support. It is truly appreciated!

Signing off for the last time.

Your President, Jeff.

In Memory of...

Dr. Elmer Marth

Madison, Wisconsin

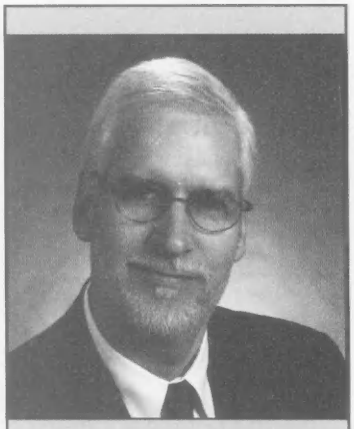
Dr. Elmer Marth, Professor Emeritus, and an icon of food science education and research, died June 19, 2006 in Madison, Wisconsin at the age of 78. He is survived by his wife of 49 years, the former Phyllis Menge.

Elmer Marth was born on a dairy farm near Jackson, Wisconsin in 1927. By 1954 he had earned his B.S., M.S., and Ph.D. degrees from UW-Madison. After 12 years at the Kraft R&D division, in 1966 he joined the UW-Madison faculty in food science, bacteriology and toxicology. He retired from UW-Madison in 1990. During his tenure he served as major professor for 64 students who earned master or doctorate degrees. Today, many of these graduates continue his legacy as published researchers and mentors to a new generation of dedicated food safety professionals and, in the course of their careers, have distinguished themselves as IAFP presidents, *JFP* co-editors, developing scientists and other award recipients.

Elmer Marth dedicated his career to identifying a practical approach to food safety. He published over 660 scientific papers, served as editor of the *Journal of Food Protection* from 1967 to 1987, was president of the Wisconsin affiliate (WAFP) in 1975, and was the recipient of multiple honors and awards. In 1989 WAFP created a scholarship in his name for UW System undergraduates in food and environmental science.

IAFP would like to extend our deepest sympathy to Dr. Marth's family and friends. IAFP will always have sincere gratitude for his numerous contributions to the Association and the profession.

"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"We want to have fully functioning Committees and PDGs so that the work of IAFP can be carried out as efficiently as possible"

Since IAFP's Committees and Professional Development Groups (PDGs) meet each year at the Annual Meeting, I thought it might be a good time to review the purpose and structure surrounding these groups.

IAFP's Committees and PDGs are the professional workforce of IAFP. The Association performs its service to Members, the profession and the general public through its Committees and PDGs. Committees and PDGs develop new ideas for carrying out existing policies, help to develop new policies and carry on the programs of activity that fall under their scope of responsibility. Our effectiveness as an association is often times judged based on the performance of our Committees and PDGs.

There are two types of Committees, either Standing or Special. Standing Committees provide operational or functional support to IAFP and consist of the *Food Protection Trends* Management Committee, the *Journal of Food Protection* Management Committee and the Program Committee. Members of these Committees are appointed for specific terms, which are approved by the Executive Board.

Special Committees provide support services to IAFP on a continuous basis and Members "volunteer" to serve on most of these Committees. Members may serve on-going, renewable terms on these Committees in most cases, but are still subject to the Executive Board's review and approval. Special Committees include the 3-A Committee on Sanitary Procedures, Audiovisual Library, Committee on Control of Foodborne Illness, Constitution and Bylaws, Foundation, Membership, Nominating, Past Presidents', and Tellers. You must be a Member to serve on IAFP Committees whether classified as Special or Standing.

For PDGs, participation is open to IAFP Members and extends to non-members too, however, only IAFP Members may serve in the role of Chairperson or Vice Chairperson. PDGs are established by the Executive Board at the request of a group of Members. Their purpose is to promote professional development in specific disciplines or areas of interest, which further the Association's goals. Current PDGs include Applied Laboratory Methods, Beverage, Dairy Quality and Safety, Food Hygiene and Sanitation, Food Law, Food Safety Education, Food Toxicology and Food Allergens, Fruit and Vegetable Safety and Quality, Meat and Poultry Safety and Quality, Microbial Risk Analysis, Retail Food Safety and Quality, Seafood Safety and Quality, Student, Viral and Parasitic Foodborne, and Water Safety and Quality.

Afer reviewing the list of PDGs, Special Committees and Standing Committees, there is surely some area that you can put your expertise to work for IAFP! Committee and PDG work provides great opportunities for professional growth and to meet new colleagues who hold similar interests as what you do. Working together and achieving success also provides a sense of accomplishment and well-being.

One thing that we have found is that Committees and PDGs communicate in a variety of ways throughout the year. There are a number of PDGs who only conduct their work each year at the Annual Meeting. Others communicate via teleconferences or E-mail on a regular schedule while still others, may schedule a teleconference on an as-needed basis. There is no magic to how a Committee or PDG should communicate during the year, but in most cases, it is advisable to have some communication at least leading into the Annual Meeting.

Many times, PDGs see their primary responsibility as generating submissions of symposium proposals for the next Annual Meeting. Although we encourage such submissions, there are also other projects that PDGs can undertake. There is a need for additional guidance booklets and pamphlets or a PDG may choose to write a white paper. It is suggested that projects like these be discussed with the Executive Board to gain initial approval and direction. The Executive Board must first review any booklets, pamphlets or white papers before they can be issued under the IAFP name.

I want to come back to the subject of communicating within PDGs. There are two PDGs who are using the latest technology to communicate. The Applied Laboratory Methods PDG have worked through a series of Webinars this year where documents can be viewed and manipulated over the Internet as other participants observe and provide input. The group has worked well together and made great progress using this technology.

The Student PDG set up a discussion board and ran it for a week during which students could ask IAFP President Jeffrey Farber questions and get answers. This worked well and created interest in the Student PDG as well as student interest in IAFP! They also created a blog for students to go to in order to ask questions and carry on discussions.

So, IAFP is willing to assist Committees and PDGs in carrying out communication throughout the year, not only at the Annual Meeting. If you serve on a Committee or PDG and want to schedule any type of communication vehicle during the year, you may simply contact the IAFP office and we will work with you to accommodate your needs. We want to have fully functioning Committees and PDGs so that the work of IAFP can be carried out as efficiently as possible.

For everyone serving on Committees and PDGs, we thank you for this service to IAFP. We appreciate your willingness to contribute your time and efforts to help move IAFP forward. If you do not serve on a Committee or PDG, we welcome your participation and hope you will review the options and let us know where you would like to become involved!

ARTICLES

Food Protection Trends, Vol. 26, No. 8, Pages 586–592

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International Association for Food Protection

Essential Food Safety Behaviors for Older Adults

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SUMMARY

Adults over age 60 may be at risk for foodborne illnesses because of normal changes of aging as well as morbidities that affect susceptibility to infection, including foodborne pathogens. The pathogens of greatest concern (*Listeria monocytogenes*, *Salmonella* species, *E. coli* O157, *Campylobacter jejuni*) can be destroyed by heat, so it is critical that foods are cooked to safe temperatures. This study investigated factors that may influence whether food is cooked adequately by adults ≥ 60 years old. A needs assessment study found that few of the subjects used food thermometers to ensure safe cooking of food. In a subsequent study, food safety knowledge, attitude, behavior and stage of readiness to change food-handling practices improved ($P \leq .05$) after a three-lesson educational intervention on consequences of foodborne illnesses to health, ways to ensure that foods are adequately cooked and a call to action to practice these behaviors in the home. Despite the improvements seen, the majority of participants did not, nor did they plan to, use food thermometers to ensure adequate cooking of food. The improvements observed do indicate, however, that relating the practice of safe food handling to health can be effective in motivating the elderly to practice food safe behaviors at home.

INTRODUCTION

Physiological aging results in loss of chemical and physical barriers that typically control access of pathogens into the body *(3, 7)*. The effects of malnutrition or chronic disease are more common with aging and compound the effects of normal aging *(15, 27)*. Infections, including foodborne illnesses, are therefore more likely in the elderly. Social, economic and health factors can influence susceptibility to foodborne illnesses, which is also exacerbated by the chronic diseases associated with advancing age. Elderly adults have life-long food handling practices that they may not perceive as being related to foodborne illnesses; however, rates of hospitalizations from gastroenteritis, an indicator of unconfirmed foodborne illness, is highest for adults 75 years or older (7.6/1000 population) *(21)*. The same age group is 33 times more likely to die during hospitalization from gastroenteritis than younger patients. These statistics suggest that food safety educational programs that target seniors are essential.

Compared to younger adults, the elderly appear to have increased susceptibility to some pathogenic foodborne infections, but not for other pathogens *(8)*. As reviewed by Smith *(24)*, older adults are more susceptible to infection from *Escherichia coli* O157:H7, *Listeria*

A peer-reviewed article

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monocytogenes, *Salmonella* species, *Clostridium perfringens* and *Staphylococcus aureus*. Historically, *Salmonella* serotype Enteritidis infections have been a particular concern for the elderly *(13)*. Data from FoodNet, the active surveillance system for tracking foodborne illnesses by the Centers for Disease Control and Prevention *(4)*, show an overall decline in incidence of illnesses from *Salmonella* serotype Enteritidis, including among the oldest age group (≥ 60 years), and the rate of infection is similar for adults of all ages *(16)*. However, for all *Salmonella* species, the elderly (60 years and older) continue to account for the greatest proportion of hospitalizations and have the highest death rate compared to younger age groups *(14)*.

Fortunately, the pathogens of greatest concern for the elderly are destroyed by heat, so cooking foods to an internal temperature that pasteurizes the food is critical for reducing incidence of foodborne illness *(19)*. USDA recommends using a food thermometer to ensure adequate internal endpoint temperatures since researchers have shown that visual cues are unreliable indicators of safe and adequate cooking *(10, 26)*. However, many elderly people have established food preparation practices that may not include use of a food thermometer and are lax on safe food handling behavior, in general *(1, 5, 9)*.

This study explored factors that may influence whether food is cooked adequately by older adults. Study questions included the following: (1) Do older adults aged 60 or older monitor safe cooking temperatures? (2) Will knowledge, attitude and behavior related to food safety improve after an educational intervention? and (3) What are the barriers that hinder older adults from changing their behavior related to food safety? We hypothesized that participants would improve their knowledge, attitude and behaviors related to food safety and that improvement would relate to readiness to change behavior. A needs assessment study was first completed to identify priority learning needs and inform development of an educational intervention. Knowledge, attitude, behavior change, and readiness to change behavior were measured after completion of a subsequent educational intervention.

METHODS

The Ohio State University Behavioral and Social Sciences Institutional Review Board reviewed and approved the studies and the procedures regarding the rights and welfare of human subjects. Verbal consent was obtained from participants prior to data collection.

Development and testing of the survey instrument

Items measuring attitudes about food safety, knowledge of adequate cooking methods, and food cooking behavior were selected from previously tested instruments *(12, 17)* and adapted for use with older adults (Table 1). Knowledge and behavior items were written as dichotomous variables (correct or incorrect) as previously described *(12, 17)*, and total knowledge and behavior scores were calculated as the sum of correct responses. Attitude items were scored on a 4-point Likert scale. An attitude score was calculated as the sum of responses. A stage-of-readiness-to-change scale had three response options: (1) Have used a food thermometer in the past, (2) Plan to use a food thermometer in the future, and (3) Do not plan to use a food thermometer. Stage-of readiness-to-change items were scored on a 3-point scale. The stage-of-readiness-to-change scale was modeled after the work of Prochaska et al. *(23)*. A section to gather demographic information (gender and age) was also included.

A check for face validity with elderly individuals indicated a need to clarify wording and format to increase the readability of the selected items. Test-retest reliability of the entire survey was completed with 34 senior participants at congregate meal sites. A period of one month with no intervening education was used for this measure. Test-Retest reliability was confirmed by Pearson's correlation *(22)*. Reliability was also confirmed after modifications. Cronbach alpha scores for internal consistency were 0.63 for six attitude items, 0.64 for eight knowledge questions, and 0.58 for four behavior questions. In the development of the survey instrument, the researchers felt that important content would have been lost if two items causing lower internal consistency were removed; thus these questions were included on the final survey. These two items had more than acceptable test-retest reliability *(22)*.

Study locations and participants

The 21 congregate meal sites selected for the needs assessment study were in the Columbus, Ohio metropolitan area and all received meals funded through Title III of the Older Americans Act. Attendees at these centers participated in educational programs funded through the Ohio Family Nutrition Program. Participants in the needs assessment and educational intervention studies were ambulatory, independent-living male and female adults who were at least 60 years of age.

Educational needs assessment

The survey instrument developed for this study was administered to participants at the congregate meal sites to determine common food safety behaviors. A convenience sample was selected. A total of 425 questionnaires were completed at the 21 centers. Questionnaires that had incomplete responses for any question or were not completed by a participant from the target population were eliminated. The final sample consisted of 293 questionnaires.

Educational intervention

Approximately one year after the needs assessment study ended, a food safety educational intervention to promote adequate cooking of food was completed. Participants were selected as a convenience sample at the same 21 congregate meal sites used for the needs assessment study. Evaluation followed a pre/post experimental design, with each participant serving as his/her own control. Lessons were designed to include principles from the Transtheoretical Model of Change *(23)*.

Participants first completed the survey instrument that measured their food safety attitudes, knowledge and behavior and then participated in a series of three 30-min food safety education lessons. Lesson one was designed to increase awareness of the dangers of consuming undercooked food and to positively influence attitudes toward safe food handling. Lesson two, which was completed one week later, taught participants basic knowledge of food safety and skills for checking for adequate cooking of food products. Participants wrote personal goals to encourage improvement in checking endpoint temperatures of foods cooked at home. They were asked to discuss barriers to using the information learned in the lessons and to devise strategies to overcome those barriers. A food thermometer was given to each participant as an incentive to check for safe cooking. Lesson three was completed three or four weeks after Lesson two.

TABLE 1. Evaluation responses from the needs assessment study (n = 293)

Variable	Items	Item means		
		Mean	Standard error of mean	Responses options
Food safety attitude[1]	Cooking and eating eggs that have firm yolks and whites is important to me for safety. *(Agree)*	3.3	.05	Strongly Agree[2] Agree
	When I buy shellfish, I do care where it comes from. *(Agree)*	3.1	.06	Disagree
	I am concerned that I get leftover foods in the refrigerator right away. *(Agree)*	3.6	.03	Strongly Disagree
	Using a clean cloth each time I wash food preparation surfaces is too much trouble. *(Disagree)*	2.9	.06	
	I am interested in using a meat thermometer. *(Agree)*	2.7	.06	
	Washing my hands before eating takes too much time. *(Disagree)*	3.3	.06	
Adequate cooking knowledge[1]	A pork chop is safe to eat when the center of the meat is 130°F. *(Disagree)*	.19	.02	Agree[3]
	Cooking eggs until both the yolk and the white are firm will kill harmful germs. *(Agree)*	.59	.03	Not Sure
	Hamburger patties should be cooked until the temperature in the middle is 160°F. *(Agree)*	.55	.03	
	The temperature of a casserole containing eggs reads 130°F in the center. The eggs are safely cooked. *(Disagree)*	.14	.02	
	Fish is safe to eat when the flesh is no longer shiny and flakes easily with a fork. *(Agree)*	.65	.03	
	Shellfish should be cooked until the shell opens and the flesh is fully cooked. *(Agree)*	.49	.03	
	Elderly adults should heat hot dogs to steaming hot or 165°F before eating them. *(Agree)*	.70	.03	
	If leftover foods are reheated to 165°F, most harmful germs are killed. *(Agree)*	.58	.03	
Cooking behavior[1]	Do you use a thermometer to determine if leftovers have been reheated enough? *(Yes)*	.08	.02	Yes[4] No
	Do you eat eggs with a runny yolk? *(No)*	.65	.03	
	Do you use a thermometer to determine if hamburger patties have been cooked enough? *(Yes)*	.08	.02	
	Do you eat rare hamburger? *(No)*	.96	.01	

[1] Direction of desired response in italics after item.

[2] Desired response value; most desirable response = 4, least desirable response = 1.

[3] Data recorded to dichotomous variable for statistical analysis and reporting: Desired response value; correct response = 1, incorrect + not sure responses = 0.

[4] Desired response value; correct response = 1; incorrect response = 0.

TABLE 2. Food safety knowledge, attitude, behavior and stage of change for the needs assessment study (n = 293)

Construct	Stage of Change for Thermometer Use	Mean Score[1]	Standard Error of Mean
Adequate cooking knowledge score	Do Not Plan[2]	3.5[a]	.17
	Plan to Use[3]	4.8[b]	.42
	Have Used[4]	4.4[b]	.40
Food safety attitude score	Do Not Plan	17.8[a]	.23
	Plan to Use	19.6[b]	.57
	Have Used	19.7[b]	.54
Cooking behavior score	Do Not Plan	1.6[a]	.06
	Plan to Use	1.9[b]	.16
	Have Used	2.1[b]	.14

[1]Mean of scores calculated as total possible score minus incorrect or undesirable responses; range = 0–8 for knowledge score, 4–24 for attitude score and 0–4 for behavior score.

[2]Data for precontemplation stage renamed "Do Not Plan" (n = 196, 66.9% of participants).

[3]Data for contemplation and preparation stage renamed "Plan to Use" (n = 53, 18.1% of participants).

[4]Data for action and maintenance state renamed "Have Used" (n = 44, 15% of participants).

[ab]Within constructs, means with different superscripts differ ($P \leq .05$).

Participants reviewed the personal goals they wrote at the second class and discussed their accomplishments. They also discussed barriers that prevented them from using the food thermometer given to them and other barriers that prevented them from practicing safe food handling. A discussion of methods to overcome barriers followed. At the conclusion of Lesson three, participants again completed the survey instrument. After incomplete surveys and ineligible study participants had been eliminated, there were 145 valid pre/post matched pairs.

Data analysis

The Statistical Program for the Social Sciences (SPSS-Version 12.0, MapInfo Corp, Troy, NY) was used for analysis of all data. For the needs assessment study, differences between the independent variable (stage of readiness to change scale) and dependent variables (food safety attitude, adequate cooking knowledge and cooking behavior scales) were analyzed by use of one-way analysis of variance to measure observed differences among groups *(2)*. The Scheffé method was used for post hoc tests to compare all combinations of means *(11)*. The relationships between food safety attitudes scores, and knowledge and behavior scores were analyzed by Kendall's tau-b correlation *(11)*. Partial correlations were calculated for attitude, knowledge and behavior scores, controlling for stage of change, gender, and age.

For the educational intervention, the paired samples t-test was used to compare the means of two variables (pre- and post-test) for attitude, knowledge and behavior questions and to detect significant differences ($P \leq .05$). Stage-of-readiness-to-change data for the pre- and post-surveys were analyzed for significant differences by use of the Chi-square test ($P \leq .05$). Barriers to using methods to check safe end-point temperatures of cooking were probed by interviews of participants during Lesson three. Content analysis techniques were used to determine major themes emerging from the comments of all participants *(6)*.

RESULTS

Educational needs assessment

Among the 293 surveys analyzed for the educational needs assessment, 201 were completed by females and 92 by males. Of the total participants, 13.7% were age 60–64, 36.9% age 65–74, 39.2% age 75–84, and 10.2% age 85–100. Survey responses are shown in Table 1. Despite relatively positive attitudes toward safe-food handling (range of 2.7 to 3.6 on 4-point scale), the mean knowledge score related to adequate cooking methods was relatively low (48.6% correct), and responses to the individual cooking behaviors varied. Almost none of the participants reported that they ate rare hamburger, and only 35% ate undercooked eggs; however, use of a food thermometer was very rare. Based on responses to the stage-of-readiness-to-use-a-food-thermometer question, the majority of respondents (66.9%) were in the Do Not Plan [to use a thermometer] group. The number of participants in the Plan to

TABLE 3. Food safety knowledge, attitude, behavior and stage of change for the educational intervention study (n = 145)

		Mean[1]	Std. Error Mean
Adequate cooking knowledge score	Pre-test	4.2[b]	.16
	Post-test	4.9[a]	.16
Food safety attitude score	Pre-test	18.7[b]	.24
	Post-test	19.4[a]	.23
Cooking behavior score	Pre-test	1.8[b]	.07
	Post-test	2.2[a]	.08

[1]Mean of scores calculated as total possible score minus incorrect or undesirable responses; range = 0–8 for knowledge score, 4–24 for attitude score and 0–4 for behavior score.

[ab]Within constructs and for matched pairs, means with different superscripts differ ($P \leq .05$).

Use [a food thermometer] group was lower ($P \leq .05$) at 18.1%, as was the Have Used [a food thermometer] group at 15% ($P \leq .05$) (Table 2).

Knowledge, attitude and behavior scores varied significantly ($P < .05$) by readiness to use a food thermometer. Cooking knowledge, cooking behavior, and food safety attitude scores were significantly higher ($P \leq .05$) in the Plan to Use and Have Used groups than in the Do Not Plan group (Table 2). Although knowledge score was not associated with behavior score ($P > .05$), both knowledge and behavior were correlated to stage of change ($r = .17$, $P \leq .01$; $r = .21$, $P \leq .01$, respectively). Food safety attitude was positively related to behavior scores ($r = .10$, $P \leq .04$), gender ($r = .14$, $P \leq .04$) and stage of change ($r = .19$, $P \leq .01$).

Women tended to have higher attitude scores than men, but the difference was not significant ($P > .05$). Partial correlations between attitude and behavior, controlling for gender and age, were significant ($P \leq .05$), indicating that the relationship between the variables was independent of gender and age. The partial correlation between attitude and behavior controlling for stage of change was not significant ($P > .05$).

Educational intervention

Of the 145 seniors who completed all three lessons and took both the pre-test and post-test surveys, 44 were men (30.3%) and 101 women (69.7%). Most of the participants were 65–74 years old (36.6%) or 75–84 years old (35.2%). There were 20 participants who were 60–64 years old and 21 who were 85 years old or over.

Scores for adequate cooking knowledge, food safety attitude and cooking behavior were significantly higher after the educational intervention ($P \leq .05$) (Table 3). The participants' stages of readiness to change are shown in Table 4. The number of individuals who characterized themselves as having used a food thermometer increased from pre to post evaluation ($\chi^2 = 45.6$, $P \leq .00$). The frequency of those characterizing themselves in the Do Not Plan stage had decreased from their initial choice after the educational intervention.

Barriers to food thermometer use were discussed during the educational lessons. The most common barrier was that participants no longer cook large meals and did not see the need to use a food thermometer. Other barriers included inability to read the numbers on the thermometer, forgetfulness, and procrastination. A limitation of this study is that we did not quantitatively assess these barriers to food thermometer use and thus cannot identify the frequency with which participants experienced each of the identified barriers.

DISCUSSION

To decrease the incidence of foodborne illness, those behaviors that are most likely to result in illness should be targeted for change *(20)*. Even though there was a significant improvement in this study of the number of participants who confirmed temperatures of cooked foods, the results indicate that the majority of seniors who participated did not currently monitor safe cooking temperatures and did not intend to do so. This was also found in a consumer study of food thermometer usage in the Pacific Northwest, in which 84% of respondents said they never use a thermometer to check temperatures of hamburgers *(25)*. Creating and providing specific educational programming for those in the Do Not Plan group would be an initial step in addressing lack of intent to actively monitor food temperature, and thus the safety, of cooked foods.

Many seniors anecdotally commented during the educational lessons that they "cooked by sight," so that they knew when a meat or fish product was adequately cooked. This is an accurate assumption for fish, which is reflected by a 65% correct response on the knowledge survey item (Table 1). Shellfish are less commonly consumed in the geographic area of this study, and fewer participants (49%) knew the visual indicator for doneness. Meat or egg dishes require more precise measures than visual inspection to confirm end point temperature *(10, 26)*. Those few who used a food thermometer (8%) said that they used it sporadically, when they cooked something large, such as a roast or turkey. They said that they typically used cookbook directions or cooked food for long periods of time to ensure adequate cooking. Many older adults also reported that they no longer cooked frequently because they lived alone. However, participants were free-living and ambulatory and did participate in minimal food preparation in their own homes.

According to Prochaska et al. *(23)*, some people are resistant to behavior change in general. For others, the first step in fostering intentional change is to be-

TABLE 4. Participants' stage of readiness to change in the educational intervention study (n = 145)[1]

Stage of Change	Pre-Test		Post-Test	
	Frequency	Percent	Frequency	Percent
Do not plan on using a food thermometer	61	42.1	37	25.5
Plan to use a food thermometer	67	46.2	66	45.5
Have used a food thermometer	17	11.7	42	29.0

[1] $\chi^2 = 45.6$, $P \leq .00$.

come aware of the issue. Prochaska et al. *(23)* concluded that many who fail to act on health preserving behaviors do so because they lack the information to perceive outcomes clearly. Gettings and Kiernan *(9)* found that seniors will use appropriate practices when inappropriate practices are linked to threats to their health from illness and/or death. This is similar to the findings of a study to measure the likelihood that cancer or organ transplant patients would adopt safe food handling behaviors *(18)*. The cancer and organ transplant patients, who, like the elderly, are at high risk for contracting foodborne illnesses, stated that they would make behavior changes if they were shown the consequences of not doing so and if the changes did not impede their usual lifestyles unnecessarily. However, the cancer and organ transplant patients said that they would adopt behavior changes if doing so were definitely linked to their health.

The results of this study were mixed regarding use of an educational intervention to convince older adults to practice behaviors in their homes to protect them from foodborne illnesses. Knowledge, attitude and behavior improved significantly ($P \leq .05$), and the percentage of persons who reported use of a food thermometer increased from 12% to 29% ($P \leq .01$). However, 71% of participants remained in the Do Not Plan (25.5%) or Plan to Use (45.5%) categories regarding food thermometer use after the educational intervention. This indicates that the older adults remained at risk for foodborne illnesses from meats and eggs they prepared in their homes. A stronger link to health and the consequences of foodborne illness on their well-being should be made to make a more compelling argument for the older adult to change well established behaviors.

Ensuring the safety of foods consumed by older adults should be broader than personal behavior and should include all individuals who are preparing food for the benefit of the elderly. This may include other family members, informal care providers or food service employees of institutional and commercial food establishments. Any licensed food establishment will be under regulatory oversight to ensure that workers are properly informed of methods to maintain the safety of foods. Family members or informal care providers should be given the benefit of educational programs to improve their awareness of the risk the elderly have for contracting foodborne illnesses and the methods to ensure food safety.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study indicate that food safety education with older adults is effective in changing food safety practices but also show that the majority of the older adults did not practice some desired behaviors and did not intend to do so. Considering the consequences of foodborne illness on the health and well-being of the elderly, continued attempts to motivate this population to adopt recommended behaviors is warranted. Although older adults may not be highly motivated to prepare food safely, educators are reminded of the need to find creative ways to persuade the elderly to care about the consequences to their health. Community health educators should also consider expanding their educational programs to include individuals and care providers who prepare foods consumed by the elderly.

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Characterizing Human Factor Risks in Food Processing

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SUMMARY

In 1984, a cult group used *Salmonella* Typhimurium to poison salad bars at several Oregon restaurants, causing an outbreak of salmonellosis. As a result, 751 people became ill. This act was described by federal agencies as the first recorded event of agroterrorism in the United States. The events of September 11, 2001, and the subsequent anthrax incidents increased concerns about unconventional terrorist attacks, including attacks on the US food supply, especially during processing. This study uses survey data, cross tabulations, and a discrete choice model to characterize human factor risks within work groups and to determine the marginal effects of factors affecting the probability of intentional contamination in turkey processing. The results indicate that being aware of rules preventing employees from carrying potentially dangerous materials onto the work floor, punishments against acts of intentional contamination, strictly following instructions to keep food safe and secure at work, and employee perception that the plant functions as a high reliability organization were significant determinants in minimizing intentional food contamination. These results can provide guidance to processors who wish to initiate policies that mitigate human factor risks and sustain safer food.

INTRODUCTION

The food industry and agriculture in general remain absolutely essential to the social, economic, and political stability of the United States, constituting a significant percent of the country's overall gross domestic product *(4)*. One in eight people work in some component of the agricultural sector – more if food processing is included – making the industry one of the country's largest employers *(7)*.

Moreover, the United States is the largest producer of food and agriculture products in the world. Its agriculture industry is a $200 billion business, with over $55 billion in exports each year. Over 500,000 farms and 6,000 meat, poultry and egg production establishments, including 57,000 food processors, provide foods to local and export markets *(24)*. Therefore, the down stream effect of any deliberate act of sabotage or contamination in the United States food industry would be significant, creating a tidal wave effect that would be felt by all other sectors. Unfortunately, food processing plants with widespread distribution networks, and with employees from various countries who speak a variety of languages, remain highly vulnerable to deliberate disruption.

According to the World Health Organization (WHO), "food is one of the most vulnerable sectors to intentional contamination by debilitating or lethal agents" *(27)*. Therefore, the contamination of food by terrorists poses a real and current threat, and food contamination at one location could have global public health implications and substantial economic loss to the food sector. Insider agroterrorism threats, like the traces of

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ricin poison found in two jars of baby food in Irvine, California, in July 2004, pose even greater concerns.

In food processing, human factor risks such as origin of employees, awareness of rules and the ability to comply with rules are risks that are very important, as opposed to psychological risks, which tend to be related to fatigue and mental disposition *(11)* and which derive from the employee's psychological disposition *(1)*. Unlike human factor risks, psychological risks are generally vague, invisible, and difficult to defeat. The former need to be given greater prominence in the realm of intentional contamination; hence it is important to determine how the flow of information or communication can reduce the potential risk of intentional contamination.

The goal of this study is not only to help increase awareness and mindfulness of food security to processors, but also to identify or determine best practices for the industry by evaluating the applicability of high reliability organization principles and risk communication strategies in turkey processing. Specific objectives include the following: to characterize risk groups and to evaluate the effect of human factor risks in minimizing insider threat in turkey processing, and to determine the probability of insider threat in a turkey processing facility and the marginal impact of high reliability organization in minimizing insider threat.

The research questions are based on a selected case study turkey processing plant that has been operating since the 1930s and whose products are sold in every state and to foreign countries. The plant provides 300 jobs for its community and surrounding area and employs workers who represent many cultural groups. Overall, this production facility can be considered representative of most medium-size processing firms. Turkey is an important food commodity whose total value of production in the United States amounted to $2.72 billion in 2003 *(18)*. The results of this study can serve as examples to other food processing plants.

REVIEW OF CONCEPTS

High Reliability Organization. The study of high reliability organizations seeks to discover how people organize for high performance in settings where the potential for error and disaster are overwhelming *(26)*. High reliability organizations focus on developing a culture of safety and on encouraging mindful actions in organizations by minimizing errors and mitigating risks. High reliability organizations can be characterized with the use of Cronbach's Alpha for purposes of quantitative analysis *(16, 25)*.

Some organizations have come to learn that safety and risk mitigation are best developed in a culture that supports front-line workers and in which constant communication is encouraged to minimize human errors. This safety culture can reflect a highly reliable organization and may motivate organizational identification by employees. A discrete choice model is used in this study to characterize human factor risks within work groups and to determine the marginal effects of high reliability organizations in mitigating insider threats in turkey processing.

Risk Communication in High Reliability Culture and Food Safety Risks. Risk can be defined as a product of the actual hazard (the consequences of human factor risks) and outrage (fear of the unknown) *(5, 14, 20, 26)*. The outrage component can be reduced significantly by effective risk communication, as propositioned in the high reliability organization culture *(12)*. Risk communication focuses on the identification of threats, assessments and projections of possible harm, and on management strategies to eliminate, reduce, and control the threats *(25)*.

Some risk scholars see risk communication as simply the process of informing the public of conclusions reached by risk analysts and managers. Others see risk communication as an integral part of both assessment and management processes, thus reflecting a complete risk analysis framework *(15)*. Therefore, risk communication in this study is viewed as a context in which all stakeholders – those who are exposed to danger as much as those who generate it – should have some control over its management, as in a high reliability organization culture.

Agroterrorism Risk. This extends the definition of risk to include the probability of outbreaks spread over time and space. It is the deliberate contamination of food for human consumption with chemical, biological, physical, or radionuclear agents for the purpose of causing injury or death to civilian populations or disrupting social, economic or political stability *(19)*. The vulnerability of the food supply to potential acts of deliberate contamination is a national concern, especially after the terrorist attacks of September 11, 2001.

Human Factor Risks. This study focuses on human factor risks such as acts of food sabotage like the introduction of physical particles, microbial pathogens, and chemical or toxin agents at various points along the farm-to-table food continuum. Terrorists could attack livestock or crops if their primary intent is to cause severe economic dislocation. Such an attack, according to the 2003 GAO report on bioterrorism, would cause severe disruption of the United States economy, as the agriculture sector accounts for 13% of the country's gross domestic product and 18% of domestic employment. Terrorists could also contaminate processed food products if their primary motive is to cause bodily harm to humans and increase outrage.

Whether terrorists target food products or livestock and crops for deliberate contamination, serious public health and economic consequences are at stake. In today's global market, the contamination of food in one country can have a significant effect on public health in other parts of the world *(9)*. The mere threat of such an attack would seriously undermine consumer confidence in the safety of the food supply and destabilize export markets. For example, when terrorists threatened to release foot and mouth disease in New Zealand, that nation's export markets and economy as a whole were placed in jeopardy. The discovery of even a single contaminated food product could result in nations closing their borders to trade of that product *(25)*.

The potential impact of contaminated food on human health from deliberate acts of sabotage can be inferred from reports of unintended foodborne disease outbreaks *(21)*. A concerted, deliberate attack on food could be more devastating than an accident, especially if a powerful chemical, biological, or radionuclear agent is used. A terrorist using the food supply as a vehicle for attack would likely attempt to use an agent that would maximize the damage and deaths associated with the contamination. While a widespread terrorist attack on the America food industry has not occurred, examples of deliberate food contamination in the United States do exist. They include the following:

In September 1984, members of a religious cult contaminated salad bars in Dallas, Oregon, restaurants with *Salmonella* Typhimurium, and 751 became sick. This attack was reportedly a trial run for a more extensive attack that was planned to disrupt local elections later that year *(23)*.

In 1996, a reference strain of *Shigella dysenteriae* type 2 was used by a disgruntled laboratory worker to deliberately contaminate food to be consumed by

TABLE 1. Variables and their descriptive statistics used in the Logit Model

Variable name	Variable description	Responses	Descriptive statistics		
			Mean	Mode	SD
FSINSTR	Do employees strictly follow instructions to keep food safe at work?	Always = 1 Many times = 2 Sometimes = 3 Not always = 4 Blank (N/A) = 9	2.02	1	2.34
UNWMAT	Are employees aware of rules preventing them from carrying unwanted materials onto the work floor?	Yes = 1 No = 0 Blank (N/A) = 9	0.91	1	0.92
ECHECK	Are employees screened for unwanted materials before they begin work?	Yes = 1 No = 0 Blank (N/A) = 9	0.45	0	1.35
ETIRAIC	Do employees receive enough training to identify and tell acts of (intentional) contamination?	Strongly agree = 1 Agree = 2 Neither = 3 Disagree = 4 Strongly disagree = 5	2.91	2	1.35
POIC	Are employees aware of punishments against acts of deliberate food contamination?	Yes = 1 No = 0 Blank (N/A) = 9	0.87	1	1.42
ORIGIN	Employees' nationality or state of origin?	SD = 1; ND = 2 MN = 3;TX= 4 Mexico = 5 Vietnam = 6 Others = 7		1	2.26
OVCPFS	The plant is concerned about the possibility of making a food safety error (High Reliability Organization Perception Index 1)	Strongly agree = 1 Agree = 2 Neither = 3 Disagree = 4 Strongly disagree = 5	2.22	2	1.06
OVCSFSI	The plant is committed to correcting any shortcomings in food safety inspection process (High Reliability Organization Perception Index 2)	Strongly agree = 1 Agree = 2 Neither = 3 Disagree = 4 Strongly disagree = 5	2.11	2	0.94
EACPFS	Employees' actions directly contribute to the prevention of food safety problems (High Reliability Organization Perception Index 3)	Strongly agree = 1 Agree = 2 Neither = 3 Disagree = 4 Strongly disagree = 5	2.26	2	1.03

TABLE 2. Categories of employees who strictly follow instructions to keep food safe/secure at work

Job Title	Always	Many times	Sometimes	Few times	Not always	No response	Total
Management	3	0	0	0	0	0	3
Supervisor	17	3	1	0	0	1	22
Line worker	99	19	6	0	5	12	141
Office staff	4	1	0	0	0	0	5
Security	1	0	0	0	0	0	1
Cleaning and sanitization	13	0	1	0	0	4	18
Total	137	23	8	0	5	17	190

Note that the numbers represent the number of responses in each category of employees who responded to the following question: Do you strictly follow instructions to keep food safe/secure at work?

colleagues, causing illness in 12 people *(10)*.

In January 2003, the CDC reported that 92 people became ill after purchasing ground beef that was intentionally contaminated with nicotine from a Michigan supermarket. An employee was indicted for intentionally poisoning 200 pounds of meat sold in the supermarket *(17)*.

In Irvine, California, on July 28, 2004, ground-up castor beans with trace amounts of ricin poison were found in two jars of baby food, which also included notes that the food had been contaminated *(2)*.

While these incidents were not necessarily carried out in a food processing facility, they illustrate the kinds of problems that deliberate contamination of the food supply may cause. The costs of such food safety risks to food processors, to retailers and to society as a whole could be very high *(22)*. Such costs can be minimized if the processing facility functions along high reliability organization principles.

RESEARCH QUESTIONS

The over-arching research question is, What role is played by risk communication in high reliability organization cultures in minimizing insider threats or deliberate acts of food contamination in the face of human factor risks? Based on the review of relevant literature, three specific research questions were established:

1. What are the high risk groups of employees in the processing plant based on the job title?
2. Do employees at the processing plant perceive the plant to be a high reliability organization?
3. Is there low or high probability of human factor risks in the processing plant, and what factors contribute to these risk levels?

METHODS

This study uses survey data, cross tabulations, and a discrete choice model (binary logit) to characterize risk groups and determine the probability of human factor risks in turkey processing. The marginal effects of having characteristics of a high reliability organization and other factors that mitigate the risks of insider agroterrorism threats are also determined. A survey questionnaire, available in English and Spanish, was distributed to 271 employees of a Midwest turkey plant. Out of the 271 questionnaires sent to employees, 190 were completed and returned, yielding a response rate of 70%; 167 were filled out in English and 23 in Spanish. The questionnaire consisted of 32 questions: 10 background and demographic questions, 12 questions about human factor risks, and 10 high reliability organization perception index questions. The demographic and human factor risk questions measures respondents' job categories, primary language, origin, immigrant or non-immigrant, and length of time they have worked in the plant and in other processing plants.

The questions also dealt with the possible ways in which employees can identify areas and pathways that are most susceptible to human factor risks. The high reliability perception index and communication questions dealt with information sharing, the plant's management, concern about the possibility of making a food safety error, the plant's commitment to correcting any shortcomings in the food safety inspection process, and whether employees' actions directly contribute to the prevention of food safety problems.

Three methods were used to analyze the data. First, cross tabulations were used to characterize employees' risk groups based on job title. Second, the reliability of the survey instrument, as well as characterization of high reliability organization for empirical analysis, was tested by use of Cronbach's Alpha. Third, a discrete choice model (binary logit) was used to measure the probability of insider threat of intentional contamination in the case study processing plant, a method that has been used successfully by several authors *(6, 8, 13)*.

The goal of any processing firm is to minimize the probability of an outbreak resulting from either unintentional or intentional contamination. The utility to minimize risk can be characterized as a discrete choice model *(12)*. In this study, this utility is reduced to a logit model because of the two choices for the dependent variable. The dependent variable (contamination , or no contamination, $Y^i = 0$) was proxied with the following: whether employees have experienced any incidence or act of deliberate contamination by carrying unwanted or restricted materials to the work floor, and not following work instructions. The probability of deliberate contamination (as a

TABLE 3. Categories of employees who are aware of rules preventing unwanted materials at work

Job Title	Not aware of rules	Aware of rules	No response	Total
Management	1	2	0	3
Supervisor	2	20	0	22
Line worker	27	112	2	141
Office staff	1	4	0	5
Security	0	1	0	1
Cleaning and sanitization	2	16	0	18
Total	33	155	2	190

Note that the numbers represent the number of responses in each category of employees who responded to the following question: Are you aware of rules preventing unwanted materials at work?

result of high human factor risk) was measured by $f(X\beta) = (1 + e^{-X\beta})^{-1}$, and $(1 - F(X\beta)$ otherwise. A utility index function for contamination Y_i^* is calculated as $Y_i^* = \beta X + \varepsilon$, where X is a vector of independent or explanatory variables, i is the observation, and ε is the random error term.

Thus, the probability of contamination is observed as a function of Y_i^* if $Y_i^* > 0$ or $X\beta + \varepsilon > 0$, and 0 otherwise. Marginal effects are calculated as

$$\frac{\partial F(X\beta)}{\partial X\beta} * \frac{\partial X\beta}{\partial x} = f(X\beta) * \beta j \text{ where } f(X\beta)$$

is a probability density function equal to $e^{-X\beta}(1 + e^{-X\beta})^{-2}$, and e is the natural log notation. Table 1 summarizes the variables used in the logit model and their descriptive statistics.

RESULTS

Results of the cross tabulations (Tables 2, 3, and 4) answer the research question, What are the high risk groups of employees in the case study plant based on the job title? The results indicate that the category of employees most likely to be considered higher risk are line workers, the group that has direct access to processed products, some of whom are immigrants. This category of employees revealed that they generally are unaware of rules preventing them from carrying unwanted materials onto the work floor, are not aware of punishments against acts of deliberate food contamination, and do not always strictly follow instructions to keep food safe at work. Thus, they are characterized as a higher risk group.

Table 2 shows the categories of employees who strictly follow work instructions to keep food safe and those who do not. All the managers strictly follow instructions to keep food safe at work, but only 17 of 22 supervisors, 99 of the 141 line workers, and 13 of the 18 janitorial workers strictly follow orders to keep food and food handling facilities safe at work. While six line workers sometimes strictly follow orders to keep food safe at work, five do not always do so, thereby characterizing them as a higher risk group.

Table 3 presents a summary of employees who are aware of rules that prevent them from carrying unwanted materials onto the work floor. Eighty-two percent of employees in the case study plant are aware of rules preventing them from carrying unwanted materials onto the work floor, following the standard sanitation operating procedures, and handling of food safely. Again, the line workers are presented here as a risk group because 27 employees who directly handled and processed the product in various work areas (processing points) responded that they were not aware of rules banning unwanted materials from the work floor.

Table 4 summarizes the categories and numbers of employees who are aware of punishments against acts of intentional food contamination in the plant. Overall, only 63.16% of the employees are aware of punishments for acts of intentional contamination. Most importantly, two of the three managers are unaware of punishments for acts of deliberate food contamination; seven out of 22 supervisors are also not aware of these punishments. The majority of employees who are unaware of such punishments are the line workers (53 out of 141), again indicating that they are a high risk group. Providing internal sanctions to keep food safe was identified by Starbird *(22)* as a viable strategy to mitigate food safety risks.

Cronbach's Alpha is used to answer the research question, Do employees at the case study plant perceive the plant to be a high reliability organization? The Alpha for the survey instrument was 0.87. The closer Cronbach's Alpha is to 1, the more reliable the survey instrument is. Thus, the instrument for this study was found to be highly reliable.

Employees generally perceive their plant to be functioning as a high reliability organization, and this high reliability organization structure of the plant has a high marginal impact on the low probability of deliberate food contamination. This study indicates that some characteristics of high reliability organization function in the turkey processing plant contribute significantly to the low probability of food sabotage in the workplace. The plant's concern about the possibility of making a food safety error and its commitment in correcting any shortcomings in food safety inspection process are important high reliability organization characteristics. Moreover, a previous study to examine communication perceptions related to food safety risk at the case study plant suggested that employees generally perceived the plant to be a high reliability organization *(16)*.

Functioning as a high reliability organization is a significant determinant that might lower the probability of intentional food contamination *(16)*. All organizations face risk; however, high reliability organization characteristics work to instill a culture of safety and to mitigate the risk of failures in organizations. Therefore,

TABLE 4. Categories of employees who are aware of punishments against acts of intentional contamination

Job Title	Not aware of punishment	Aware of punishment	No response	Total
Management	2	1	0	3
Supervisor	7	15	0	22
Line worker	53	84	4	141
Office staff	0	4	1	5
Security	0	1	0	1
Cleaning and sanitization	3	15	0	18
Total	65	120	5	190

Note that the numbers represent the number of responses in each category of employees who responded to the following question: Are you aware of punishments against acts of intentional contamination?

TABLE 5. Parameter estimates and coefficients of binary logit model of employees' characteristics on intentional contamination

Variable names	Variable description	Coefficient	*P*-Value	Elasticity
OVCPFS	High Reliability Organization index 1	-0.06(0.03)	0.05	-1.16
OVCSFSI	High Reliability Organization index 2	0.08(0.03)	0.01	1.44
EACPFS	High Reliability Organization index 3	-0.01(0.02)	0.67	-0.20
FSINSTR	Work Instructions	0.03(0.01)	0.00	0.51
UNWMAT	Unwanted Materials	-0.08(0.04)	0.08	-0.61
ETIRAIC	Received Training	-0.47(0.02)	0.01	-1.21
ORIGIN	Origin	-0.02(0.01)	0.02	-0.58
POIC	Punishments for IC	-0.00(0.02)	0.96	-0.01
McFadden's R^2 Statistic	0.09			
Percentage Correct Predictions	86.32%			

The values in parentheses are standard errors. Variables are defined in Table 1.

risk-averse organizations work to develop highly reliable practices by constantly surveying their surroundings for early signs of impending hazards. Consequently, one implication of functioning as a high reliability organization is that employees detect and report any deviations from the normal processing procedures.

The study also answered the research question, Is there low or high probability of human factor risk in the processing plant, and what factors contribute to these risk levels? The results predicted that there is a very low probability of human factor risk in this processing plant. The outcome of the discrete choice model revealed that the occurrence of human factor risk measured by the dependent variable is very low ($P = 0.02$).

Table 5 presents the results of the binary logit model and the marginal effects of determinants of intentional contamination. Table 5 also summarizes the important determining factors affecting the probability of intentional contamination. The coefficient, *P*-value, elasticities, and standard errors for the binary logit model are included. The goodness-of-fit test shows a high predictive value of 86.32% for the model and a McFadden R^2 of 0.09. Several models were run, and the model was selected based on the goodness-of-fit, the number of significant variables, and the absence of multicollinearity among variables.

The majority of coefficients are significant. The first two high reliability organization perception indices OVCPFS (the concern about the possibility of making a food safety error) and OVCSFSI (the commitment to correct any shortcomings in food safety) are significant ($P = 0.05$

TABLE 6. Marginal effects for Binary Logit Model

Variable names	Variable description	Probability of Y=0	Probability of Y=1	Marginal effects
OVCPFS	High Reliability Organization index 1	-0.05	-0.10	-0.06
OVCSFSI	High Reliability Organization index 2	0.07	0.13	0.08
EACPFS	High Reliability Organization index 3	-0.01	-0.02	-0.01
FSINSTR	Work Instructions	0.03	0.05	0.03
UNWMAT	Unwanted Materials	-0.07	-0.13	-0.08
ETIRAIC	Received Training	-0.04	-0.08	-0.05
ORIGIN	Origin	-0.02	-0.04	-0.02
POIC	Punishments for IC	-0.00	-0.00	-0.00

Variables are defined in Table 1.

and 0.01), but the third high reliability organization variable, EACPFS (employees actions directly contribute to the prevention of food safety problems) is not significant ($P = 0.67$). Being aware of rules preventing employees from carrying unwanted materials onto the work floor (UNWMAT) is also significant ($P = 0.08$). Strictly following instructions at work to keep food safe and secure (FSINSTR) is significant ($P = 0.00$), while receiving enough training to keep food safe and secure by identifying and reporting any deviations from the normal processing practice (ETIRAIC) and employees' state of origin or nationality (ORIGIN) are both significant ($P = 0.01$ and 0.02). The results in Table 5 indicate that the high reliability organization perception indexes, strictly following work instructions, being aware of unwanted materials on the work floor, receiving enough training on food protection, and employees' origin are significant determinants in minimizing insider food threats in the case study processing plant.

The marginal values (Table 6) show that the variables with least impact on the probability of no contamination are awareness punishments against acts of deliberate contamination (POIC) and employees' actions contributing to the prevention of food safety problems (EACPFS). The variables with the greatest impact on the probability of limited human factor risk are strict following of orders to keep food safe (FSINSTR), commitment to correcting any shortcomings in food safety inspection (OVCSFSI), awareness of rules that prevent unwanted materials onto the work floor (UNWMAT), and the plant's concern about the possibility of making a food safety error (OVCPFS). When considering the probability of contamination, the most important variables are OVCSFSI, OVCPFS (the high reliability organization perception index), and FSINSTR, with POIC being the least important. The data indicate that the high reliability organization perception index is a significant determinant in minimizing the risk of human factor insider threat or intentional contamination at the turkey processing facility.

DISCUSSION AND CONCLUSIONS

In the past, food safety risk focused on the occurrence of physical, chemical and microbial outbreak hazards. This paradigm is expanding to include intentional human factor risk, especially after September 11, 2001. Human factor risks can be best mitigated with effective communication, as in a high reliability organization culture.

We develop a discrete choice logit model to identify significant determinants for minimizing human factor risks of intentional contamination in a food processing plant. Included in the model were high reliability organization perception variables such as strict following of work instructions to keep food safe during processing, awareness of rules preventing employees from carrying unwanted materials onto the work floor, receiving of enough training to keep food safe, ability to identify and report acts of insider threats of food sabotage, and employees' nationality or state of origin.

The data revealed that most employees not only perceive their organization as functioning as a high reliability organization but also strictly followed orders to keep food safe at work. Employees' strict adherence to instructions suggests that the plant's management has been effective in communicating policy. Similarly, the data show that employees have developed a reliance on food safety information from top management officials who are mindful of delivering safe products to their customers.

Another indicator of high reliability organization status is the finding that most employees (81.6%) are aware of rules preventing them from carrying unwanted materials onto the work floor. Moreover, restricting access to unknown or unauthorized persons is already standard practice in the processing plant. However, it will be workers in the plant who might present a greater threat (insider food sabotage), due to their access to raw materials, process, and finished foods.

Unfortunately, not all of the data reflect effective policies or procedures. For example, employees did not perceive that they receive enough training on food protection and security. The marginal impact of this training variable showed that if management increased training, the probability of human factor risk would decrease. Thus, increasing required training, on food protection and food safety risks, especially for newly hired employees, should be beneficial.

This research used a discrete choice model (binary logit) to reveal that the probability of human factor risk of intentional food contamination is low at the case study processing facility. However, because food still remains one of the most vulnerable sectors to intentional contamination by debilitating or lethal agents, its contamination by terrorists poses a real and current threat. One lesson that the tragic events of September 11, 2001 have indelibly etched upon the minds of most Americans is that terrorists will seek new and unexpected methods in their attempts to harm the United States *(3)*. This nation's food supply and agricultural industries could be a target for these new methods.

Although this vulnerability cannot be completely eliminated, this study suggests that the food processing industry can minimize human factor insider agroterrorism threats by functioning in a highly reliable manner; communicating food safety rules to all groups of employees; targeting training needs to frontline and newly hired employees; providing incentives for detecting and reporting risks; compensating employees annually for achieving target safety performance standards; taking precautionary and security measures against insider agroterrorism threats; enhancing food safety programs to include possibilities of deliberate contamination; and designating a food security management coordinator.

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Call for Nominations 2007 Secretary

A representative from the education sector will be elected in March of 2007 to serve as IAFP Secretary for the year 2007–2008.

Send letters of nomination along with a biographical sketch to the Nominations Chairperson:

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1109 Experiment St.
Griffin, GA 30223-1797
Phone: 770.412.4740
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The Secretary-Elect is determined by a majority of votes cast through a vote taken in March of 2007. Official Secretary duties begin at the conclusion of IAFP 2007. The elected Secretary serves as a Member of the Executive Board for a total of five years, succeeding to President, then serving as Past President.

For information regarding requirements of the position, contact David Tharp, Executive Director, at 800.369.6337 or 515.276.3344; Fax: 515.276.8655; E-mail: dtharp@foodprotection.org.

Nominations Close November 1, 2006

Call for Symposia
IAFP 2007

July 8–11
Lake Buena Vista, Florida

The Program Committee invites International Association for Food Protection Members and other interested individuals to submit a symposium proposal for presentation during IAFP 2007, July 8-11, 2007 in Lake Buena Vista, Florida.

WHAT IS A SYMPOSIUM?

A symposium is an organized, 3 1/2-hour session emphasizing a central theme relating to food safety and usually consists of six presenters each giving 30-minute presentations with a 30-minute break between the third and fourth presentation. Short symposia with three or four 30-minute presentations are also possible. Round-table discussion forums, which are 90 minutes in length with 2–3 brief presentations (10–15 minutes each), a formal question and answer session, followed by time for audience participation, are also acceptable.

Symposia may include a discussion emphasizing a scientific aspect of a common food safety and quality topic, issues of general interest relating to food safety and microbiological quality, a report of recent developments, an update of state-of-the-art methodologies, or a discussion of basic and applied 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. Proposals may be prepared by individuals, groups of individuals, committees, or professional development groups (PDGs).

SUBMISSION INSTRUCTIONS

To submit a symposium proposal, read all the information on this page, paying close attention to the "Symposium Selection Procedure" on the next page, then complete the "Symposium Proposal." Follow all instructions when making a submission. Your suggested presenters need not be confirmed at this stage, only identified.

SYMPOSIUM PROPOSAL DEADLINE

Send symposium proposals to the Association office no later than August 7, 2006 or submit to the IAFP registration desk at IAFP 2006 by Tuesday, August 15, 2006 at 10:00 a.m. At the submitter's option, the submitter may discuss their proposal with the Program Committee at 7:00 a.m. on Wednesday, August 16. The Program Committee will review submitted symposia at the conclusion of the IAFP 2006 Annual Meeting to decide which symposia will be selected for further development. Organizers will be notified as to the status of their proposal by September 29, 2006. Symposia selected for further development should be completed and sent to the IAFP office by January 16, 2007. **FINAL DECISIONS ABOUT ACCEPTANCE AND CONTENT OF SYMPOSIA FOR PRESENTATION AT IAFP 2007 WILL BE MADE BY THE PROGRAM COMMITTEE DURING THEIR JANUARY 2007 MEETING.** Symposia organizers and potential moderators and speakers should understand that not all symposia selected for further development will be accepted as submitted. The IAFP Program Committee reserves the right to reject poorly organized symposia, and/or to review symposia, including proposed subjects and speakers, and make modifications based on providing the most comprehensive and balanced forum. The organizer will be notified of the final results by February 28, 2007.

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The 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 Annual Meeting 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. After final acceptance of the symposium (February 2007), symposia organizers may make requests in writing to the Executive Director. Requests are reviewed on an individual and first-come-first-served basis. The maximum funding grant will be $750 per presenter ($1,250 if outside North America). 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.

SYMPOSIUM SELECTION PROCEDURE

The primary focus of the symposium selection procedure is to provide a balanced educational program for attendees of the IAFP Annual Meeting. To achieve this goal, symposia may be combined or modified by the Program Committee during their August 2006 or February 2007 review, as appropriate, to prevent overlap of topics among competing symposia. The Program Committee also reserves the right to suggest alternative speakers and/or topics in an effort to round out symposia or discussion forums. During the symposia selection process, only the most relevant and promising symposia proposed by groups and individuals will be selected for further development.

Guidelines for tentative acceptance:

1. Proposed symposia must be pertinent to IAFP Members and PDGs. Priority will be given to symposia that address one or more of the following program areas:
   - Safety and Microbial Quality of Foods (dairy, meat and poultry, seafood, produce, water)
   - Viruses and Parasites, Retail Food Safety, Epidemiology and Public Health
   - Non-Microbiology Food Safety Issues (food toxicology, allergens, chemical contaminants)
   - General-Applied Food Safety Microbiology (for example, advances in sanitation, lab methods, quality assurance, food safety systems)
   - General-Food Protection for the Future (risk analysis, emerging pathogens, biotechnology, predictive models, etc.)
   - Developments in Food Safety Education
   - Other pertinent food protection topics may be considered if space is available
2. In addition to addressing pertinent program areas, symposia accepted for further development should:
   - Be new, emerging and/or address areas not covered in last 2 years
   - If covered in last 2 years, provide new information that warrants another symposium
3. Symposium submissions must include:
   - Titles that clearly convey the topics to be covered
   - Topics that are unique to prevent overlap of basic information among speakers
   - Names of suggested speakers from a variety of backgrounds, such as industry, regulatory, academic researchers, or consumer perspective (as appropriate)
   - Suggested speakers who are knowledgeable and good communicators
4. Special consideration will be given to symposium submissions that:
   - Are directly applicable or provide viable safety options for food manufacturers, including small to medium size manufacturers
   - Bring an international (outside of North America) focus or viewpoint to the meeting
   - Attract/involve students
   - Attract/involve local affiliate members who would not otherwise attend the Annual Meeting (e.g., regional specialties like shellfish issues for Gulf States)
   - Would attract members of a new PDG or program area that IAFP is trying to develop or encourage
5. Other considerations for selecting symposia for further development:
   - Proposals must be submitted to the IAFP office by August 7, 2006 or the IAFP registration desk at IAFP 2006 by 10:00 a.m. on Tuesday, August 15, 2006
   - The Program Committee reserves the right to limit the number of sessions devoted to a single program area to provide a balanced program

- If relevant topics are proposed by more than one submission, the Program Committee will make the final decision to combine or modify symposia as appropriate to avoid overlap of topics among competing symposia. In this case, organizers may be asked to work with one another to combine symposia
- Due to space and time limitations, only the most relevant and promising proposals (as modified by the Program Committee) will be selected for further development as full sessions (typically consisting of six 30-minute presentations), short sessions (typically consisting of three or four 30-minute presentations) or roundtable discussions (90 minutes in length with two or three brief presentations and question and answer session). Again, the Program Committee will make final decisions regarding symposia format and length
- Three sessions will be reserved for symposia sponsored by our partner, the International Life Science Institute North America (ILSI, N.A.). The ILSI N.A. symposia address topics that are of general interest to IAFP meeting attendees, focus on emerging food safety issues and technologies, and provide a global perspective
- Additional sessions may be added at the discretion of the Program Committee to accommodate emerging issues

6. Final decisions on symposia selection will be made at the January 2007 Program Committee Meeting.
    - Symposia recommended for further development should be submitted, in finalized form, to the IAFP office by January 16, 2007. This includes symposium title, abstract, convener and speaker information (name, contact information, and proposed title of presentation). Organizers are encouraged to contact and get preliminary confirmation from speakers in advance of submitting the final symposium application. However, full confirmation of speakers, and acceptance of symposia, will be provided after the January 2007 Program Committee meeting (organizers will be notified by February 28, 2007). The IAFP Program Committee reserves the right to review symposia, including proposed subjects and speakers, and make modifications in order to provide the most comprehensive and balanced program. Invited symposium speakers need to be aware of this when they are contacted.

WHO TO CONTACT:

Tamara Ford
International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
E-mail: tford@foodprotection.org

Symposium Proposal
IAFP 2007

July 8–11
Lake Buena Vista, Florida

Title: _____

Organizer's Name: _____

Committee or PDG Submitting Proposal: _____

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: _____

Topic Area:

- ❒ Food Safety/Microbial Quality (list commodities) _____
- ❒ Foodborne Viruses and Parasites
- ❒ Retail Food Safety
- ❒ Epidemiology and Public Health
- ❒ Food Safety (Non-Microbiology Issues)
- ❒ General – Advances in Technology Applications
- ❒ General – Emerging Issues
- ❒ Education
- ❒ Other _____

Attach a short statement describing the relevance of the symposium to IAFP attendees and how this symposium is unique compared to topics previously presented at IAFP 2006 and IAFP 2005.

Signature of Organizer: _____

Submit by August 7, 2006 to:

IAFP — Symposium Proposal
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA

or

Submit in person during IAFP 2006
to the IAFP registration desk by
Tuesday, August 15, 2006 at 10:00 a.m.

or Contact:

Tamara Ford
International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
E-mail: tford@foodprotection.org

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 621 of this issue) 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 Nancy Herselius, Association Services at 800.369.6337 or 515.276.3344 if you wish to make a donation.

International Association for Food Protection

AUDIOVISUAL LIBRARY

as of July 6, 2006

A Member Benefit of IAFP

DAIRY

D1010 **The Bulk Milk Hauler: Protocol & Procedures** – (8 minutes). 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)

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)

D1031 **Dairy Plant** – (28 minutes). Join in on this video as it follows a tour of the University of Wisconsin Dairy Plant. Observe the gleaming machinery and learn the ins and outs of milk processing, packaging, and storage. Watch as workers manufacture butter, cheese, yogurt, sour cream and ice cream, and learn about secondary dairy products. (Chipsbooks Company–2003)

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

D1050 **Food Safety: Dairy Details** – (18 minutes). Dairy products are prime targets of contamination because of their high protein and water content, but this presentation shows how to maintain dairy foods. It explores techniques such as selection, handling, preparation and storage for milk, yogurt, cheese and other dairy products. (Chipsbooks Company–2003)

D1060 **Frozen Dairy Products** – (27 minutes). 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, 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 minutes). Describes the Gerber milk fat test procedure for dairy products and compares it to the Babcock test procedure. (CA–1990) (Reviewed 1998)

D1080 **High–Temperature, Short–Time Pasteurizer** – (59 minutes). 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 minutes). 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** – (Two–45 minute tapes). 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, Post milking Teat Dip Protocols, Milk Quality, and Milking Systems. (Nasco–1993)

D1105 **Milk Hauling Training** – (35 minutes). This video covers the procedures and duties of the milk hauler from the time of arrival at the dairy farm, to the delivery of the milk at the processing plant. It also provides the viewer with a general understanding of the quality control issues involved in milk production and distribution. Topics include milk composition breakdown, milk fat content measurement, testing for added water, antibiotic and pesticide residues, somatic cell and bacteria counts, sediment, and aflatoxins. (Avalon Mediaworks LLC–2003)

D1110 **Milk Plant Sanitation: Chemical Solution** – (13 minutes). 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, 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 minutes). Developed by the California Department of Food and Agriculture. It covers pre - and post-inspection meetings 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 lockers and restrooms. Recommended for showing to plant workers and supervisors. (CA–1986)

D1125 **Ohio Bulk Milk Hauling Video** – (15 minutes). Milk haulers, weighers, and samplers are the most constant link between the producer, the producer cooperative, and the milk processor. This video shows their complete understanding of all aspects of farm milk collection and handling, milk quality and quality tests, and sanitation and sanitary requirements that contribute to the trust between the producer and the dairy plant. The video educates prospective haulers, weighers, and samplers throughout Ohio. (Ohio State University–2001)

D1130 **Pasteurizer: Design and Regulation** – (16 minutes). 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 minutes). 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 minutes). 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)

D1180 **10 Points to Dairy Quality** – (10 minutes). 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)

ENVIRONMENTAL

E2012 **Better TEDs for Better Fisheries** – (42 minutes). Introduces the usefulness of turtle excluder devices (TEDs) and demonstrates the working nature of the devices. It covers the major sea turtles and the specific TEDs needed for each. It precedes two segments on installation of appropriate TEDs in shrimp trawl nets. (MS Dept. of Marine Resources–2003)

E3010 **The ABC's of Clean – A Handwashing and Cleanliness Program for Early Childhood Programs** – For early childhood program employees. This tape illustrates how proper hand washing 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 minutes). 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 minutes). In–door 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)

E3031 **Allergy Beware** – (15 minutes). Designed to educate food and beverage company employees about their role in preventing an accidental allergic reaction caused by a product their company produces. Recommended for product development, production, labeling, scheduling and cleaning. Everyone has an important role to prevent cross contamination and mislabeling issues. (Food and Consumer Products Manufacturers of Canada–2003)

E3040 **Asbestos Awareness** – (20 minutes). 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** – (3.5 minutes). 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 minutes). Demonstrates the Ceriodaphnia Seven–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 Toxicity Tests (Using Fathead Minnow Larva)** – (15 minutes). A training tape that teaches environmental professionals about the Fathead Minnow Larva Survival and Growth Toxicity Test. The method described is

found in an EPA document entitled, "Short Term Methods for Estimating the Chronic Toxicity of Effluents & Receiving Waters to Freshwater Organisms." The tape demonstrates how fathead minnow toxicity tests can be used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. (1989) (Reviewed 1998)

E3075 **EPA: This is Super Fund** – (12 minutes). 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 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 minutes). 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 minutes). 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 minutes). 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; and effects of deforestation, planting of trees and recycling as means of slowing the build-up of greenhouse gases. (Churchill Films–1995)

E3125 **Good Pest Exclusion Practices** – (28 minutes). Most pests you find inside come from outside your food plant. This video covers numerous tactics of keeping pests out of food processing and distribution operations. Tactics include grounds, landscaping and building design; inbound trailer and bulk transportation materials inspection; and key employee actions. Learn how to defend your perimeter with one of the best weapons in the battle against pests – exclusion. (CTI Publications–2004)

E3128 **Integrated Pest Management (IPM)** – (28 minutes). This video develops the IPM concept into a comprehensive 12-point program. To emphasize this concept, computer-animated, digital graphics are used to piece together the IPM puzzle. This dramatic effect assists participants in visualizing and retaining key points of the video. To paint the complete picture, each of the 12 points is discussed providing an IPM overview. (CTI Publications–2004)

E3130 **Kentucky Public Swimming Pool and Bathing Facilities** – (38 minutes). 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)

E3131 **Key Pests of the Food Industry** – (28 minutes). Many types of pests can cause waste and loss of profits. Keeping food processing operations free of pest problems is a challenge. This video will assist food plant employees in the review of basic identification, biology, habits and control options of three key groups of pests frequently associated with food processing operations: birds, insects, and rodents. (CTI Publications–2004)

E3133 **Physical Pest Management Practices** – (28 minutes). Do you feel that you cannot do your job without pesticides? There are solutions. Many of them are what we call physical controls. This video will provide you with some of the things which can help you manipulate the physical environment in a manner that will prevent the growth of the pest population, causing them to leave or die. (CTI Publications–2004)

E3135 **Plastics Recycling Today: A Growing Resource** – (26 minutes). Recycling is a growing segment of our nation's solid waste management program. It 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 minutes). 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 minutes). This videotape explains the danger associated with hazardous chemical handling and discusses the major hazardous waste handling requirements presented in the Resource Conservation and Recovery Act.

E3160 **RCRA–Hazardous Waste** – (19 minutes). 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.)

E3161 **The Kitchen Uncovered: Orkin Sanitized EMP** – (13 minutes). This video teaches restaurant workers what they can do to prevent pest infestation, and what health inspectors look for. An excellent training tool for food service workers that can be used in conjunction with HACCP instruction. (Orkin–1997)

The New Superfund: What It Is and 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 minutes). 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 minutes). 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 minutes). 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 minutes). 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 and hazardous chemical inventory and the toxic chemical release inventory.

E3220 **Tape 5 – Underground Storage Tank Trust Fund & Response Program** – (48 minutes). Another additional 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 minutes). An important new mandate of the new Superfund are the technical provisions for research and development to create more permanent methods in the 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.

E3235 **Regulatory and Good Manufacturing Practices** – (42 minutes). This video comes in two parts. Part one is a professional, 20-minute drama using real actors emphasizing the importance of food safety and GMPs. This dramatization will focus your emotions on the importance of cleanliness. Part two is a comprehensive 22-minute video introducing your

employees to basic GMP elements. This training video uses numerous split screens of "good" and "bad" practices, and will help viewers understand GMPs and basic food safety. (CTI Publications–2004)

E3236 **Rodent Control Strategies** – (22 minutes). Pest control is a vital part of food safety, and leading pest-control specialist Dr. Bobby Corrigan shows you how to design and maintain a rodent-control program at food processing establishments. (J.J. Keller–2004)

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

E3245 **Wash Your Hands** – (5 minutes). Hand washing is the single most important means of preventing the spread of infection. This video presents why hand washing is important and the correct way to wash your hands. (LWB company–1995)

E3250 **Waste Not: Reducing Hazardous Waste** – (35 minutes). 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)

E3251 **Would Your Restaurant Kitchen Pass Inspection?** – (29 minutes). Help ensure a perfect score on any health inspection with this video by addressing safe food-handling techniques in the food service industry. Learn how foodborne illness is spread and how it can be prevented. Dramatizations display specific techniques students and employees can use to help any restaurant kitchen meet the highest standards. (Chipsbooks Company–2003)

E3260 **Swabbing Techniques for Sampling the Environment and Equipment** – (DVD) (60 minutes). This training program is designed to assist in providing effective training to technicians that collect environmental samples for APC and *Listeria*. It will help assure that technicians understand the basic principles and best practices, and can demonstrate good sample collection techniques. (Silliker Labs–2005)

FOOD

F2005 **A Lot on the Line** – (25 minutes). 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)

F2007 **The Amazing World of Microorganisms** – (12 minutes). This training video provides your employees with an overview of how microorganisms affect their everyday lives and the foods they produce. The video explores how microscopic creatures are crucial in producing foods, fighting disease, and protecting the environment. In addition, certain microorganisms – when given the proper time and conditions to grow – are responsible for food spoilage, illness, and even death. Equipped with this knowledge, your employees will be better able to protect your brand. (Silliker Laboratories Group, Inc.–2001)

F2008 **A Recipe for Food Safety Success** – (30 minutes). This video helps food–industry employees understand their obligations in the areas of safety and cleanliness...what the requirements are, why they exist, and the consequences for all involved if they're not adhered to consistently. Critical information covered includes the role of the FDA and USDA; HACCP systems; sanitation and pest control; time and temperature controls that fight bacteria growth; and the causes and effects of pathogens. (J. J. Keller–2002)

F2009 **Basic Personnel Practices** – (18 minutes). This training video covers the practical GMPs from the growing field to the grocery store with a common sense approach. Employees learn the necessary training to help them understand the basic principles of food safety. (AIB International–2003)

F2010 **Close Encounters of the Bird Kind** – (18 minutes). 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)

F2011 **Available Post Harvest Processing Technologies for Oysters** – (8 minutes). This video explains three currently available post-harvest processing (PHP) technologies for oysters that continue to be developed to provide safer oysters to consumers. The Gulf oyster industry increasingly adopts solutions offered by modern technology in its efforts to continue to promote quality, food safety and extended shelf life of oysters. (MS Dept. of Marine Resources–2003)

F2013 **Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments** – (26 minutes). (English and Spanish) – This video addresses a variety of issues facing meat processors who must meet

revised regulations concerning *Listeria monocytogenes* in ready-to-eat meats. Topics covered include personal hygiene, sanitation, biofilms, cross contaminations, in plant sampling, and microbiological testing. (Penn State college of Ag Sciences–2003)

F2014 **Controlling Food Allergens in the Plant** – (16 minutes). This training video covers key practices to ensure effective control in food plants and delivers current industry knowledge to help companies enhance in-plant allergen training. Visually communicates allergen-specific Good Manufacturing Practices, from checking raw material to sanitation, to prevent serious, costly problems. (Silliker Laboratories, Inc.–2004)

F2015 **Controlling *Listeria*: A Team Approach** – (16 minutes). In this video, a small food company voluntarily shuts down following the implication of one of its products in a devastating outbreak of *Listeria monocytogenes*. This recall dramatization is followed by actual in-plant footage highlighting 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)

F2016 **Bloodborne Pathogens: What Employees Must Know** – (20 minutes).This program provides an overview of the hazards and controls for worker exposure to bloodborne pathogens. Specifically, the program covers the basic requirements of the standard; definitions of key terms (including AIDS, contaminated sharps, and occupational exposure); engineering controls and work practices; housekeeping techniques; Hepatitis B and more. (J.J. Keller–2005)

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

F2021 **Egg Production** – (46 minutes). Live action footage of a completely automated operation follows the egg from the chicken to the carton. Watch the eggs as they roll down onto the main line, are washed, "candled," sorted by weight, placed into their packing containers, and prepared for shipment. Sanitation and health concerns are addressed. (Chipsbooks Company–2003)

F2030 **"Eggs Games" Foodservice Egg Handling & Safety** – (18 minutes). 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)

F2035 **Fabrication and Curing of Meat and Poultry Products** – (2 tapes – 165 minutes). (See Part 2 Tape F2036 and Part 3 F2037) This is session one of three-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)

F2036 **Emerging Pathogens and Grinding and Cooking Comminuted Beef** – (2 tapes – 165 minutes). (See Part 1 Tape F2035 and Part 2 Tape F2037) This is session two of a three–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, and local authorities, industry, and trade associations in a foodborne outbreak. (AFDO/USDA–1998)

F2037 **Cooking and Cooling of Meat and Poultry Products** – (2 tapes – 176 minutes). (See Part 1 Tape F2035 and Part 2 Tape F2036) This is session three of a three-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)

F2039 **Food for Thought – The GMP Quiz Show** – (16 minutes). 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 veteran employees. Topics covered include employee practices – 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 minutes). 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, over-ripening, 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 tapes – 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 and Its Application to the Food Industry (Parts 1 & 2)** – (2 tapes – 16 minutes each). (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 videos)** – (4 tapes – 10 minutes each). (1) "Receiving and 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 Facility 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) "Foodservice 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 videos)** – (4 tapes – 10 minutes each). 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 videos)** – (4 tapes – 10 minutes each). 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)

F2081 **Food Safety Begins on the Farm (DVD)** – (15 minutes). From planting to consumption, there are many opportunities to contaminate produce. This is an excellent resource for training fruit and vegetable growers Good Agricultural Practices (GAPs). It includes seven PowerPoint presentations that deal with all aspects of food safety relative to growing, harvesting, and packing fresh fruits and vegetables. (Cornell Good Agricultural Practices Program–2000)

F2090 **Food Safety: An Educational Video for Institutional Food Service Workers** – (10 minutes). 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 Dept of Health & Human Services–1997)

F2095 **Now You're Cooking** – (DVD and video) (15 minutes). Using a food thermometer can improve the quality and safety of meat. This 15-minute video describes the why and how of using a food thermometer when cooking small cuts of meat like meat patties, chicken breasts, and pork chops. Topics include: why color is not a good indicator of doneness; how to choose an appropriate food thermometer for small cuts of meat; quick and easy steps for using an instant-read thermometer; how to calibrate an instant-read thermometer; and the most effective cooking methods for reducing *E. coli* O157:H7 in hamburger patties. (University of Idaho–2005) (Reviewed–2005)

Food Safety for Food Service Series I – 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–2000)

F2100 **Tape 1 – Food Safety for Food Service: Cross Contamination** – (10 minutes). 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.

F2102 **Tape 2 – Food Safety for Food Service: Personal Hygiene** – (10 minutes). 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.

Food Safety for Food Service Series II – An employee video series containing quick, 10-minute videos that boost safety awareness for food service employees and teach them how to avoid foodborne illness. (J.J. Keller & Associates–2002)

F2104 **Tape 1 – Basic Microbiology and Foodborne Illness** – (10 minutes). Covers four common microorganisms in food, how

they get into food, and simple ways to prevent contamination. Stresses the importance of keeping food at the right temperature, having proper personal hygiene, and cleaning and sanitizing work surfaces.

F2105 **Tape 2 – Handling Knives, Cuts, and Burns** – (10 minutes). Explains why sharp knives are safer than dull ones, provides tips for selecting a good knife, and gives techniques for cutting food safely. Also explains first aid for cuts and burns and the most common causes of burns.

F2106 **Tape 3 – Working Safely to Prevent Injury** – (10 minutes). Discusses common lifting hazards and how back injuries can happen. Gives proper lifting and carrying techniques to prevent soreness and injury. Also covers how to prevent slips, trips, and falls.

F2107 **Tape 4 – Sanitation** – (10 minutes). Provides tips for good personal hygiene habits, including the proper way to wash your hands, dress, and prepare for work. Also covers cleaning and sanitizing equipment; storing chemicals and cleaning supplies; and controlling pests that can contaminate work areas and food.

F2110 **Food Safety is No Mystery** – (34 minutes). This is an excellent training visual for foodservice 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 foodservice 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) (Reviewed 1998)

F2111 **Controlling *Salmonella*: Stretegies That Work** – (16 minutes). This training video provides practical guidelines to prevent the growth of *Salmonella* in dry environments and avoid costly product recalls. Using this video as a discussion tool, supervisors can help employees learn about water and how it fosters conditions for the growth of *Salmonella* in dry processing plants with potentially devastating consequences. (Silliker Laboratories–2002)

F2120 **Food Safety: For Goodness Sake Keep Food Safe** – (15 minutes). Teaches food handlers 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 Extention–1990) (Reviewed 1998)

F2121 **Food Safety the HACCP Way** – (11.5 minutes). Introduces managers and line–level staff to HACCP, or the Hazard Analysis Critical Control Point food safety system. The HACCP system is a seven–step process to control food safety, and can be applied to any size and type of food establishment.

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 four topics are: Basic Microbiology, Cross Contamination, Personal Hygiene, and Sanitation. (J.J. Keller & Associates–1999)

F2125 **Tape 1 – Basic Microbiology and Foodborne Illness** – (10 minutes). Covers four common microorganisms in food, how they get into food, and simple ways to prevent contamination. Stresses the importance of keeping food at the right temperature, having proper personal hygiene, and cleaning and sanitizing work surfaces.

F2126 **Tape 2 – Food Safety Zone: Cross Contamination** – (10 minutes). 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** (English and Spanish) – (10 minutes). 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 minutes). 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 the 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.

F2129 **Food Technology: Irradiation** – (29 minutes). Video covers the following issues: history and details of the irradiation process; effects of irradiation on treated products; and consumer concerns and acceptance trends. Other important concerns addressed include how food irradiation affects food

cost, the nutritional food industry, food science and research, and irradiation regulatory industries (such as the Nuclear Regulatory Commission) add insight into the process of irradiation. (Chipsbooks–2001)

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

F2131 **Fruits, Vegetables, and Food Safety: Health and Hygiene on the Farm** (DVD and video) – (15 minutes). This presentation shows ways to prevent contamination of fruits and vegetables while you work. It was filmed in real production fields and packinghouses in the United States. Organisms of concern in fruits and vegetables are discussed, along with proper hygiene practices when handling and harvesting fruits and vegetables. (Cornell University–2004)

F2133 **Food Safety First** (English and Spanish) (DVD and Video) – (50 minutes). Presents causes of foodborne illness in foodservice and ways to prevent foodborne illness. Individual segments include personal hygiene and hand washing, cleaning, and sanitizing, preventing cross contamination, and avoiding time and temperature abuse. Food handling principles are presented through scenarios in a restaurant kitchen. (GloGerm–1998)

F2134 **Food Safety: Fish and Shellfish Safety** – (21 minutes). Seafood tops the list for foods that can become contaminated with bacteria–causing foodborne illness. This video shows how to protect yourself from fish and shellfish contamination by learning proper selection, storage, preparation and safe consumption. (Chipsbooks Company–2003)

F2135 **Get with a Safe Food Attitude** – (40 minutes). 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 women 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 Dept. of Agriculture–1999)

F2136 **GLP Basics: Safety in the Food Micro Lab** – (16 minutes). This video is designed to teach laboratory technicians basic safety fundamentals and how to protect themselves from inherent workplace dangers. Special sections on general laboratory rules, personal protective equipment, microbiological, chemical, and physical hazards, autoclave safety, and spill containment are featured. (Silliker Laboratories–2001)

F2137 **GMP Basics: Avoiding Microbial Cross–Contamination** – (15 minutes). 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, un–sanitized tools and equipment. Employees need specific knowledge and practical training to avoid microbial cross contamination in plants. This video aids in that training. (Silliker Laboratories–2000)

F2140 **GMP Basics: Employee Hygiene Practices** – (20 minutes). 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 minutes). 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)

F2147 **GMP Basics: Process Control Practices** – (16 minutes). 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 activites in the plant have an impact on product safety. (Silliker laboratories–1999)

F2148 **GMP – GSP Employee** – (38 minutes). 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 and Practices in Food Manufacturing (English, Spanish, and Vietnamese)** – (14 minutes). 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)

A GMP Food Safety Video Series – This five–part video series begins with an introduction to GMPs and definitions, then goes on to review specific sections of the GMPs: personnel, plant and grounds, sanitary operations, equipment and utensils, process and controls, warehousing, and distribution. Developed to assist food processors in training employees on personnel policies and Good Manufacturing Practices (CMPs), the series includes different types of facilities, including dairy plants,

canning factories, pasta plants, bakeries, and frozen food manufacturing facilities. (J.J. Keller–2003)

F2151 **Tape 1 – Definitions** – (12 minutes). Provides the definitions necessary to understand the meaning of the CMPs.

F2152 **Tape 2 – Personnel and Personnel Facilities** – (11 minutes). Covers selection of personnel, delegation of responsibilities, development of plant policies for employees, and operational practices.

F2153 **Tape 3 – Building and Facilities** – (16 minutes). Discusses guidelines for the construction and maintenance of the manufacturing plant and grounds around the plant.

F2154 **Tape 4 – Equipment and Utensils** – (12.5 minutes). Provides guidelines for the construction, installation, and maintenance of processing equipment.

F2155 **Tape 5 – Production and Process Controls** – (20 minutes). Covers establishing a food safety committee, in–house inspections, analysis of raw materials and ingredients, cleaning schedules and procedures, and more.

F2160 **GMP: Sources and Control of Contamination during Processing** – (20 minutes). 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)

GMPs for Food Plant Employees: Five-Volume Video Series Based on European Standards and Regulations – Developed to assist food processors in training employees in the Good Manufacturing Practices. Examples are drawn from a variety of processing facilities including dairy plants, canning facilities, pasta plants, bakeries, frozen food facilities, etc. (AIB International–2003)

F2161 **Tape 1 – Definitions** – (13 minutes). Begins with an introduction to the GMPs and traces a basic history of food laws in Europe, ending with the EC Directive 93/43/EEC of June 1993 on the hygiene of foodstuffs.

F2162 **Tape 2 – Personnel and Personnel Practices** – (13 minutes). Selecting personnel, delegating responsibilities, developing plant policies for employees and visitors, and establishing operational practices.

F2163 **Tape 3 – Building and Facilities** – (17 minutes). Guidelines for the construction and maintenance of the manufacturing facility and grounds around the factory.

F2164 **Tape 4 – Equipment and Utensils** – (13 minutes). Guidelines for construction, installation, and maintenance of processing equipment.

F2165 **Tape 5 – Production/Process Controls** – (22 minutes). Covers production and process controls, establishing a food safety committee, conducting in-house inspections, analyzing raw materials and ingredients, developing operational methods, establishing cleaning schedules and procedures, creating pest control programs and record keeping.

F2169 **HACCP: Training for Employees – USDA Awareness** – (15 minutes). This video is a 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 principals; HACCP plan checklist; and an HACCP employee training program. (J.J. Keller & Associates–1999)

F2170 **The Heart of HACCP** – (22 minutes). 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 a critical limits, monitoring systems, and corrective actions that are vital to the success of a HACCP plan. (Silliker Laboratoraies–1994)

F2171 **HACCP: The Way to Food Safety** – (53 minutes). 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)

F2172 **HACCP: Training for Managers** – (17 minutes). Through industry-specific examples and case studies, this video addresses the seven HACCP steps, identifying critical control points, record keeping 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–2000)

F2173 **Inside HACCP: Principles, Practices and Results (English and Spanish)** – (15 minutes). This video is designed to help you build a more knowledgeable work-force and meet safety standards through a comprehensive overview of HACCP principles. Employees are provided with details of prerequisite programs and a clear overview of the seven HACCP principles. "Inside HACCP" provides short, succinct explanations of how HACCP works and places special emphasis on the four principles – monitoring, verification, corrective action, and recordkeeping – in which employees actively participate. (Silliker Laboratories–2001)

F2175 **Inspecting for Food Safety – Kentucky's Food Code** – (100 minutes). 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. (Dept. of Public Health Commonwealth of Kentucky–1997) (Reviewed 1999)

F2180 **HACCP: Safe Food Handling Techniques** – (22 minutes). 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 Assoc.–1990) (Reviewed 1998)

F2190 **Is What You Order What You Get? Seafood Integrity** – (18 minutes). 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)

F2191 **Microbial Food Safety: Awareness to Action (DVD PowerPoint presentation)** –(90 minutes). An overview of GAPs and resources by the United Fresh Fruits and Vegetables Association, a hazard identification self–audit, a sample farm investigative questionnaire, copies of relevant California state information, and US federal regulations. Contains numerous commodity flow charts and photos for more than 30 fruits and vegetables, one dozen PowerPoint presentations containing more than 400 slides, including may in Spanish and two dozen supplemental documents on a variety of food safety topics. (UC Davis–2002)

F2210 **Northern Delight – From Canada to the World** – (13 minutes). 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)

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

F2230 **Purely Coincidental** – (20 minutes). 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)

F2240 **On the Front Line** – (18 minutes). 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** (English and Spanish) – (30 minutes). 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. (The Food Processors Institute–1993) (Reviewed 1998)

F2260 **100 Degrees of Doom...The Time and Temperature Caper** – (14 minutes). 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)

F2265 **A Day in the Deli: Service, Selection, and Good Safety** – (22 minutes). This training video provides basic orientation for new deli department employees and highlights skills and sales techniques that will build department traffic and increased sales. The focus will be on the priorities of the deli department freshness, strong customer service, professionalism, and food safety. By understanding the most important issues for their position(s), employees can comprehend their contribution to the financial interests of the store. (Food Marketing Institute–2003)

F2266 **HACCP: A Basic Understanding** – (32 minutes). Explore applications for Hazard Analysis Critical Control Points (HACCP), a system of process controls required by federal and state governments for most areas of the food service industry. Learn to minimize the risk of chemical, microbiological and physical food contamination while focusing on the seven principles of HACCP and the chain of responsibility. (Chipsboosk company–2003)

F2270 **Pest Control in Seafood Processing Plants** – (26 minutes). 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.

F2271 **Preventing Foodborne Illness** – (10 minutes). This narrated video is for food service workers, with emphasis on insuring food safety by washing one's hands before handling food, after using the bathroom, sneezing, touching raw meats and poultry, and before and after handling foods such as salads and sandwiches. Safe food temperatures and cross contamination are also explained. (Colorado Dept. of Public Health and Environment–1999)

F2280 **Principles of Warehouse Sanitation** – (33 minutes). 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 and Shelf Life** – (40 minutes). 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 problem 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, Inc.–1987) (Reviewed 1997)

F2310 **Safe Food: You Can Make a Difference** – (25 minutes). 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 hand washing as methods of foodborne illness control is provided. The video provides an orientation to food safety for professional food handlers. (Tacoma–Pierce County Health Dept–1990) (Reviewed 1998)

F2320 **Safe Handwashing** – (15 minutes). Twenty-five percent of all foodborne illnesses are traced to improper hand washing. The problem is not just that hand washing 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 & Management–1991) (Reviewed 1998)

F2325 **Safe Practices for Sausage Production** – (180 minutes). 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 be depicted. Characteristics of different types of sausage (fresh, cooked, and smoked, and dry/semi–dry) will be explained. Pathogens of concern and outbreaks 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)

F2330 **Sanitation for Seafood Processing Personnel** – (20 minutes). A training video suited for professional food handlers working in any type of food manufacturing plant. The film highlights Good Manufacturing Practices and their role in assuring food safety. The professional food handler is introduced to a variety of sanitation topics including: (1) food handlers 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 minutes). Provides an introduction to basic food safety for professional food handlers. 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)

F2341 **Science and Our Food Supply** – (45 minutes). Becoming food safety savvy is as easy as A–B–C! This video includes a step-by-step journey as food travels from the farm to the table; the Fight BAC®! Campaign's four simple steps to food safety, clean, cook, separate (combat cross contamination), and chill, and the latest in food safety careers. Other topics covered include understanding bacteria, food processing and transportation, and the future technology of food processing. (FDA Center for Food Safety & Applied Nutrition–2001)

F2342 **Seafood HACCP Alliance Internet Training Course** – This DVD contains the on-line equivalent material found in the Seafood HACCP Alliance Internet Training Course (http://seafoodhaccp.cornell.edu). This new program is designed to be equivalent to the first two days of the "live" three–day Alliance training courses. There are 12 training modules in the course that cover all of the information on HACCP principles, their application to seafood products, and the FDA regulation. Experience has shown that HACCP implementation can be more effective when a number of key people in the operation have a good understanding of the system and its requirements. (Cornell University–2004)

F2350 **ServSafe Steps to Food Safety** (DVD and Video) (English and Spanish) – 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. (National Restaurant Association Education Foundation–2000)

Tape 1 **Step One: Starting Out with Food Safety** – (12 minutes). Defines what foodborne illness is and how it occurs; how foods become unsafe; and what safety practices to follow during the flow of food.

Tape 2 **Step Two: Ensuring Proper Personal Hygiene** – (10 minutes). Introduces employees to ways they might contaminate food; personal cleanliness practices that help protect food; and the procedure for thorough hand washing.

Tape 3 **Step Three: Purchasing, Receiving and Storage** – (12 minutes). Explains how to choose a supplier; calibrate and use a thermometer properly; accept or reject a delivery; and store food safely.

Tape 4 **Step Four: Preparing, Cooking and Serving** – (11 minutes). Identifies proper practices for thawing, cooking, holding, serving, cooling, and reheating food.

Tape 5 **Step Five: Cleaning and Sanitizing** – (11 minutes). 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 set up a cleaning program.

Tape 6 **Step Six: Take the Food Safety Challenge: Good Practices, Bad Practices – You Make the Call** – (35 minutes). Challenges viewers to identify good and bad practices presented in five short scenarios from different industry segments.

F2370 **Supermarket Sanitation Program – Cleaning and Sanitizing** – (13 minutes). 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 minutes). Contains a full range of basic sanitation information with minimal emphasis on product. Filmed in a supermarket, the video is designated as a basic program for manager training and a program to be used by managers to train employees. (1998) (Reviewed 1998)

F2390 **Take Aim at Sanitation** (English and Spanish) – (8 minutes). Produced by the Foodservice & Packaging Institute in cooperation with the US Food and Drug Administration, this video demonstrates how to properly store and handle foodservice disposables so customers are using safe, clean products. This video demonstrates: the problem of foodborne illness; how foodservice disposables are manufactured for cleanliness; tips for storing foodservice disposables; tips to help your customers in self-serve areas; guidelines for serving meals and maintaining proper sanitation; and tips for cleaning up after meals. Throughout the program a roving microscope "takes aim" at common mistakes made by workers to help audiences identify unsanitary handling and storage practices. (Foodservice & Packaging Institute, Inc.)

F2391 **Understanding Foodborne Pathogens** – (40 minutes). Explore the major causes of foodborne illness and review the practices used to minimize the risk of contracting or spreading a foodborne disease. Learn about microorganisms associated with foodborne illness such as parasites, viruses, fungi and bacteria. Study ways to reduce harmful pathogens through proper handling, storage, and cooking. (Chipsbooks Company–2003)

F2410 **Wide World of Food Service Brushes** – (18 minutes). 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)

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

F2430 **Smart Sanitation: Principles and Practices for Effectively Cleaning Your Food Plant** – (20 minutes). 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 Laborabories–1996)

F2440 **Cleaning and Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!** (English and Spanish) – (16 minutes). 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 a processing plant as it is for washing dishes at home. (University of Wisconsin Extension–1996)

F2450 **A Guide to Making Safe Smoked Fish** – (21 minutes). 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–1999)

F2451 **A HACCP-based Plan Ensuring Food Safety in Retail Establishments** (DVD) – (11 minutes). This is an educational DVD that provides a brief summary of HACCP. It explains the purpose and execution of each of the seven principles. Can be used as part of a wide range of HACCP training programs beyond retail establishments. The major emphasis is on proper documentation and validation. (Ohio State University–2004)

F2460 **Safer Processing of Sprouts** – (82 minutes). 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 Service, Food & Drug Branch–2000)

Fast Track Restaurant Video Kit – These five short, direct videos can help make your employees more aware of various food hazards and how they can promote food safety. (Diversey Lever–1994)

F2500 **Tape 1 – Food Safety Essentials** – (23 minutes). This video provides an overview of food safety. All food service employees learn six crucial guidelines for combating foodborne illness. Prepares employees for further position-specific training to apply the six food safety principles to specific jobs.

F2501 **Tape 2 – Receiving and Storage** – (22 minutes). Make sure only safe food enters your doors! Receiving and storage staff learn what to look for and how to prevent spoilage with proper storage with this video.

F2502 **Tape 3 – Service** – (22 minutes). Servers are your last safety checkpoint before guests receive food. This video helps you make sure they know the danger signs.

F2503 **Tape 4 – Food Production** – (24 minutes). Food production tasks cause most food safety problems. Attack dangerous practices at this critical stage with this video training tool.

F2504 **Tape 5 – Warewashing** – (21 minutes). Proper sanitation starts with clean dishes! With this video, warewashers will learn how to ensure safe tableware for guests and safe kitchenware for co-workers.

F2600 **Food Industry Security Awareness: The First Line of Defense** – (24 minutes) (Video and DVD). This video reinforces the importance of security awareness in all phases of product handling, from receiving ingredients to processing and shipping. With this program, you can have an immediate impact on plant security with very little time or resources, all while helping maximize the effectiveness of your overall security investment. Everything you need to turn your biggest security challenge into your biggest security asset is covered. (J. J. Keller–2006)

OTHER

M4010 **Diet, Nutrition and Cancer** – (20 minutes). 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 minutes). 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 minutes). 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)

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

M4060 **Psychiatric Aspects of Product Tampering** – (25 minutes). 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 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 minutes). 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)

M4071 **Understanding Nutritional Labeling** – (39 minutes). Learn why the government initiated a standardized food labeling system and which foods are exempt. Explore each component listed on the label including cholesterol, carbohydrates, protein, fat, health or nutritional claims, service size, percentage of daily value, and standard calorie reference/comparison. (Chipsboosk Company–2003)

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OTHER

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- ❒ M4030 Ice: The Forgotten Food
- ❒ M4050 Personal Hygiene and Sanitation for Food Processing Employees
- ❒ M4060 Psychiatric Aspects of Product Tampering
- ❒ M4070 Tampering: The Issue Examined
- ❒ M4071 Understanding Nutritional Labeling Processing Employees

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Margaret M. Bowman
Keystone Foods, LLC
West Conshohocken

Jose RF Brito
USDA-ARS-ERRC
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Marshfield Clinic
Marshfield

Dorn Clark
Marshfield Clinic
Marshfield

Carrie L. Saynisch
WI Center for Dairy Research
Madison

UPDATES

Novazone Inc. Appoints Michael Weber Vice President of Engineering

Novazone, Inc., has announced the appointment of Michael Weber as vice president of engineering. In his position, Mr. Weber will lead Novazone's research and development efforts and report to Paul White, president and CEO of Novazone, Inc.

Mr. Weber brings more than 20 years of engineering, technical and management experience to Novazone. During his career, he has held numerous senior level positions, developed and introduced new product lines, built high-performance teams, and has received ten US patents in process control and instrumentation.

Prior to joining Novazone, Mr. Weber was vice president of engineering for Nanometrics, a semiconductor equipment company. Previously, Mr. Weber held key executive level positions at KLA-Tencor and Sensys Instruments. He holds a master's in physics from University Bremen, Germany.

Morgan Named President of Farr Air Pollution Control

Lee Morgan has been named president of Farr Air Pollution Control (APC), a manufacturer of dust collection equipment for IAQ control and product recovery. In the newly created post, Morgan will oversee all activities of the Farr APC operating unit, which has been consolidated and expanded to include all of North America.

Morgan joined Farr in 1997 and has held a variety of management posts in the company's air pollution control business unit. His 15 years of experience in the dust collection industry spans virtually every aspect of applications, equipment design and development, marketing, sales and customer service. He is chairman of ASHRAE Technical Committee 5.4 (Industrial Process Air Cleaning), which is working on developing a standard for stating dust collector performance.

Jim Kendzel Appointed to Managing Director of the Safe Quality Food Institute

The Food Marketing Institute (FMI) is pleased to announce the appointment of Jim Kendzel, a long-time leader and executive in the public health field, as managing director of the Safe Quality Food Institute (SQFI), a division of FMI.

Kendzel joins SQF with 24 years of experience at NSF International, the world's leading nonprofit, independent provider of public health testing and certification. His numerous responsibilities there included overseeing the quality systems for certifying thousands of products according to 50 national standards governing water, air and food safety. He created auditing systems and oversaw their use in the field to ensure compliance with the standards.

Kendzel served as a leader at the American National Standards Institute (ANSI) as a member of its Executive Standards Council, National Policy Committee and Accreditation Committee, which he chaired.

The American Council of Independent Laboratories recognized his work, presenting him its Conformity Assessment Leadership Award in 2000. He holds a Master's degree in public health from the University of Michigan.

FKI Logistex Promotes Martin Clark to Oversee Marketing for Manufacturing Systems in North America

FKI Logistex® announces that Martin Clark has been promoted to the position of director of marketing and business development for FKI Logistex Manufacturing Systems North America. Clark, an industry veteran with more than 20 years of material handling experience, was previously director, international and newspaper operations.

Clark joined FKI Logistex in 1999, and was instrumental in developing the company's manufacturing-based business in the United Kingdom. He has played a major role in building the customer base in Mexico and Canada for FKI Logistex Manufacturing Systems North America. In his new role, Clark will continue to focus on business development while overseeing marketing operations for the division.

Prior to joining FKI Logistex, Clark served as director of material handling technology for Interroll® Corporation. Clark holds a bachelor of science degree in mechanical engineering from the University of Kentucky.

International Association for Food Protection® NEWS

CFIA: Canada Strengthens Feed Controls

The Canadian Food Inspection Agency is banning cattle tissues capable of transmitting bovine spongiform encephalopathy (BSE) from all animal feeds, pet foods and fertilizers. The enhancement will significantly accelerate Canada's progress toward eradicating the disease from the national cattle herd by preventing more than 99% of any potential BSE infectivity from entering the Canadian feed system.

The banned tissues, which are collectively known as specified risk material (SRM), have been shown in infected cattle to contain concentrated levels of the BSE agent. Canada has already applied identical protection to the human food system, where SRM are removed from all cattle slaughtered for human consumption. This measure is internationally recognized as the most effective way to protect the safety of food from BSE.

"This ban tightens already strong, internationally recognized feed controls and shortens the path we must follow to move beyond BSE," said the Honorable Chuck Strahl, Minister of Agriculture and Agri-Food and Minister for the Canadian Wheat Board. "Preventing all these materials from entering the animal feed chain minimizes risks and demonstrates the commitment of Canada's new government to take necessary, science-based actions to address BSE."

Ongoing surveillance testing continues to indicate that the level of BSE in Canada is very low. This is attributable to Canada's current feed ban, which has prohibited the use of SRM in feed for cattle and other ruminant animals since 1997. Extending SRM controls to all animal feeds addresses potential contamination that could occur during feed production, transportation, storage and use. Removing SRM from pet food and fertilizers is intended to mitigate the risk associated with the potential exposure of cattle and other susceptible animals to BSE through the misuse of these products.

The new outcome-based regulations enter into force on July 12, 2007, with additional time provided for small establishments to achieve full compliance. In the meantime, an awareness campaign will be undertaken to ensure that all regulated parties are fully aware of their responsibilities and have adjusted their practices and procedures as required. Special emphasis will be placed on working closely and in full cooperation with small abattoirs to help them transition to the new requirements and facilitate their long-term viability. The government has set aside $80 million to work with the provinces to assist industry's implementation of the new feed controls.

Enhanced feed controls complete the government's response to the detection of BSE, consistent with the recommendations of the international team of experts that reviewed Canada's situation. As a priority, Canada first focused on human health protection, which was achieved through the removal of SRM from the food system. Attention then turned to animal health measures through intensified surveillance testing for BSE and increased animal tracing capabilities.

The removal of SRM from the feed system, pet food and fertilizers involves a broad range of diverse stakeholders and considerations. In developing the required regulatory amendments, the Canadian Food Inspection Agency undertook analyses and broad consultations with industry, provinces and territories, the animal health community, trading partners and the public. This preparatory work was essential to ensure that an enhanced feed ban would be effective, enforceable, environmentally sustainable and economically feasible. Governments have identified and will continue to pursue alternative uses for SRM, such as processes that can generate biofuel.

SRM are defined as the skull, brain, trigeminal ganglia (nerves attached to the brain), eyes, tonsils, spinal cord and dorsal root ganglia (nerves attached to the spinal cord) of cattle aged 30 months or older and the distal ileum (portion of the small intestine) of cattle of all ages.

Fact Sheet: Canada's Enhanced Feed Ban http://www.inspection.gc.ca/english/anima/feebet/rumin/enhrene.shtml.

2006 World Food Prize Winners Announced

The recipients of the 2006 World Food Prize were announced June 15 at a ceremony at the US State Department featuring Nobel Peace Prize Laureate Dr. Norman E. Borlaug and hosted by the Hon. Josette Sheeran Shiner, Under Secretary of State for Economic, Business, and Agricultural Affairs.

World Food Prize Foundation President Ambassador Kenneth M. Quinn announced that the three men who will share the 2006 World Food Prize are: former Brazil Minister of Agriculture H.E. Alysson Paolinelli and former Technical Director of EMBRAPA Cerrado Research Center Mr. Edson Lobato, both of Brazil; and Washington

Representative of the IRI Research Institute, Dr. A. Colin McClung of the United States.

The $250,000 World Food Prize was established in 1986 by Dr. Borlaug. Celebrating its 20th anniversary this year, it was created to be the foremost international award for achievements that significantly increase the quality, quantity or availability of food in the world.

Ambassador Quinn noted that this year marks the first time in its twenty-year history that the World Food Prize will be awarded to three recipients. Lobato and Paolinelli are the first World Food Prize Laureates from Brazil, while McClung is the eleventh Laureate from the United States. Quinn added that the 2006 recipients each played a vital role in transforming the Cerrado – a region of vast, once infertile tropical high plains stretching across Brazil – into highly productive cropland. Though they worked independently of one another, in different decades and in different fields, their collective efforts over the past 50 years have unlocked Brazil's tremendous potential for food production. Their advancements in soil science and policy leadership made agricultural development possible in the Cerrado, a region named from Portuguese words meaning "closed, inaccessible land."

Dr. Borlaug, who is credited with saving more than one billion lives as the Father of the Green Revolution, called the development of the Cerrado "one of the great achievements of agricultural science in the 20th century, which has transformed a wasteland into one of the most productive agricultural areas in the world."

The World Food Prize will be formally presented at a ceremony on October 19, 2006 at the Iowa State Capitol Building in Des Moines. The ceremony will be held as part of the World Food Prize International Symposium, entitled "The Green Revolution Redux: Can We Replicate the Single Greatest Period of Food Production in All Human History?"

Dr. A. Colin McClung's pioneering soil fertility research in the 1950s analyzed the complexity of Cerrado soils and showed that a transformation of the region was possible. His work uncovered an innovative soil improvement process to correct the drastic nutrient depletion of the Cerrado and counteract aluminum toxicity in the region's highly acidic soils.

His findings paved the way for agricultural development in the Cerrado in the 1970s under the direction of H.E. Alysson Paolinelli. Beginning his career as Secretary of Agriculture in the state of Minas Gerais in the early 1970s, Paolinelli created a new model for rural credit and other development programs. He envisioned and oversaw the creation of the institutional and financial infrastructure that enabled crop and livestock production to flourish in the Cerrado. His focus on the Cerrado continued as Minister of Agriculture from 1974 to 1979, when he was instrumental in establishing the Brazilian Agricultural Research Corporation (EMBRAPA) to provide a national system of research, technical, and administrative support to farmers and agribusinesses. Paolinelli also provided leadership in establishing the Cerrado Research Center as part of EMBRAPA in 1975.

Mr. Edson Lobato was a leader in evaluating and carrying out studies of Cerrado soil fertility and agricultural production, further expanding upon the work of McClung and Paolinelli. During the course of his 30-year career as an agronomy engineer and administrator at EMBRAPA (1974 to 2004), Lobato led Cerrado soil fertility and agronomy research as it expanded to include soil microbiology, soil management, and crop management.

NZFSA Reviews Food Safety Training and Education

A snapshot survey of the amount and type of training undertaken by New Zealand's food industry workers has revealed that just over one in five has had no formal food safety training whatsoever.

The survey was commissioned by the New Zealand Food Safety Authority (NZFSA), as part of its Domestic Food Review (DFR), to determine the current arrangements relating to food safety education and training within New Zealand's burgeoning food industry. It involved individuals, companies and education providers.

Results show that the most common form of training takes no more than a day or, at the most, less than a week, and that many of the shorter programs are designed specifically to meet the base legislative requirements. It reveals that industry concerns about high staff turnover, which is estimated to be about 35% a year, could be a contributing factor for employers who may consider food safety training to be a costly investment for a relatively short-term gain.

NZFSA considers education and training to be crucial to ensuring the delivery of safe and suitable food in New Zealand. As part of the DFR, NZFSA's Position Paper which was published in February asked readers about the role of government in this area in the future.

Carole Inkster, NZFSA's director of policy, says, "Education and training in the food sector survey report is a snapshot of current education and training trends within the food sector. It looks at which sectors under-

take training, what type (for example, standards, or non standards-based) and who provides it (i.e., in-house, contract trainers or educational institutes). "It enables us to identify issues around training and education that may need to be addressed as part of the DFR."

"The Food Act is silent on training for people in the food sector. As a consequence, about a third of local governments require such training through local government bylaws. This means there is no consistent, national approach."

The survey was well supported and returned just over 400 responses from the sectors approached. These included: retail, food service, food processing, food manufacturing, and education providers.

The survey indicates that training is equally driven by personal motivation and organizational requirements. It found that the food service industry, which is primarily responsible for serving individual customers, had the highest level of staff who had received some training (84%).

In the food manufacturing industry, 81% of respondents had received training, of which 67% had attended NZQA-approved courses, and 33% had attended either in-house training or courses provided by private training establishments.

Data was collected from an organizational and individual perspective. Where one person was approached to complete the survey on behalf of an organization, another employee within that organization was approached to provide their own perspective.

All of the polytechnics and universities surveyed are NZQA registered, with 71% of private training establishments and half of contract trainers delivering NZQA unit standard-based courses. The majority of these courses do not have a refresher or renewal component.

A copy of the report is available on the NZFSA Web site at: www.nzfsa.govt.nz/policy-law/projects/domestic-food-review/education-and-training-report/index.htm.

Novel Antimicrobials Protect against Mastitis-causing Bacteria

An Agricultural Research Service (ARS)-led team has combined specific DNA segments from two different sources to produce a novel antimicrobial protein. The resulting "fusion" antimicrobial protein degrades the cell walls of several bacterial pathogens in a solution of whey extracted from cow's milk.

Agriculturally, the technology provides a key step to developing dairy cows that have a natural, built-in defense against mastitis— a disease that costs US dairy producers up to $2 billion annually.

In the realm of infectious disease, one way to reduce microbial resistance that results from widespread antibiotic use is to come up with new ways to fight pathogens. The findings from this experimental study were published in the April 2006 issue of *Applied Environmental Microbiology*.

David M. Donovan, a molecular biologist at the ARS Biotechnology and Germplasm Laboratory at Beltsville, MD, presented the study's results at the American Society for Microbiology's 2006 Annual Meeting, in Orlando, FL. ARS is the US Department of Agriculture's chief scientific research agency.

Donovan is the named inventor on a USDA/ARS-filed patent application that describes the technology behind fusing the protein-coding DNA sequences that produce the novel fusion antimicrobial. He and colleagues from Birmingham, AL, and Quebec, Canada, hope to use the technology to produce fusion proteins as alternatives to the use of broad-range antibiotics both in clinics and on farms.

While all milk contains several naturally occurring antimicrobial proteins, such as lysozyme and lactoferrin, the sale of milk containing the fusion protein would first require rigorous food safety testing and federal regulatory approval.

Bacteria have layers of macromolecules that provide strength and shape to their cell walls. The fusion antimicrobial protein, as a cell-wall-degrading enzyme, kills pathogens by decomposing this structural layer and causing the cell to break down.

The B30-lysostaphin fusion protein developed by Donovan's team is active against both *Staphylococcus aureus* and three streptococcal mastitis pathogens that together are responsible for up to 50 percent of the dairy cattle mastitis that occurs in the United States.

Antimicrobial Treatments to Food are Safe to Human Health

Prudent use of decontaminants, sanitizers and other antimicrobial treatments in the production and manufacturing of food appears to generate no bacterial resistance of concern to human health, according to the Institute of Food Technologists. In its report issued recently, "Antimicrobial Resistance: Implications for the Food System," IFT recommends that current antimicrobial treatments continue unabated to ensure food safety and public health.

"The benefits of antimicrobial treatments are numerous," says Michael P. Doyle, Ph.D., IFT food safety expert, microbiologist and chair of the expert panel who wrote the report. "From healthy animals entering the food chain to good

physical condition of crops to maintaining sanitation during processing, antimicrobial treatments are having their intended effect," he says.

Antimicrobials can come in the form of preservatives applied to keep food from deteriorating, or as fungicides applied to produce, or as sanitizers and disinfectants used on processing equipment. In the home, antimicrobials are commonly known as antibacterial products.

More than 700 soaps and other antimicrobial products are marketed commercially for the home, but use of these decontaminants does not impact bacterial resistance in the environment at the level that medicine and agriculture do, according to the report.

However, consumers' increased preference for minimally processed foods may be affecting the survival of resistant bacteria.

"The current demand for minimally processed foods and preservative-free foods may increase the occurrence of resistant pathogens. The result of fewer antimicrobial applications to food that inactivate pathogens during processing," says Doyle.

This is the fourth Expert Report commissioned by IFT and funded by the nonprofit IFT Foundation, following the release of *Functional Foods* (2005), *Emerging Microbiological Food Safety Issues* (2002) and *Biotechnology and Foods* (2000).

This new report and the others are available online at http://www.ift.org/ExpertReport.

Ice-Cream Vendors Warned of Food Poisoning Risks

The Food Safety Authority of Ireland (FSAI) has launched a new information booklet targeting those involved in the sale of soft serve ice cream (i.e., whipped and scoop ice cream), to highlight the risk of food poisoning that can result from poor hygiene practices in the handling and serving of the product. The booklet, 'Safe Handling and Serving of Soft Serve Ice Cream', will assist retailers to comply with their legal obligations to implement adequate food safety management practices, and therefore, improve the microbiological quality of soft serve ice cream being consumed. According to the FSAI, poor hygiene practices can increase the risk of food poisoning bacteria in soft serve ice cream. Its warning comes at an important time of the year and retailers prepare for high volume sales of soft serve ice cream.

While most bacteria are harmless, some can cause foodborne illnesses. The bacteria can be found on and in people's bodies, on dirty food preparation equipment, in dirty food premises, and in contaminated water. Foodhandlers with poor hygiene and handling practices can contaminate and spread bacteria to soft serve ice cream through inadequate handwashing, using dirty machines and equipment, using utensils which have not been cleaned properly before use and using unclean dish cloths or serving cloths. Those particularly at risk of food poisoning are young children, pregnant women, the elderly and the sick. Typical symptoms include nausea/vomiting, diarrhea, stomach pains and headaches.

Dr. Wayne Anderson, chief specialist food science, FSAI, warned that the dangers of food poisoning and the effects it can have on those high risk groups cannot be underestimated.

"With the summer season fast approaching, consumption levels of soft serve ice cream will be at their annual peak. It is therefore vital that we advise foodhandlers and food business owners/managers nationwide to ensure that the necessary food hygiene practices are in place when serving soft serve ice cream, in order to protect consumer health. We are asking owners and operators of such outlets to abide by the simple and easy-to-follow information contained in the FSAI booklet and to distribute it to staff so that all recommendations are applied to the business operations."

According to the FSAI, all food businesses have a legal obligation to produce food in a hygienic manner, implement a food safety management system based on the principles of HACCP (Hazard Analysis Critical Control Point), implement a traceability and recall system, and ensure that staff are supervised and instructed in food hygiene matters.

In a bid to improve the microbiological quality and safety of soft serve ice cream, the FSAI information booklet outlines the following guidelines to those involved in its handling or serving:

1. Personal Hygiene – personal hygiene is important in preventing the spread of bacteria. The FSAI recommends that handlers are clean and tidy, wear clean protective clothing, wear hair net/hat to keep hair neat and tidy, keep finger nails short and clean, keep all cuts, sores or grazes covered, do not cough or sneeze around food products, wash hands regularly, wear gloves where necessary, and do not serve ice cream if they are ill.
2. Good Hygiene Practices – good hygiene practices begin with the positioning of the ice cream machine and cabinet which should be sited indoors away from direct sunlight, heat and

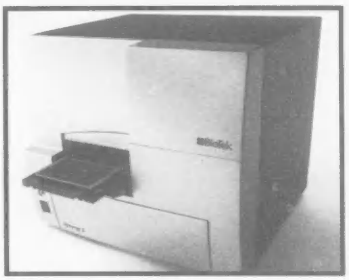
draughts. The foodhandler must store all ingredients and supplies in the correct location and at the correct temperature. In addition, foodhandlers must adhere to hygienic guidelines for the preparation and serving of soft ice cream including following supplier's advice on preparing the ice cream mix, discarding any unused product, not re-freezing ice cream and not refilling containers.

3. Cleaning – cleaning is a vital activity, as it removes the dirt and food particles which allow bacteria to grow. Cleaning should be carried out at regular intervals and a designated bucket or sink used. In addition to general cleaning, ice cream machines and all utensils must be sanitized fully and regularly.

The FSAI information booklet 'Safe Handling and Serving of Soft Serve Ice Cream' will be distributed to ice-cream vendors and retailers throughout the country. A copy of the booklet can also can be obtained by contacting the Food Safety Authority of Ireland on 1890 336677 and is available online.

A survey carried out by the FSAI in 2001 on the microbiological quality of soft serve ice cream found that considerable improvements are required during the handling and serving of soft ice cream in retail premises: (http://www.fsai.ie/surveillance/food/3rdQuarter.pdf).

INDUSTRY PRODUCTS



Bio Tek Instruments, Inc.

BioTek Instruments Introduces the Synergy 2 Multi-Detection Microplate Reader

BioTek Instruments, Inc., has announced the launch of the Synergy 2. Multi-Detection Microplate Reader. Based on the popular Synergy HT, the Synergy 2 is a five-mode microplate reader designed for the life science research and drug discovery markets. This new detection system will provide researchers with an unprecedented level of cost-effectiveness, and a very high level of performance in a compact and modular instrument.

The Synergy 2 detection modes include Fluorescence Intensity, Fluorescence Polarization, Time-Resolved Fluorescence, Luminescence and UV-visible Absorbance. Synergy 2 uses a unique combination of monochromator, filters and dichroic mirrors that provide the best possible level of performance in all detection modes. Its three broad-spectrum light sources have been chosen for optimal illumination and excitation in all applications.

When asked about the Synergy 2 Multi-Detection Microplate Reader, Gary Barush, director of sales and marketing at BioTek commented, "The Synergy 2 is the first of a new generation of multi-detection microplate readers that reflect the convergence of requirements associated with HTS/drug discovery and life science research. This instrument has been designed with screening applications in mind but has retained the need for greater flexibility found in life science research. Synergy 2 is fast, reads a 384-well plate in less than 30 seconds, is compatible with 1536-well plates, and provides high performance in fluorescence polarization and time-resolved modes, and at the same time comes equipped with precise temperature control, built-in shaking, monochromator-based photometry and a reagent injection system for applications traditionally found in research laboratories."

With its modular architecture, the Synergy 2 can be customized for specific applications, making it an extremely cost-effective reader. The Synergy 2 runs all common microplate applications such as ELISA assays, 260 nm DNA quantification, reporter gene assays, cytotoxicity and cell proliferation assays, protein and nucleic acid quantification, kinetic enzyme assays, as well as ion channel assays, FRET and TR-FRET assays, binding assays and much more.

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A suitable replacement for thyratrons and switch tubes, PowerMod™ HVPM Series Solid-State Modulators are air insulated, water cooled, and offer full internal self-protection against over-voltage and over-current conditions. Applications include researching the effects of high voltage in semiconductor fabrication and the effects on food, chemical, physical, and biological properties for curing and sterilization.

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Be sure to mention, "I read about it in *Food Protection Trends*"!

Advanced Instruments Delivers Dairy, Food Products Testing and Analysis Solutions to Cooperative, Regulatory and Processor Dairy Labs

Advanced Instruments offers solutions for four common tests that represent a large percentage of work in most cooperative, regulatory, and dairy processor laboratories.

- Cryoscopy: Cryoscopy is used to accurately and rapidly determine the amount of added water that is present in a milk sample. Present cryoscope technology is semi-automated and utilizes the Freezing Point depression method. Samples are tested before raw milk is unloaded into storage. Finished products also are tested for water content for quality assurance purposes.

Advanced Instruments cryoscopes are reliable and offer high-throughput and maximum up time. The company's newest cryoscope, the Model 4250, features an updated look plus new electronics offering multi-language capability, on-board printer, downloadable upgrades, reduced maintenance, and simple push-button operation.

- Pasteurization Testing: Advanced Instruments, Fluorophos® ALP Test is the only rapid phosphatase method that offers results in three minutes and has been accepted by AOAC, FDA, ISO, IDF, SANCO (France), and EU. The test involves the use of an automated instrument and a fluorimetric assay that is extremely robust, reliable, and dependable.

Known as Alkaline Phosphatase testing (ALP), the Fluorophos system, rather than a technician, interprets and records the results, thus dramatically reducing the evaluation process to three minutes. And unlike the colorimetric method, ALP testing can be used to screen and or confirm pasteurization of many different products including bovine, sheep, and goat milk, flavored and cultured products, and cheeses.

The Fluorophos ALP Test continues to revolutionize how dairy processors check for pasteurization. The system delivers higher precision, reproducibility, and a ten-fold sensitivity improvement over colorimetric methods. It also enhances process improvement and troubleshooting capabilities while allowing immediate process validation following maintenance. By employing the Fluorophos method, plants are able to improve HACCP and food safety programs to protect consumers and continue manufacturing quality, consistent products.

- Chemical Component Analysis: Dairy labs use two types of instruments to perform chemical (milk) component analysis. The Fourier Transform Infrared (FTIR) analyzer can evaluate a wide range of products, including complex recipes such as yogurt drinks, multi-flavored ice creams, and cottage cheeses. The filter analyzer, both accurate and reliable, is a workhorse at determining the basic composition of milk and is used by hundreds of labs.

With the growth of specialty dairy products, labs are moving to highly versatile FTIR technology. The FTIR analyzer, with its sensitive infrared spectrometer, is accurate enough to evaluate the most complex products and compounds.

Delta solutions, offered by Advanced Instruments, feature a low cost of ownership. Delta's reliable optical systems feature an open architecture and require little maintenance and much less calibration.

- Microbiological Profile: Because of its impact on consumer safety and product shelf life, microbiological content has become a major concern in foods.

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Gardner Denver Welch Vacuum Technology

Dryfast® from Welch® Introduces Advanced Vapor Management

Welch® has improved Dry Vacuum Pump Technology with the new Dryfast® and Dryfast Ultra® having built-in Advanced Vapor Management (AVM). AVM means precise control capability for the distillation of organic solvents and applications handling aggressive vapors and gases.

Constructed with solid PTFE heads, PTFE diaphragms, Kalrez® valves and utilizing fluorinated plastics on all

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The six new models feature flows to 70 l/min and ultimate vacuum levels down to 2-Torr. No cold traps are needed to operate. These stand-alone vacuum pumps need very little maintenance leading to low cost of ownership and improved productivity.

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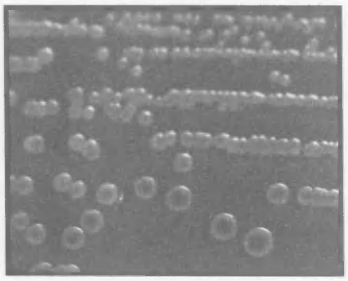

Hardy Diagnostics

Hardy Diagnostics CHROM™O157 Allows for Rapid and Reliable Detection of *E. coli* O157

Escherichia coli O157 is a pathogen responsible for outbreaks of serious foodborne disease. Outbreaks of disease are directly associated with the consumption of contaminated bovine food products. Classical media entail complex and costly detection procedures with non-specific results that could lead to false positives. HardyCHROM™ O157 allows for rapid and reliable detection of *E. coli* O157 through the use of specific chromogenic substrates in the medium's formulation. Colonies produced by *E. coli* O157 can be presumptively identified by a pink color. Organisms other than *E. coli* O157 will be inhibitied or produce white colonies.

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New Electrostatic Spraying Technology to Revolutionize Multiple Industries

Electrostatic Spraying Systems, Inc. (ESS), is now bringing its revolutionary air-assisted technology to new markets and industries. The new electrostatic spraying technology and latest nozzle designs allow for maximized coverage and longer residual time for sprayed compounds.

"This patented technology has application across a multitude of industries," said Bruce Whiting, president and owner of Electrostatic Spraying Systems, Inc. "This technology is being utilized now in construction for mold and termite prevention; food safety in dealing with biological outbreaks and contamination; and devices for sanitization. Our goal is to continue to develop new uses for this innovative technology."

The ESS nozzle applies an induction electrical charge to liquid droplets sprayed through the nozzle in a fine mist. As the spray is atomized, the negatively charged droplets are carried in an air stream toward the target. The charge causes the droplets to wrap around the target object with a force of attraction of 75 times that of gravity. Droplets will even reverse direction and move upward against gravity to coat hidden surfaces providing four to ten times better coverage than conventional sprayers.

Test results with agricultural growers result in users requiring 30 to 60 percent less chemicals when applied through an ESS electrostatic sprayer.

Growers, particularly organic growers, have also found that they can use more environmentally-safe chemicals with improved efficacy when using an electrostatic system. Additional benefits include reduced chemical usage, longer time between treatments and reduced drift. Electrostatic technology has been used for many years in the automotive industry to apply automotive paint. The ESS patented new technology uses lower voltages making it safe for new applications. ESS nozzles are designed to allow many different types of solutions to be sprayed through them, including heavy powders mixed in all types of liquids.

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American Air Scrubbers Announces a Complete Line of Airscrubbers for Disinfection and Deodorization of Processing and Packaging Facilities

American Air has multi-sized stainless steel portable units which can be rolled around on the floor or suspended from the ceiling. These units are 1,000 CFM to 10,000 CFM based on need of air flow. These are standard in-stock stainless steel items. American Air Scrubbers also has in-house engineers and scientists to provide custom design for specific requirements.

American Air Scrubbers, Inc. manufactures equipment which eliminates bacteria through the use of a combination of UVC lamps and patented-pending reactors. American Air technology works by eliminating the organic particulates not filtering or capturing them.

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BioControl Systems' Assurance GDS™ for *Salmonella* Has Been Approved as an AOAC Performance Tested Method

Assurance GDS for *Salmonella* was found to be equivalent to or better than the reference culture methods for both food and environmental samples. BioControl will be proceeding forward to obtain AOAC Official Method of Analysis approval on this method.

Assurance GDS for *Salmonella* is the first commercially available DNA-based detection method to provide *Salmonella* results in as few as 20 hours. "Increasing emphasis is being placed on process control as a means of improving operational efficiency and food safety," states Anita Kressner, director of sales and marketing. "Fast and accurate *Salmonella* detection methods validated for both food and environmental samples can offer customers a significant advantage," says Kressner.

In addition to faster results, Assurance GDS also offers greater accuracy in the form of multiple layers of specificity including immunomagnetic separation (IMS), highly specific primers, and a patented probe system. "The multiple levels of specificity have enabled us to overcome matrix interference and cross reactivity; issues that are common to other genetic based systems. The benefit to customers being consistently, accurate results," says Geoff Bright, microbiology product manager.

Completing the system is the Assurance GDS Rotor-Gene, an innovative multi-channel rotary cycler for the amplification and detection of the target. The Assurance GDS Rotor-Gene can read multiple, distinct targets thereby eliminating the need for melt curves, which can be difficult and time consuming to interpret.

In addition to *Salmonella*, the Assurance GDS platform includes assays for *E coli* O157:H7 (AOAC Official Method 2005.04), Shiga Toxin Genes (AOAC Official Method 2005.05), *Listeria* spp., and *Listeria monocytogenes*.

BioControl Systems, Inc.
800.245.0113
Bellevue, WA
www.biocontrolsystems.com

COMING EVENTS

SEPTEMBER

- **5–9, China Brew & Beverage 2006,** China International Exhibition Centre, Beijing, China. For more information, call 852.2865.2633; E-mail: elaine@bitf.com.hk.
- **5–12, Food Plant GMP/Sanitation and HACCP Workshops,** Chicago, IL. For more information, contact AIB International at 800.633.5137 or go to www.aibonline.org.
- **14–15, Mequoda Summit 2006,** Conference Center at Waltham Woods. For more information, contact Kim at 800.901.3556; E-mail: Kim@Mequoda.com.
- **15–19, International Symposium on Air Quality and Waste Management for Agriculture,** Omni Interlocken Resort, Broomfield, CO. For more information, go to www.asabe.org.
- **17–20, World Grains Summit: Foods and Beverages,** San Francisco, CA. For more information, contact Kayleen Larson at 651.454.7250; E-mail: klarson@scisoc.org.
- **19–20, Food Safety and Risk Management,** Chicago, IL. For more information, contact Marisse. Downie at 246.417.5391; E-mail: marissed@marcusevansbb.com.
- **19–21, 3rd International Symposium Milk Genomics & Human Health,** Brussels, Belgium. For more information, contact Jennifer Giambroni at 322.733.9888; E-mail: info@cdrf.org.
- **19–21, Developing and Implementing Food Safety Programs,** Hilton Garden Inn, Baltimore, MD. For more information, call AIB International at 800.633.5137 or go to www.aibonline.org.
- **19–21, New York State Association for Food Protection Annual Meeting,** Wyndham Hotel, Syracuse, NY. For more information, contact Steve Murphy at 607.255.2893; E-mail: scm4@cornell.edu.
- **20, Seventh Annual Illinois Food Safety Symposium,** Hotel Pere Marquette, Peoria, IL. For more information, contact Jayne Nosari at 217.785.2439; E-mail: jnosari@idph.state.il.us.
- **20–21, The 7th EurepGAP Global Conference, "The Global EurepGAP Event for Revision and Implementation,"** Prague, Czech Republic. For more information, call 49.(0) 221.579 93.33; E-mail: giesen@foodplus.org.
- **25–29, Food Safety Management (FSMS) ISO 22000 Combined Internal/Lead Auditor Workshop,** Toronto, Ontario, Canada. For more information, call 905.889.6800; E-mail: nextstep@pathcom.com.
- **26–28, Washington Association for Food Protection,** Campbells Resort, Lake Chelan, WA. For more information, contact Stephanie Olmsted at 425.455.8953; E-mail: stephanie.olmsted@safeway.com.
- **27–29, Food Safety Education Conference "Reaching At-risk Audiences and Today's Other Food Safety Challenges,"** Adam's Mark Hotel, Denver, CO. For more information, go to www.fsis.usda.gov/denver2006.

OCTOBER

- **3–4, Advancing Your HACCP Program: Integrating Process Controls with HACCP and Quality Control to Improve Profits,** University of Georgia, Athens, GA. For more information, contact Eve Mayes at ebmayes@uga.edu; or go to www.EFSonline.uga.edu/calendar.htm.
- **9–11, SQFI Food Safety Certification Conference,** Hyatt Hotel, Crystal City, VA. For more information, go to www.fmi.org.
- **9–13, Wisconsin Cheese Technology Short Course,** University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Bill Wendorff at 608.263.2015 or go to www.cdr.wisc.edu.
- **10–11, Associated Illinois Milk, Food and Environmental Sanitarians,** Stoney Creek Inn, East Peoria, IL. For more information, contact Steve DiVencenzo at 217.785.2439; E-mail: adivince@idph.state.il.us.
- **10–12, Prerequisites for Food Safety and Security,** The Atherton Hotel, State College, PA. For more information, call 814.865.8301; E-mail: shortcourse@psu.edu.
- **11, College of Agricultural Sciences Career and Internship Fair,** Colorado State University, Fort Collins, CO. For more information, contact Judi Blum at 970.491.3721; E-mail: judi.blum@colostate.edu.
- **11–13, 2006 Food Safety Supply Chain Conference,** Grand Hyatt Hotel, Washington, D.C. For more information, E-mail jkendzel@fmi.org.
- **14–17, 26th Food Microbiology Symposium,** University of Wisconsin-River Falls, River Falls, WI. For more information, call 715.425.3704 or go to www.uwrf.edu/food-science.
- **18–19, Iowa Association for Food Protection Annual Meeting,** Quality Inn, Ames, IA. For more information, contact Phyllis Borer at 712.754.2511 ext. 33; E-mail: borerp@ampi.com.
- **25–26, Nano and Microtechnologies in the Food and Health Food Industries,** NH Grand Hotel Krasnapolsky, Amsterdam. For more information, call 44.(0)1786.447520; E-mail: carrie.smith@nano.org.uk.

IAFP UPCOMING MEETINGS

JULY 8-11, 2007
Lake Buena Vista, Florida

AUGUST 3-6, 2008
Columbus, Ohio

JULY 12-15, 2009
Grapevine, Texas

NOVEMBER

- **1, Ohio Association of Food and Environmental Sanitarians,** Ohio Dept. of Agriculture, Reynoldsburg, OH. For more information, contact Gloria Swick-Brown at 614.466.7760; E-mail:gloria.swick-brown@odh.ohio.gov.
- **4–8, American Public Health Association's 134th Annual Meeting and Expo,** Boston, MA. For more information, call 202.777.APHA or go to www.apha.org.
- **6–8, The 4th World Mycotoxin Forum,** Hilton Cincinnati Netherland Plaza, Cincinnati, OH. For more information, call 31.30. 229 42 47; or go to www.bastiaanse-communication.com.
- **7–8, Cheese Grading and Evaluation Short Course,** University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Scott Rankin at 608.263.2008 or go to www.cdr.wisc.edu.
- **30–Dec. 1, IAFP's Second European Symposium on Food Safety, "Innovations in Food Safety Management,"** Fira Palace Hotel, Barcelona, Spain. For more information, contact IAFP at 800.369.6337; E-mail: info@foodprotection.org.

ADVERTISING INDEX

CAREER SERVICES SECTION

THE UNIVERSITY OF GEORGIA
Center for Food Safety

Assistant Professor, Food Microbiologist

POSITION:

Assistant Professor, tenure-track, 100% research position. Center for Food Safety, College of Agricultural and Environmental Sciences, University of Georgia, Griffin, Georgia.

MAJOR RESPONSIBILITIES:

The successful candidate will develop a research program in the area of food microbiology and contribute to outreach programs of the Center for Food Safety. Research on methods for detecting and controlling foodborne pathogenic bacteria or viruses will be the focus of the program. Securing extramural funding for research and recruitment and advising graduate students will be expected. In addition to developing his/her own research program, the successful candidate will be expected to work cooperatively with other faculty and staff and industry personnel.

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A Ph.D. in Food Microbiology, Food Science (with an emphasis on Food Microbiology), or closely related field will be highly desired. Experience with microbial genetics would be advantageous. Women and minorities are encouraged to apply.

APPLICATION PROCEDURE:

Submit a curriculum vitae detailing background and capability to conduct research and outreach, a transcript of academic records, and the names, postal addresses, telephone numbers, and e-mail addresses of five (5) references to:

Dr. Larry R. Beuchat
Chair, Search Committee
Center for Food Safety
University of Georgia
1109 Experiment Street
Griffin, Georgia 30223-1797
Tel: 770-412-4740; Fax: 770-229-3216
e-mail: lbeuchat@uga.edu

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Research Notes

ERRATUM

In the article "Reduction of *Campylobacter jejuni* on Chicken Wings by Chemical Treatments" by Zhao and Doyle, *Journal of Food Protection* 69(4):762–767, in the third line under the Results section on p. 763, 1% lactic acid should be 0.1% lactic acid. The percentage of lactic acid listed in Table 1 on p. 764 as a chemical treatment should be 0.1%, not 1%. The first sentence of the first full paragraph on p. 765 should be, "Acetic acid was more bactericidal to *C. jejuni* than lactic acid at an equivalent concentration of 0.1%, however, the pH of the acetic acid treatment was 2.9 compared with pH 5.4 for lactic acid."

* Author, indicates author for correspondence

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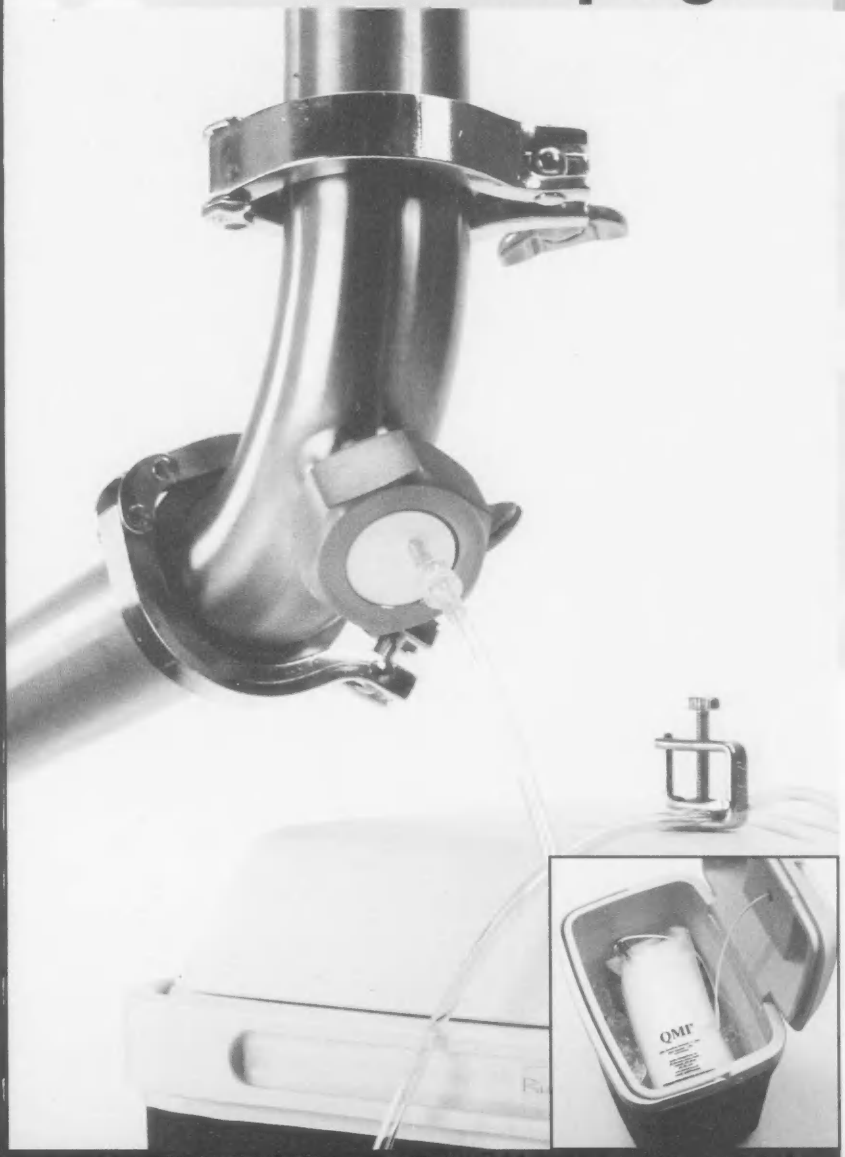

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