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FOOD PROTECTION TRENDS

SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

FEBRUARY 2005

www.foodprotection.org

The International Association for Food Protection (IAFP) Foundation Fund was established in the 1970s to support the mission of IAFP – "To provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

IAFP *Foundation* FUND

We live in a global economy and the way food is grown, processed, and handled can impact people around the globe. From a public health perspective, it often provides unique challenges to the food safety professional. Combine these issues with the complexity of protecting the food supply from food security threats and the challenges seem overwhelming. However, with your support the Foundation can make an impact on these issues. Funds from the Foundation could help to sponsor travel for deserving scientists from developing countries to our Annual Meeting, sponsor international workshops, and support the future of food scientists through scholarships for students or funding for students to attend IAFP Annual Meetings.

The Foundation is currently funded through contributions from corporations and individuals. A large portion of the support is provided from the Sustaining Members of IAFP. The Sustaining Membership program is a unique way for organizations to partner with the Association. Contact the Association office if you are interested in this program.

Support from individuals is also crucial in the growth of the Foundation Fund. Contributions, big or small, make an impact on the programs supported by the IAFP Foundation. Programs currently supported by the Foundation include the following:

- Ivan Parkin Lecture
- Travel support for exceptional speakers at the Annual Meeting
- Audiovisual Library
- Developing Scientist Competition
- Shipment of volumes of surplus *JFP* and *FPT* journals to developing countries through FAO in Rome

Donate Today!

It is the goal of the Association to grow the Foundation to a self-sustaining level of greater than $1.0 million over the next 10 years. This would allow the Foundation to provide additional programs in pursuit of our goal of *Advancing Food Safety Worldwide*®!

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International Association for Food Protection

FOOD PROTECTION TRENDS

VOLUME 25, NO. 2

ARTICLES

ASSOCIATION NEWS

Editor's Note:

In the November 2004 issue of *FPT* on page 824 the incorrect figure was printed. The corrected figure is on page 93 of this issue. We apologize for this error.

DEPARTMENTS

EXTRAS

Is Your Program Crumbine Material? Put it to the Test!

The Samuel J. Crumbine Consumer Protection Award for Excellence in Food Protection at the Local Level is seeking submissions for its 2005 program. The Crumbine Award is given for excellence and continual improvement in a comprehensive program of food protection at the local level. Achievement is measured by:

- Sustained improvements and excellence over the preceding four to six years;
- Innovative and effective use of program methods and problem solving to identify and reduce risk factors that are known to cause foodborne illness;
- Demonstrated improvements in planning, managing, and evaluating a comprehensive program; and
- Providing targeted outreach; forming partnerships; and fostering communication and information exchange among regulators, industry and consumer representatives.

All local environmental health jurisdictions in the U.S. and Canada are encouraged to apply, regardless of size, whether "small," "medium" or "large."

The Award is sponsored by the Conference for Food Protection, in cooperation with the American Academy of Sanitarians, American Public Health Association, Association of Food and Drug Officials, Foodservice & Packaging Institute, Inc., International Association for Food Protection, International Food Safety Council, National Association of County & City Health Officials, National Environmental Health Association, NSF International, and Underwriters Laboratories, Inc.

For more information on the Crumbine Award program, and to download the 2005 criteria and previous winning entries, please go to www.fpi.org or call the Foodservice & Packaging Institute at (703) 538-2800. **Deadline for entries is March 15, 2005.**

NFPA Food Safety Award

Nominations Wanted!

The International Association for Food Protection welcomes your nominations for the National Food Processors Association (NFPA) Food Safety Award. This award will be presented in 2005 to an individual in recognition of a long history of outstanding contributions to food safety research and education.

Eligibility: Individuals may be from government, academia, or industry including consultants. The nominee must have a minimum of 10 years of service in the food safety arena.

Nomination deadline is March 14, 2005.

Nomination criteria available
at our Web site or call our office at 800.369.6337; 515.276.3344

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FOOD PROTECTION TRENDS
SCIENCE AND NEWS
FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

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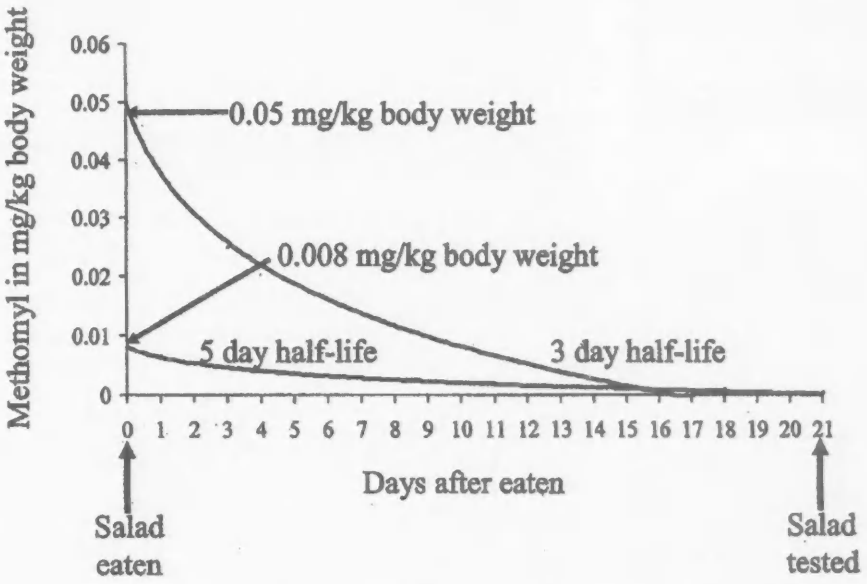
Editor's Note:

In the November 2004 issue of *FPT* on page 824 the incorrect figure was printed. The corrected figure is printed below. We apologize for this error.

FIGURE 2. Estimated ingested dose using the median weight of 69 kg for ill patrons, a salad portion size of 0.15 kg, and the 3–5 day half-life of methomyl



Future Annual Meetings

IAFP 2005

AUGUST 14-17

Baltimore Marriott
Waterfront Hotel
Baltimore, Maryland

IAFP 2006

AUGUST 13-16

Telus Convention Centre
Calgary, Alberta, Canada

IAFP 2007

JULY 8-11

Disney's Contemporary Resort
Lake Buena Vista, Florida

International Association for Food Protection

FOOD PROTECTION TRENDS

"The mission of the Association is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

Associations Make A Better World

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"A VIEW FROM WISCONSIN"

By **KATHLEEN A. GLASS**
PRESIDENT

"As an association, we can demonstrate our dedication to a safe food supply worldwide by fostering the education and professional development of students in our field"

I was prepared to forward this column to IAFP announcing a new student travel scholarship program when the massive earthquake and tsunami ravaged South Asia in late December. Early reports estimated that the catastrophe killed at least 150,000 people, injured half a million more, displaced 1 million and deprived up to 5 million of basic services. The United Nations World Food Program, FAO, WHO, and UNICEF, and many secular and faith-based nongovernmental organizations responded rapidly to provide food, safe drinking water, shelter, medical supplies, and other non-food items, and worked to restore sanitation to prevent the spread of disease. In spite of the massive effort, many areas were not immediately reached because of bureaucratic delays and impassable roads. WHO reported poor quality and quantity of water, insufficient sanitation, overcrowding, and poor hygiene in temporary camps that increased the risk for outbreaks of diarrheal disease.

This cataclysmic event brings to mind several issues. One is that we are a global community. Even though most IAFP Members live thousands of miles from the destruction, it is the responsibility of food safety professionals worldwide to ensure that safe food, proper sanitation, and thorough and sustained water purification are available to all people regardless of geography. Although the disaster occurred more than a month ago, recovery is far from complete. If you haven't done so already, I encourage you to transform your convictions into actions and send a donation to a reputable agency to aid in the recovery. Two Web sites that have links to US-based and other international agencies involved in the relief include www.reliefweb.int and www.give.org. Collectively, even our small contributions will have an impact on restoring basic services to the affected areas, help rebuild the countries' infrastructures, and assist the survivors in a return to a more normal life. Secondly, while it was impossible for the residents and tourists of South Asia to prepare for a calamity of this magnitude and rarity, it reminds us that communities and individuals should develop contingency plans to deal with more common disasters, such as floods, hurricanes, and power outages. The recently revised pamphlet *Before Disaster Strikes…A Guide to Food Safety in the Home*, including a Spanish language version, is available from IAFP. This pamphlet outlines for the consumer the basic necessities required to cope with the aftermath of disasters and reduce the risk of illness due to contaminated water and food. Lastly, as an association, we can demonstrate our dedication to a safe food supply worldwide by fostering the education and professional development of students in our field, some of whom may go on to assist victims of disasters directly or indirectly.

Currently, the IAFP Foundation Fund recognizes the talents of students and recent graduates in the area of food safety research by supporting the Developing Scientist Competition. This program rewards the top research students in oral and poster competitions at our Annual Meeting. As I reviewed the list of past winners I was reminded of a saying "*The expert at anything was once a beginner.*" Many of these students have gone on to be respected professionals in our field and have maintained their involvement in IAFP; some have been honored by IAFP through awards or election to the executive board.

Both the IAFP Strategic Plan and the Foundation Fund mission target expanding our support of future food safety scientists through

establishing scholarships and travel grants for needy students and research scientists to attend the IAFP Annual Meeting. We are putting our plans into action and are very pleased to announce new travel scholarships to be awarded to two qualified students to attend our 2005 conference. An announcement has been sent directly to faculty and student members and detailed information is posted on the IAFP Web site.

To qualify for the award, the individual must:

- Be a member of IAFP
- Demonstrate interest in and commitment to food protection as a student enrolled full-time in a food science, microbiology, toxicology, or other program related to food microbiological or toxicological safety (undergraduate or graduate level)
- Submit an application by March 14, 2005 including a cover letter, listing of completed coursework and grades, a one-page statement of interest including why the applicant wants to attend the IAFP Annual Meeting, their career aspirations, and if currently working on a research project, extent the project will enhance food safety or quality. One letter of recommendation from a faculty member or department head is also required.

This program will augment the travel grants offered by several active affiliates that support students to present research at the IAFP Annual Meeting. Our goal is to support two students in the inaugural year and expand the program thereafter. Obviously, we will not be able to support this program without increasing our budget. We will work with the Foundation Fund to solicit some support, but I challenge corporations and individuals to contribute to this program. Consider that the students who you support today may be your employees of tomorrow. Your gifts toward this program will enrich the education of these future workers, expand the breadth of their experience beyond the classroom, and provide them with opportunities to develop essential professional skills. Please contact our Executive Director, David Tharp, to get more details on how you can financially help this program to grow.

As always, I welcome your ideas and comments. Please feel free to email me at kglass@wisc.edu and let me know your view.

Student Travel Scholarship

The International Association for Food Protection and the IAFP Foundation Fund are proud to announce the establishment of a Student Travel Scholarship program.

The scholarships will provide travel funds to enable the selected students to travel to IAFP 2005 in Baltimore, Maryland, USA.

For 2005, two scholarships will be awarded. As the IAFP Foundation Fund grows, additional scholarships will be added to this program.

Full details of the scholarship program are available on the IAFP Web site at

www.foodprotection.org

Application deadline is March 14, 2005.

"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR

By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"Please take time today to review the Awards' listing and prepare a nomination"

February is a busy month for IAFP! Although it is six months prior to our Annual Meeting, much of the base work for the meeting is carried out now. The Program Committee met in late January to set the program in place for IAFP 2005 in Baltimore. Program topics are included in this issue (see page 152) and additional detail will be available on the IAFP Web site between now and August, so check the Web site often for updated program information.

In addition to the program coming together, meeting registration and hotel reservations are now open (we encourage making your hotel reservation early this year to assure your room at the host hotel). Also during February, our Exhibit Hall begins to fill up and sponsorship opportunities become more limited. If you are interested in either providing sponsorship for IAFP 2005 or exhibiting at IAFP 2005, contact the IAFP office as soon as possible to ensure your inclusion.

Very soon, all IAFP Members will receive the ballot to vote for the next IAFP Secretary (to begin service after IAFP 2005). Be sure to review the biographical information for Stan Bailey and LeeAnne Jackson and return your ballot to the IAFP office by March 18. Your vote is important!

The last item we want to encourage you to tend to is to review the list of IAFP Awards on page 120 and nominate a deserving colleague. IAFP has a full complement of Awards that are presented annually at the Annual Meeting. Sometimes over the past few years we have not received a nomination for a certain Award. This is truly a missed opportunity! We have a great number of very active, worthy Members who should be nominated to receive these Awards! Please take time today to review the Awards' listing and prepare a nomination so that we present all available Awards at IAFP 2005.

In our President's column this month, Kathy Glass announced a new, student travel scholarship program and provided details. If you are a student, you must review this information and consider submitting an application for this new scholarship! Professors are also encouraged to review the program and suggest to their students that they submit an application.

Now, as you can see, we are very busy with multiple projects and programs underway at any one time. I am sure that is not unlike what we all experience each and every day. Even when we are so busy and under pressure to complete projects according to preset timelines, we must always be extra careful to slow down and pay attention to the details. I am sorry to report that we missed a very important detail in the "2005 Member Guide" that you received last month with your January issue of *Food Protection Trends*.

On the facing page to this column, you see the IAFP Executive Board. If you compare it to what appeared in the "2005 Member Guide," you will see that our Affiliate Council Chairperson, Stephanie Olmsted's picture was omitted. Certainly, this was our error as staff and it should not have been printed the way it was. We have numerous proofing and review stages and we even look at the printed pages before binding our publications. With the holiday breaks that took place during production of the Member Guide, this critical step was overlooked. Our goal is to be extra careful during our review processes and to produce the highest quality publications possible. As you can see, we missed a very important step in our processes!

We must always follow our checklists. Sometimes that means we need to slow down just a little to be extra careful so that we avoid mistakes such as this one! I can say that in general over the last few years, we have had very few errors and for that we can all be proud. We continue to monitor our processes and make revisions for improvements and we are confident that we can continue to make publications that the Association can be proud of.

For the error of omitting Stephanie's picture from the "2005 Member Guide", we sincerely apologize.

Executive Board

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ARTICLES

Food Protection Trends, Vol. 25, No. 2, Pages 102–113

6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2864

International Association for Food Protection

Shelf Lives of Pasteurized Fluid Milk Products in New York State: A Ten-year Study

N. R. CAREY, S. C. MURPHY, R. N. ZADOKS, and K. J. BOOR*

Department of Food Science, 413 Stocking Hall, Cornell University, Ithaca, NY 14853, USA

SUMMARY

The results of an ongoing fluid milk quality evaluation program are summarized to illustrate trends in commercial fluid product shelf lives. Packaged fluid milk samples were collected from 23 dairy processing plants across New York State at least twice per year over a period of 10 years and subjected to shelf-life analyses that included Standard Plate Count (SPC), coliform count and sensory evaluation. Products were tested initially and after storage at 6.1°C for 7, 10 and 14 days post-packaging. On an annual basis, the percent of samples that met the Pasteurized Milk Ordinance (PMO) standard of SPC ≤ 20,000 CFU/ml after 7, 10 and 14 days ranged from 46% to 66%, 25% to 50% and 12% to 32%, respectively. Over the ten-year period, SPC values across test days decreased in eight plants, including the four plants that had the lowest SPC scores among all 23 plants; increased in two plants; and did not change significantly in the remaining 13 plants. The percent of samples positive for coliforms in a given year ranged from 5% to 15% on initial testing and up to 34% after subsequent storage. The percent of samples scored as unacceptable from a sensory perspective (score < 6.0) after 7, 10 and 14 days ranged from 0% to 8%, 16% to 35%, and 41% to 67%, respectively. For the majority of plants, product flavor scores improved during this 10-year period. Although some plants involved in the study can produce fluid milk products that are consumer acceptable when stored at 6.1°C for ≥ 14 days, others consistently fall short of this goal.

INTRODUCTION

In recent years, changes in milk consumption, marketing and distribution patterns have driven the need for production of fluid milk products with shelf lives of at least 14 days. From a functional perspective, shelf life can be defined as the period of time that a product retains acceptable quality under practical or recommended storage conditions. In the case of pasteurized Grade "A" fluid milk products "practical or recommended storage conditions" means storage under refrigeration at 7.2°C (45°F) or less, while "acceptable quality" of the product means satisfactory flavor, odor and appearance as judged by the consumer (i.e., no "consumer complaints") and that the milk is wholesome and safe to drink. Consumer-detectable flavor defects typically, but not always, develop in processed milk when the bacterial population of the milk reaches ≥ 10^6 CFU/ml *(11, 28)*. Regulatory requirements for sensory characteristics of milk are not well defined; however, the Grade "A" Pasteurized Milk Ordinance (PMO) states that bacterial counts must not exceed 20,000 CFU/ml and that coliform bacteria counts must not exceed 10 CFU/ml *(12)*. Although PMO bacterial standards apply throughout the period when milk products are offered for sale, the standards are generally not enforced through the code date.

Factors that influence pasteurized fluid milk quality and shelf life include the overall quality and specific microflora of the raw milk supply *(7, 16, 18, 19, 23, 26)*, the design and effectiveness of the

A peer-reviewed article

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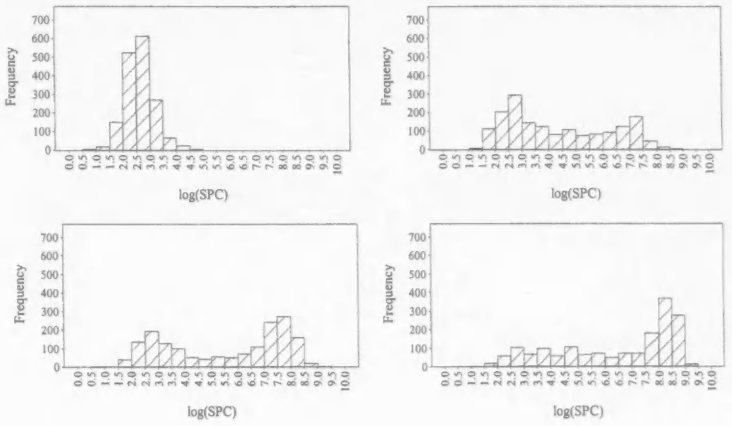
FIGURE 1. Distribution of log (SPC) of 1,667 milk samples collected from 1991 to 2000 at 23 dairy plants on initial test day (upper left panel), and after 7 (upper right panel), 10 (lower left panel) and 14 (lower right panel) days of storage at 6.1°C (43°F)



processing and handling parameters at the plant *(3, 10, 17)*, cleaning, sanitation and maintenance programs *(3, 25, 29)*, and the level of product protection (e.g., from light or absorbed flavors) and refrigeration during transportation, retail distribution and consumer possession *(2, 4)*. Regarding shelf life, the most common cause of reduced quality is the presence of spoilage organisms that contaminate the milk post-pasteurization *(9, 17, 25, 27, 29)*. The rate at which spoilage characteristics become apparent is dependent on the types and numbers of microorganisms and the subsequent storage temperature *(11)*.

Fluid milk quality and shelf life are assessed by sensory, chemical and microbiological analyses. These types of analyses may be used to measure quality from the time that milk leaves the cow to the time of consumption of the final product *(2, 4, 5, 6, 8, 21, 24)*. Shelf-life potentials for fluid milk are commonly determined after holding products at refrigeration temperatures near the upper limit allowed for Grade "A" fluid milk [6.1–7.2°C (43–45°F)] *(12)*. Refrigerated storage at these upper limits may reflect temperatures commonly encountered in retail settings and also will allow product defects and sanitation deficiencies to become more evident than in products stored at more ideal temperatures [≤ 4°C (39.2°F)].

The "sell-by," "code" or "expiration" dates that are stamped on retail milk packages are intended to reflect the potential shelf life of that product. Consumers are taught to expect an additional 2–5 days of acceptable product quality following the printed date *(14)*. Code-dating applications vary depending on state regulations and processor policies. For example, requirements for pasteurized milk within New York State represent two extremes; currently, for the New York City (NYC) metropolitan area, "the expiration date shall not be more than nine calendar days following the date of pasteurization" *(1)*, while no specific code date requirements exist for milk sold in the remainder of NY State. With the exception of milk processed for NYC, the majority of processors in NY use code dates ranging from 12 to 21 days post-processing. In 2003, the average code date in New York State was ~15 days, with a few processors choosing not to provide a sell-by date. Other states, such as Pennsylvania, have specific regulatory guidelines for maximum code dates. From a standpoint of retaining consumer confidence, it is important that processors use code dates that accurately reflect the shelf-life potential of their products.

Although much experimental work has been performed in the area of fluid milk shelf life, few recent comprehensive observational studies of commercial samples collected directly from dairy plants have been published. This paper presents a summary of shelf-life data for pasteurized fluid milk samples collected from 23 commercial processing plants over a period of 10 years in New York State.

MATERIALS AND METHODS

Dairy plants and sample collection

Samples were collected from twenty-three fluid milk processing plants across New York State (NYS) over the 10-year period between 1991 and 2000. Samples collected represented nearly all fluid milk processed in NYS. Plants were sampled 3 times per year during 1991–1992 and 2 times per year from 1993 to 2000. The plants involved in the study varied in size, available processing equipment and milk volume. Estimated per-plant monthly fluid sales ranged from 51,000 lbs to 43,000,000 lbs. Milk samples were collected at random from storage coolers at each plant during unannounced visits. The types of samples collected at each plant depended on their product line, but included whole (3.25% milk fat minimum), reduced fat (1.5% or 2% milk fat), lowfat (1% milk fat) and nonfat milk products packaged in gallon (3.8 l) or half-gallon (1.9 l) high density polyethylene (HDPE) jugs or half-gallon (1.9 l) paperboard cartons. The only products available from two plants in the study were packaged in glass quarts (0.96 l). All samples were collected on a Monday or Tuesday, with the majority of the milk processed on either of these days. A small percentage of milks (< 0.03%) had been processed Friday through Saturday of the previous week. Milk samples were transported to the laboratory on ice in coolers and kept at 4°C or less until the initial test day, i.e., the Wednesday falling one to two days after collection, or four to five days for samples processed on Friday or Saturday.

Sample handling and shelf-life storage

Each milk sample was aseptically distributed among four sterile 500-ml glass bottles (~400 ml/bottle) after 25 complete inversions of the commercial container. When only quart containers were available, two containers were inverted as just described and the contents combined in a sterile bottle before being mixed again and distributed. One 500-ml bottle was used for initial day testing, while the other 3 bottles were subsequently stored at 6.1°C (43°F) for testing at 7, 10, and 14 days post-packaging.

Quality and shelf-life evaluations

For each test day, all samples were subjected to Standard Plate Count (SPC), coliform bacteria count and sensory evaluation. SPC and coliform counts were performed according to Standard Methods for the Examination of Dairy Products, 16th ed. *(20)*. Presumptive coliform colonies found on violet red bile agar were confirmed by use of the brilliant green bile broth method. Only confirmed coliform counts were reported. Serial dilutions of

TABLE 1. Percent of milk samples collected annually with SPC ≤ 20,000 CFU/ml or > 1,000,000 CFU/ml tested at initial, 7, 10 and 14 days over the ten-year period 1991 to 2000

	% Samples Each Test Day[a] With SPC ≤ 20,000 CFU/ml				% Samples Each Test Day[a] With SPC Counts > 1,000,000 CFU/ml			
Year (Samples)	Initial	Day 7	Day 10	Day 14	Initial	Day 7	Day 10	Day 14
1991 (217)	100	55	41	24	0	24	49	59
1992 (236)	100	46	34	20	0	36	59	66
1993 (158)	99[b]	47	25	12	0	28	58	70
1994 (157)	100	48	32	17	0	34	59	67
1995 (153)	99[b]	59	41	24	0	24	50	58
1996 (142)	100	61	35	20	0	25	51	65
1997 (150)	100	54	37	22	0	27	54	63
1998 (153)	100	61	42	27	0	25	53	58
1999 (150)	99[b]	63	45	31	0	21	46	57
2000 (151)	99[b]	66	50	32	0	19	42	53

[a]Initial testing performed 1–2 days after processing. Milk samples were subsequently stored at 6.1°C and tested after 7, 10 and 14 post-packaging. All percentages were rounded to the nearest integer.

[b]Number of samples testing > 20,000 on initial testing for 1993, 1995, 1999, and 2000 were 2, 2, 1 and 1, respectively.

milk samples were prepared for both SPC and coliform bacteria counts as needed, based on counts of previous test days and in some cases on the quality history of the specific plant. Sensory evaluations were performed in accordance with the guidelines of the American Dairy Science Association as described by Bodyfelt et al. *(6)* to generate an average acceptability score from individual scores that had been assigned for a given product by 6 to 8 trained panelists. Personnel serving as panelists changed over the 10-year period. Milk samples were scored on a scale of 1–10, with 9 or 10 considered "excellent" whereas scores of less than 6 were considered "unacceptable".

Statistical analyses

Univariate analysis of data on SPC, coliform count, and flavor score was performed by use of SAS 8.02 (SAS Institute Inc., Cary, NC, USA). None of the count data, flavor scores or log-transformed data were normally distributed. Rather, two populations of values that were approximately normally distributed were observed for log-transformed SPC, log-transformed coliform counts and flavor scores; one reflected observations for good quality milk and the other reflected observation for poor quality milk. To be able to analyze the dataset across all outcome values, non-parametric testing was used. Because of computational limitations, cor-

TABLE 2. Percent of milk samples collected annually with coliform bacteria counts ≤ 1 CFU/ml when tested initially and after 7, 10 and 14 days post-processing at 6.1°C over the ten-year period 1991 to 2000[a]

	% Samples Each Test Day[a] With Coliform Counts ≤ 1 CFU/ml			
Year (Samples)	Initial	Day 7	Day 10	Day 14
1991 (217)	86	73	72	74
1992 (236)	87	68	68	66
1993 (158)	91	77	72	72
1994 (157)	85	72	68	68
1995 (153)	90	78	75	79
1996 (142)	91	77	75	77
1997 (150)	95	83	82	79
1998 (153)	93	76	74	72
1999 (150)	91	76	72	76
2000 (151)	94	82	77	79

[a]Initial testing performed 1–2 days after processing. Milk samples were subsequently stored at 6.1°C and tested after 7, 10 and 14 post-packaging. All percentages were rounded to the nearest integer.

relations between repeated measures (e.g., repeated SPC measurements within plant, multiple flavor scores per panelist) and interactions between variables could not be calculated.

Non-parametric analyses were performed in Statistix 8.0 (Analytical Software, Tallahassee, FL, USA) by Kruskal-Wallis (KW) one-way analysis of variance (ANOVA). This analysis is based on the rank of the observation in the total dataset rather than on the actual value of the observation. The effect of test day (1, 7, 10 and 14); as categorical variable, year (1991–2000); as categorical variable, and milk type (whole, reduced fat, low fat, nonfat), on SPC, coliform count and flavor score was examined across and within plants. In addition, the effect of plant on SPC, coliform count and flavor score was analyzed statistically. The association between SPC, coliform count, flavor score, and year (1991–2000, as continuous variable) was also tested by Spearman rank correlation. Like the Kruskal-Wallis ANOVA, this correlation is based on ranks and is suitable for examining the degree of association for data that are not normally distributed. Statistical significance was declared at $P < 0.05$.

Although average values do not accurately reflect the actual distribution of the data, which was often bimodal, they are used in some tables (e.g., Table 3) and figures (e.g., Fig. 3) because it is intuitively easier to interpret average values than alternative presentations of the data and because a change in average value does reflect a shift in the data distribution.

RESULTS

Sample summary

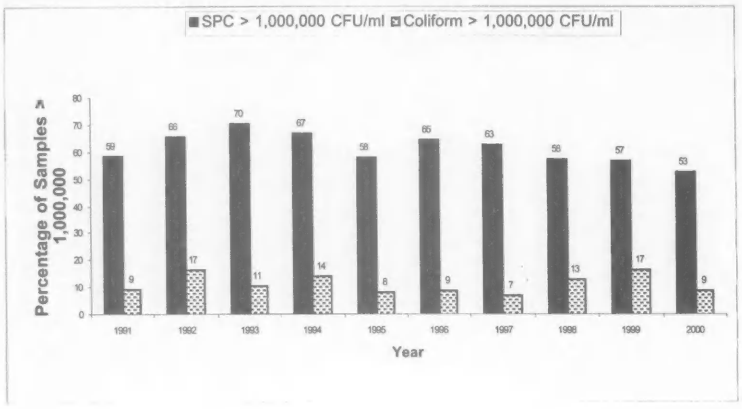
From January 1991 to December 2000, 1,667 samples of pasteurized commercially packaged fluid milk were collected from 23 participating dairy plants. In total, the samples tested over the 10-year period consisted of 475 whole (3.25% fat minimum), 441 reduced fat (1.5% or 2% fat), 309 lowfat (1% fat) and 442 nonfat milk samples.

Standard plate count

The distribution of SPC values for all plants and all years is depicted in Figure 1. Results for days 7, 10 and 14 show a bimodal distribution, with a decreasing number of milk samples of good quality (log SPC centered around 2.5 to 3.0) and a growing number of milk samples with loss of quality (log SPC centered around 7.0 to 8.5). Across all plants and years, SPC increased significantly over storage time (Kruskal-Wallis ANOVA, $P < 0.001$, with average results from each test day significantly different from those of other test days).

Table 1 summarizes the percentage of samples each year with bacteria counts ≤ 20,000 CFU/ml for initial day and at 7, 10 and 14 days post-packaging. Nearly all of the pasteurized milks tested met the legal SPC standard for pasteurized milk of ≤ 20,000 CFU/ml when tested initially, except for 1 or 2 samples tested for each of 4 collection years (1993, 1995, 1999, and 2000). Over the ten-year period, initial day SPC values were < 500, < 1000 and ≤ 20,000 CFU/ml in 56%, 77% and 99.6% of the total number of samples tested, respectively. After 7 days, only 46% to 66% of the samples met the PMO standard of 20,000 CFU/ml on an annual basis; the proportion of samples meeting this criterion decreased to 25% to 50% after 10 days and to 12% to 32% after 14 days. Of the total number of samples tested with > 20,000 CFU/ml SPC on day 7, 96% had

FIGURE 2. Percent of day 14 samples with either SPC values or coliform counts >1,000,000 CFU/ml for samples collected from the years 1991 to 2000



> 1,000,000 and 93% had > 10,000,000 CFU/ml at day 14.

The percentage of samples with SPC values > 1,000,000 CFU/ml during each year are also given in Table 1. Although no samples exceeded this limit on the initial test day, 19% to 36% of the samples exceeded this level after 7 days. After 10 and 14 days, the percentages ranged from 42% to 59% and from 53% to 70%, respectively. At the end of the study (in the year 2000), the average code dating used by the plants was 13.9 days. Although a number of plants use code dates that are 14 days or longer, more than 50% of the samples tested at day 14 had counts that exceeded 1,000,000 CFU/ml, suggesting that these milk samples could have warranted consumer complaints *(11, 28)*.

Across all test days, there was a significant but very low correlation between SPC and year (Spearman rank correlation coefficient = -0.05, $P < 0.0001$), implying that there was a slightly decreasing trend in average SPC over the years. On a per test-day basis, the correlation between SPC and years was significant for days 7 (Spearman rank correlation coefficient = -0.11, $P < 0.0001$) and 10 (Spearman rank correlation coefficient = -0.07, $P < 0.01$), but not for days 1 and 14, showing that the decrease in average SPC over the years predominantly reflects improved milk quality at days 7 and 10 without any significant improvement in SPC values for days 1 and 14.

Coliform count

Coliform counts were determined for all samples tested. While the established limit for coliforms in pasteurized Grade "A" milk is 10 CFU/ml *(12)*, any level of coliform bacteria detected in a product suggests the occurrence of post-pasteurization contamination. Therefore, our analyses were focused on detection of the presence of coliforms, rather than on detection of 10 CFU/ml. Percentages of samples in which coliforms were not detected initially and after 7, 10 and 14 days post-processing are shown in Table 2.

Overall, 90% (range 85–95%) of all the samples tested were coliform-negative on initial testing, i.e., they had < 1 coliform CFU/ml. Coliform counts were significantly lower on initial test days than on days 7, 10 and 14 ($P < 0.001$). Differences between counts on days 7, 10 and 14 were not significant. At day 14 post-packaging, only 66% to 79% of a given year's samples were coliform-negative, indicating that a number of initial coliform-negative samples became coliform-positive ($\geq$ 1 CFU/ml) during storage. In 7% to 17% of the samples, psychrotrophic growth of coliforms resulted in counts exceeding 1,000,000 CFU/ml at day 14 over the 10-year period (Fig. 2). No trend is apparent in the proportion of samples exceeding 1,000,000 coliforms/ml during this 10-year period; however, our data demonstrate that psychrotrophic coliform bacteria can contribute to high bacterial numbers in pasteurized fluid milk products. Across all test days, there was a significant, but very low, correlation between coliform counts and years (Spearman rank correlation coefficient = -0.06, $P < 0.0001$), showing a decreasing trend in coliform counts similar to that observed for SPC over the years. On a per-test-day basis, the correlation between coliform counts and years was significant for days 1 (Spearman rank correlation coefficient = -0.08, $P < 0.001$), 7 (Spearman rank correlation coefficient = -0.07, $P < 0.01$), and 14 (Spearman rank correlation coefficient = -0.05, $P < 0.05$), but not for day 10. Considering that the improvement in coliform counts is similar for days 1, 7 and 14, it is possible that an improvement in 10-day coliform counts occurred but was obscured by high random variability in day 10 data.

Association between SPC and coliform counts

Table 3 provides a comparison of the average SPC values of coliform-negative samples versus coliform-positive samples. Both detection of coliforms on initial testing and detection of coliforms on any test date are shown. SPC was higher in samples with coliform bacteria than in samples that never tested positive for coliforms (Kruskal-Wallis one-way ANOVA, $P < 0.001$). There was no significant difference in SPC among samples that tested positive for coliforms on the initial test day or any subsequent test day. In samples that were coliform-positive on the initial test day, coliform counts were significantly higher on days 7, 10 and 14 than on day 1, and on day 14 compared to day 7 (Kruskal-Wallis one-way ANOVA, $P < 0.05$). Of the initial day coliform-negative samples, 420 (28%) became coliform positive on a subsequent test day. Coliform counts in those samples for days 7, 10 and 14 were not significant different from each other. Overall, there was a significant positive correlation of modest strength between SPC values and coliform counts (Spearman rank correlation coefficient = 0.44, $P < 0.0001$), meaning that although SPC and coliform counts tend to increase together, there is no strong relationship between the two values. Clearly, high coliform counts cannot occur without high SPC values, as coliforms are included in SPC, but SPC values can be high without coliform counts being high, as shown in Fig. 2. On test day 1, the correlation between SPC and coliform count was weak (Spearman rank correlation coefficient = 0.11, $P < 0.0001$), reemphasizing the fact that coliform counts contributed only slightly to SPC on the initial test day, but for each of the remaining test days the correlation was moderate to good (Spearman rank correlation coefficient = 0.52, 0.53 and 0.50 for days 7, 10 and 14, respectively, $P < 0.0001$ for each day), showing that coliform counts became more important contributors to total SPC values during storage. In many samples, microbial growth to high levels

TABLE 3. Average coliform counts and SPC values for initial day coliform-negative samples (< 1 CFU/ml) versus initial day coliform-positive samples (≥ 1 CFU/ml) and average SPC values for all day coliform-negative samples versus any day coliform-positive samples

	Coliform-Negative Initial Day Versus Coliform-Positive Initial Day				Coliform-Negative All Days Versus Coliform-Positive Any Day	
	Average Log Coliform Count		Average Log SPC		Average Log SPC	
Test Day[a]	Initial Day Coliform Negative[b]	Initial Day Coliform Positive[c]	Initial Day Coliform Negative[b]	Initial Day Coliform Positive[c]	All-Coliform Negative[d]	Any-Coliform Positive[e]
Initial	0.00	0.40	2.62	2.79	2.58	2.74
Day 7	0.33	2.02	4.19	5.97	3.61	5.76
Day 10	0.68	3.02	5.37	7.10	4.72	7.05
Day 14	0.96	3.79	6.32	7.90	5.72	7.87
Number	1499	168	1499	168	1079	588

[a]Initial testing performed 1–2 days after processing. Milk samples were subsequently stored at 6.1°C and tested after 7, 10 and 14 post-packaging.

[b]Initial coliform-negative includes all samples where coliform counts were < 1 CFU/ml on initial testing.

[c]Initial coliform-positive includes all samples where coliform counts were ≥ 1 CFU/ml on initial testing.

[d]All coliform-negative includes all samples where coliform counts were < 1 CFU/ml on all test days.

[e]Any coliform-positive includes all samples where coliform counts were ≥ 1 CFU/ml on any test day.

occurred in the absence of detectable coliform bacteria. To illustrate, of the total samples tested that had > 1,000,000 CFU/ml SPC at 14 days, 48% were coliform-negative on all test days.

Sensory results

Milk samples with flavor scores < 6.0 in this study were considered unacceptable, with the potential to warrant consumer complaints. The percentages of samples at each test period that were scored as unacceptable during the 10-year period are shown in Table 4. A low number of samples were scored < 6.0 on initial testing, with perceived defects suggestive of poor raw milk quality, inadequate handling procedures or light-induced off-flavors. At 7 days post-packaging, the percentage of unacceptable samples ranged from 0% to 8%. Samples that were considered unacceptable initially but that were scored ≥ 6.0 after 7 days were observed (e.g., in 1995 and 1997). A few samples initially criticized as having "light-induced" defects were scored less severely after 7 days, supporting previous observations that some pronounced flavor notes associated with this defect dissipate during storage *(21)*. After 10 and 14 days post-packaging, 16% to 35% and 41% to 67% of the samples tasted were considered unacceptable, respectively, during the 10-year period. During the second half of 1999 and all of 2000, panelists did not taste milk samples that had had coliform counts > 10 CFU/ml in the previous sampling period. As a consequence, the "not tasted due to high coliform" samples were included as unacceptable in the calculations (equivalent to score of < 6.0) in the percent of samples that had flavor scores of < 6.0 for the 7, 10 and 14 day results for 1999 and 2000. The percentages in parentheses for 1999 and 2000 were determined only from those samples actually tasted. The major defects identified by the panelists that resulted in unacceptable flavor scores over shelf life were generally typical off-flavors associated with spoilage by gram-negative psychrotrophic bacteria. Frequent criticisms included "fruity," "bitter," "rancid," "unclean" and "coagulated." The possibility of similar defects associated with gram-positive spoilage [e.g., *Bacillus* spp.; *(22)*] cannot be entirely ruled out in this study. However, the specific defects observed, in parallel with the presence of high numbers of bacteria at < 14 days post-processing, are typical of spoilage by gram-negative psychrotrophs *(11, 13)*. The proportion of acceptable milk samples was significantly higher for the years 1998–2000 than for the years 1992–1994 (Kruskal-Wallis one-way ANOVA, $P < 0.05$).

Association between SPC and flavor

SPC values were compared to flavor scores in an attempt to find a statistical correlation and to assess the usefulness of elevated SPC as an indicator of flavor

TABLE 4. Percent of milk samples collected annually with flavor scores < 6.0, indicating product failure at initial, 7, 10 and 14 days over the ten-year period 1991 to 2000[a]

	% Samples Each Test Day[a] With Sensory Scores < 6.0			
Year (Samples)	Initial	Day 7	Day 10	Day 14
1991 (217)	3	5	25	51
1992 (236)	2	8	35	67
1993 (158)	0	5	25	66
1994 (157)	0	7	24	63
1995 (153)	2	1	18	52
1996 (142)	0	1	16	46
1997 (150)	1	0	21	50
1998 (153)	1	3	18	41
1999[b] (150)	0	7 (6)	24 (19)	41 (34)
2000[b] (151)	0	7 (3)	20 (8)	43 (29)

[a]Initial testing performed 1–2 days after processing. Milk samples were subsequently stored at 6.1°C and tested after 7, 10 and 14 post-packaging. All percentages were rounded to the nearest integer.

[b]Samples tested during 1999 and 2000 were not tasted if the coliform count on any previous test date was >10 CFU/ml. For 1999 the number of samples "not tasted due to high coliforms" were 1, 9 and 15 at 7, 10 and 14 days post-processing, respectively. For 2000 the number of samples "not tasted due to high coliforms" were 7, 21 and 30 at 7, 10 and 14 days post-processing, respectively. Percentages of samples with scores < 6.0 reported for these years included the "not tasted due to high coliform " samples as unacceptable (flavor score < 6.0). Percentages in parentheses represent the number of failed samples (score < 6.0) of only those that were actually tasted. Totals tasted for 1999 were 149, 141 and 135 at 7, 10 and 14 days post-processing, respectively. Totals tasted for 2000 were 144, 130 and 121 at 7, 10 and 14 days post-processing, respectively.

defects. There was a significant and strong negative correlation between SPC and flavor (Spearman rank correlation coefficient = -0.65, $P < 0.0001$; coliform-positive samples in 1999 and 2000 were excluded from tasting and hence from calculations), but the sensitivity, specificity and predictive value of SPC as an indicator of consumer acceptability were poor. The number and percentage of flavor scores that were either "acceptable" (score ≥ 6.0) or "unacceptable" (score < 6.0) over the range of SPC values are presented in Table 5. While milk samples with higher counts (e.g., > log 7.0) are more likely to be perceived as "unacceptable," unacceptable milk samples were also found at lower SPC levels (e.g., log < 4.0) and "acceptable" milks were found at higher SPC levels (e.g., > log 8.0). The distribution indicates that there are no specific "cut-off" SPC values for determining milk spoilage. This observation supports the premise that the development of defects in milk is dependent not only on the numbers of microorganisms, but on the types and their enzymatic capabilities, which may vary substantially *(11, 26)*. Other variables can include the quality of the raw milk and defects related to handling. For all SPC ranges, the proportion of unacceptable milk samples increased, as holding time increased and flavor scores dropped as holding time increased.

Milk types

The average SPC values, coliform counts and flavor scores based on milk type (whole, reduced fat, low fat and nonfat) are shown in Fig. 3. This study did not show any significant differences between the different milk types with respect to SPC or coliform count. Across all plants, flavor scores for low fat milk were significantly higher than those for whole milk on day 14 but not on any other day (Kruskal-Wallis one-way ANOVA, $P < 0.01$). Neither low-fat milk nor whole milk differed significantly from reduced fat or nonfat milk with respect to flavor.

During this study, not all plants produced low-fat milk; therefore, we hypothesized that the apparent higher flavor quality of low-fat milk compared to whole milk on day 14 may have reflected higher overall milk quality in products from plants that produced low fat milk than from those that did not. Thus, the analysis of the relation between flavor and milk type was repeated for only those plants that produced all milk types. These analyses showed that flavor scores were higher for reduced-fat and low-fat milk

TABLE 5. Distribution of "Acceptable" (flavor score ≥ 6.0) and "Unacceptable" (flavor score < 6.0) milk flavor scores compared to SPC values at initial, 7, 10 and 14 days for all milk tested 1991–2000[a]

		Initial		Day 7		Day 10		Day 14	
Log SPC Range		≥ 6.0	< 6.0	≥ 6.0	< 6.0	≥ 6.0	< 6.0	≥ 6.0	< 6.0
< 4.0	n	1620	15	862	5	571	17	291	36
	(%)[b]	(99)	(1)	(99)	(1)	(97)	(3)	(89)	(11)
4.0-5.0	n	31	1	189	3	90	2	132	18
	(%)[b]	(97)	(3)	(98)	(2)	(98)	(2)	(88)	(12)
5.0-6.0	n	0	0	153	2	104	3	121	28
	(%)[b]	-	-	(99)	(1)	(97)	(3)	(81)	(19)
6.0-7.0	n	0	0	196	10	154	17	91	32
	(%)[b]	-	-	(95)	(5)	(90)	(10)	(74)	(26)
7.0-8.0	n	0	0	184	42	335	161	107	127
	(%)[b]	-	-	(81)	(19)	(68)	(32)	(46)	(54)
>8.0	n	0	0	5	8	23	160	45	594
	(%)[b]	-	-	(38)	(62)	(13)	(87)	(7)	(93)

[a]Initial testing performed 1–2 days after processing. Milk samples were subsequently stored at 6.1°C and tested after 7, 10 and 14 post-packaging. Percentages were rounded to the nearest integer.

[b]Percentages are based on total samples ("acceptable" plus "unacceptable") for each test day within each SPC.

than for nonfat milk across all test days, while scores for whole milk did not differ significantly from those for other milk types (Kruskal-Wallis one-way ANOVA, $P < 0.001$). On days 1 and 7, flavor scores for whole, reduced-fat and low-fat milk did not differ from each other, but all were better than flavor scores for nonfat milk. On days 10 and 14, flavor scores did not differ between milk types. Thus, in an analysis across all plants, including those that did not produce low-fat milk, the higher flavor scores for low-fat milk compared to whole milk on day 14 can indeed be attributed to plant bias. For those plants that produce all milk types, there is no difference in flavor scores among milk types on day 14. However, across all plants, low-fat milk flavor scores were positively influenced by a greater proportion of products from plants with relatively high milk quality, resulting in relatively high flavor scores for low-fat products on day 14. As whole milk products were manufactured by all plants, including those with quality concerns, average flavor scores were lower for whole milk than for low fat milk on day 14. These results support the previous observation of "processing plant" as an important variable that influences processed product quality *(13)*.

Plant-specific results

While the data summarized previously were based on all samples from all plants, shelf-life trends differed among the 23 plants participating in the study. Figure 4 shows the ranking of plants based on average SPC value for day 14, as well as the average coliform counts and flavor scores for the plants. Ranks based on all test days were similar to those based on scores for test day 14. Across all test days, eight groups of plants could be identified for which the ranking of SPC values did not differ significantly from the rest of the plants in that group. For example, SPC for plants ranked 1 through 4 in Fig. 4 formed a homogeneous group, i.e., did not differ significantly from each other, but the group of four plants had significantly lower SPC values than all other plants in the study (Kruskal-Wallis one-way ANOVA, $P < 0.05$). For coliform counts and flavor score, many significant pair-wise differences between plants were identified (for 51% and 38% of 253 pair-wise comparisons, respectively) but there was no consistent clustering of plants into groups. On day 14, many significant pair-wise differences between plants with respect to SPC and coliform count were identified (for 51% and 30% of 253 pair-wise comparisons, respectively) but clusters could not be formed, while eight overlapping groups could be identified for flavor score.

Over the ten year period, SPC values across test days decreased in eight plants, including the four that had the lowest SPC scores among all 23 plants; increased in two plants; and did not change significantly in the remaining 13 plants. During the same period, coliform counts decreased in nine plants; increased in two plants; and did not change significantly in 12 plants. Of the 8 plants showing a decrease in SPC values, four showed a decrease in coliform counts as well. Of the 2 plants with increased SPC values,

FIGURE 3. Day 14 average log SPC and coliform bacteria counts and average flavor scores for all whole, reduced fat (2%), lowfat (1%) and nonfat milks collected over the years 1991 to 2000

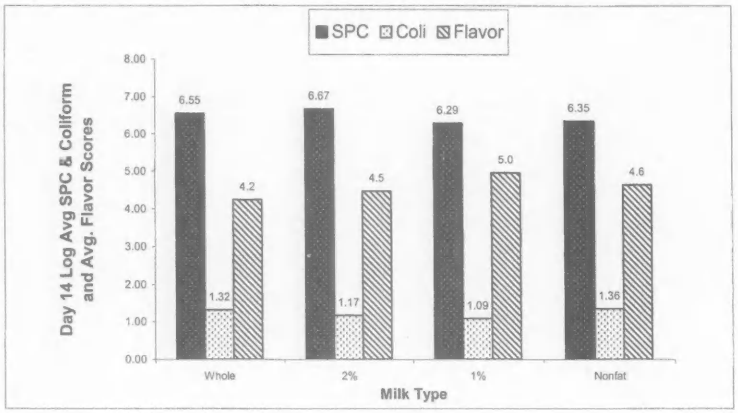
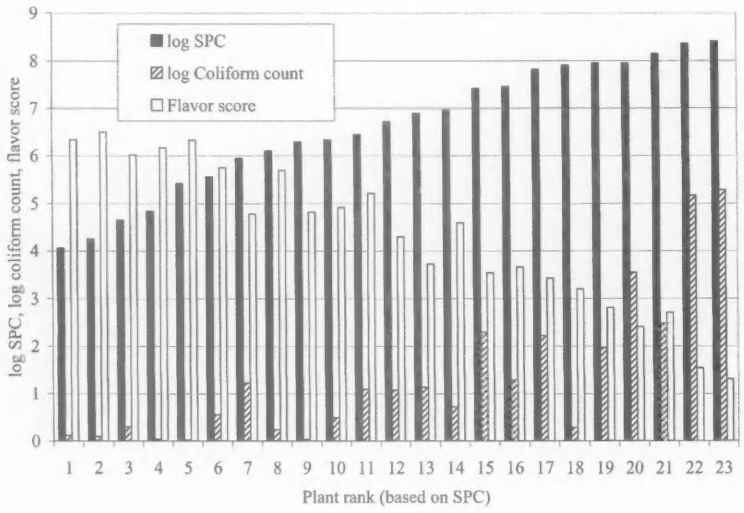


FIGURE 4. Average log SPC, log coliform count and flavor score for 23 dairy processing plants ranked on basis of average log SPC for test day 14 of all samples collected from each plant over the years 1991 to 2000



only one showed an increase in coliform counts. For nine plants, no samples were excluded from tasting on the basis of presence of coliforms in 1999 or 2000. For all those plants, flavor scores improved significantly over the years, even when there was no significant change in SPC and/or coliform count. For 14 plants, between one and 17 samples were excluded from tastings on a given test day in 1999 or 2000 because of the presence of coliform bacteria. For those plants, trends in flavor scores over time were analyzed for the period 1991–1998 to avoid bias due to exclusion of coliform-positive samples, which were likely to have had relatively low flavor scores. For eight of fourteen plants with coliform-positive samples, flavor scores improved over the eight years, while there was no significant change in flavor for the remaining six plants. Decreased flavor scores over time were not detected. Examples of SPC, coliform counts and flavor scores on day 14 for plants with consistent high milk quality, major improvement in milk quality over time, and consistent quality concerns are shown in Figure 5.

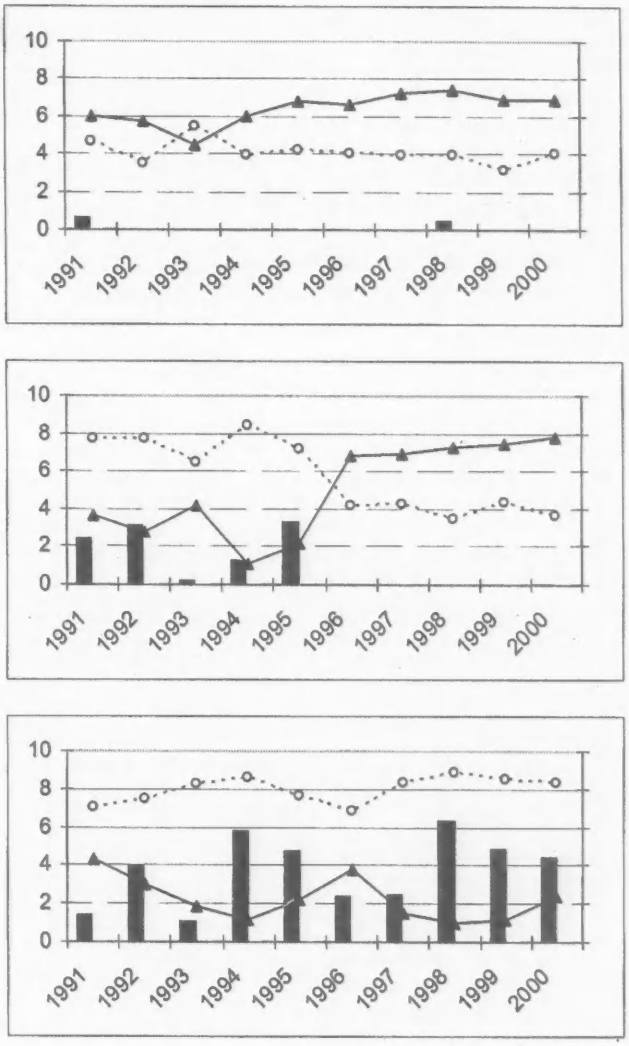
DISCUSSION

The results of this study indicate that a pasteurized milk shelf life of 14 days or beyond when milk is held at 6.1°C (43°F) is achievable. However, the pattern of shorter shelf life observed in a majority of the samples tested suggests that much work is still needed in order to extend and maintain product shelf life for many of the plants involved in the study. Post-pasteurization contamination, as characterized by relatively rapid increases in microbial numbers and perceived spoilage defects typical of gram-negative psychrotrophic bacteria, continues to be a barrier to shelf-life extension for a number of plants. The routine presence of coliform bacteria, as indicators of post-pasteurization contamination, appears persistent in some operations.

Despite the clear need for further improvement in dairy product quality, a trend for improved milk shelf-life characteristics was observed. Flavor scores improved during the test period for the majority (17 of 23) of plants. Further, flavor scores were significantly better for the last years of the study (1998–2000) than for the early years (1992–1994) across all plants, although this may also partially reflect the exclusion from tasting of the milk samples bearing ≥ 10 coliform/ml in 1999 – 2000. Some plants have demonstrated the ability to produce high quality milk, while others tend to manufacture products either of more variable or lower quality. In some plants, a dramatic improvement in milk quality was seen over the years (Fig. 5). The differences in shelf-life trends observed among plants are generally attributable to differences in management related policies, procedures and capabilities that put emphasis on product quality and customer satisfaction. While the goal of achieving customer satisfaction ranks high with all processors, the perspectives on and the resources to do what is required for meeting longer shelf-life expectations differ among processors.

Development of and adherence to proper cleaning, sanitation and maintenance procedures, as well as appropriate training of plant personnel, are essential to consistently obtain shelf lives of > 14 days. Hot water sanitization procedures followed by either a chemical sanitizer solution or pasteurized water cool-down are used effectively by a number of the plants involved in the study. Hot water sanitization requires a minimum tempera-

FIGURE 5. Test day 14 log SPC (dotted line with open circles), log coliform count (dark bars) and flavor score (solid line with black triangles) over a ten-year period for dairy plants with consistent high milk quality (top panel), major improvement in milk quality (center panel), and consistent quality concerns (bottom panel)



ture of 77°C (170°F), as measured at the system outlet, for a minimum of 5 minutes *(12)*. Several processors that effectively use this procedure strive for temperatures of greater than 82°C (180°F) for at least 10 minutes. Hot water sanitization requires sufficient boiler capacity, proper flow design, sufficient start-up time and proper safety precautions, not all of which are readily made available in some plants. Even when properly set up and applied, hot water sanitization procedures do not reduce the importance of hygiene and preventative maintenance programs within these operations. Hot water may not sufficiently penetrate areas that are difficult to clean effectively, including pumps or air valves with bad seals, plug valves, old or misaligned and leaking gaskets and mandrels, and valve assemblies on filling machines *(3, 17, 25, 27)*. In addition, not all equipment food contact surfaces are effectively sanitized with hot water (e.g., pasteurized milk storage vessels), so that chemical sanitization is also required. Even in the absence of hot water sanitization, effective cleaning, chemical sanitization (e.g., chlorine or peroxyacetic acid compounds) and maintenance programs can improve shelf life *(17)*.

In some samples, increased bacterial counts were not observed until 10 to 14 days post-processing. This growth pattern has been observed for spore-forming psychrotrophic contaminants predominantly identified as *Bacillus* and *Paenibacillus* species *(9, 13, 22)*. These contaminants appear to have slower growth rates or longer lag or outgrowth times than typical gram-negative post-pasteurization contaminants. These microbes could be present in the raw milk supply and survive the pasteurization process, although contamination with similar organisms that survive the cleaning and sanitization procedures on the pasteurized side of the system cannot be ruled out *(15)*. The presence of spore-forming psychrotrophs may make it difficult to meet the ≤ 20,000 CFU/ml PMO criterion when product shelf life is extended beyond 14 days. A number of the plants involved in the study have already increased their sell-by or code dates to 15 days or greater. As processors extend their sell-by dates, extra consideration will need to be given to prevention of sporadic post-processing contamination and to the potential for non-gram-negative spoilage that would likely occur later in shelf life. The overall quality of the raw milk will also become more critical. Processing raw milk with bacterial counts > 1,000,000 CFU/ml is associated with development of post-pasteurization product defects during storage, even in the absence of subsequent microbial growth *(18, 26)*. Heat-stable enzymes have been well studied in Ultra High Temperature (UHT) milks *(23)*. Depending on the specific microflora present, these deteriorative enzymes may even be present in low count raw milk (~100,000 CFU/ml) at levels that can decrease the quality of UHT milks stored at ambient temperatures. Little information exists on the influence of heat-stable microbial enzymes on refrigerated pasteurized milk quality when raw milk bacteria counts are within the legal limits of 300,000 CFU/ml. The influence of high somatic cell counts (SCC) and associated enzymes on pasteurized milk quality has been documented *(19)*. When counts are near the legal limit of 750,000 SCC/ml, defects associated with proteolytic and lipolytic enzymes can become evident within 14 to 21 days. Further reductions in somatic cell counts will help achieve even longer shelf-life potentials.

Although several plants involved in the study generally obtained shelf lives ~ 14 days, no plants involved in this study were completely free from sporadic samples with high counts or reduced shelf

lives, emphasizing that stringent procedures must be followed at all times in order to prevent post-processing contamination. In some plants, equipment and general cleaning and sanitization programs have remained essentially the same for many years. Although the existing equipment and procedures may have been effective for past expectations, they may not be sufficient for producing milk with a shelf life of ≥ 14 days. For some plants, inability to meet necessary capital expenditures appears to be a limiting factor. Older plants with older equipment and low profit margins have difficulty keeping equipment, procedures and personnel up to date with strategies needed to manufacture milk that meets current shelf-life expectations. Clean-in-place procedures can become inadequate as equipment ages or when new equipment lines are added, while procedures for manual cleaning of items (e.g., plug valves, filler valves) and routine maintenance (e.g., changing gaskets and seals) also may be ineffective in preventing post-pasteurization contamination. Most of the plants within this study that have not demonstrated the ability to achieve a 14-day shelf life at 6–7°C are aware of their limitations and have sell-by or code dates that are more realistic (i.e., < 14 days). Consumer complaints also can be avoided by keeping the milk properly refrigerated and ensuring rapid distribution and turnover.

In summary, the demand for fluid milk product shelf lives of > 14 days is increasing. To achieve shelf lives > 14 days, post-pasteurization contamination must be prevented or minimized. This goal is currently a challenge for many processors. For those who are successful at routinely eliminating post-pasteurization contamination, subsequent barriers to extending the shelf lives of conventionally processed fluid milks include limitations imposed by raw milk quality and the presence of psychrotrophic spore-forming organisms that may survive the pasteurization process.

ACKNOWLEDGMENTS

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In memory of…

Dr. Laurence Harmon

IAFP would like to extend our deepest sympathy to the family and friends of Dr. Laurence Harmon who recently passed away. IAFP will always have sincere gratitude for his contribution to the association and the profession.

IT'S A FACT

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Roadmap to Validation of Processing Technologies for Juices

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SUMMARY

Process validation plays a key role in the use of novel technologies for production of safe juice products. This article is based on the recommendations of a February 2003 workshop, organized by the National Center for Food Safety and Technology (NCFST, Summit-Agro, IL), on the validation of new processing technologies for juices in Kissimmee, FL. The structure and key components of the validation process for new technology were first identified: microbiological safety; quality validation; equipment validation, including elements of cleaning, calibration and analytical parts; and validation of facilities. Three working groups were formed in accordance with the principles of this process. The guidelines for each key component of the validation process described in this paper derived from the discussions within the working groups. The brief summaries aim to suggest objectives and identify critical procedures of process and equipment validation for juice processors, technology developers, equipment manufacturers, regulatory inspectors, and extension specialists during the commercialization of new technologies. The importance and steps of the scale-up process that a juice company needs to take were also recognized in the workshop and are discussed.

INTRODUCTION

As a result of disease outbreaks across North America that have been associated with the consumption of unpasteurized juices and cider, the United States Food and Drug Administration (US FDA) published a juice Hazard Analysis Critical Control Point (HACCP) regulation designed to improve the safety of juice products (21CFR) *(3, 4)*. Under the rule, juice processors are required to produce juice by use of a HACCP system that achieves a 5-log reduction for the most resistant microorganism of public health significance that is likely to occur in the juice. Thermal pasteurization is not the only way to meet this safety standard. Alternative technologies, such as high-pressure processing (HPP), dense phase carbon dioxide ($DPCO_2$) processing, ultraviolet radiation (UV) processing and combined intervention steps may be used. Although these new technologies have only recently been developed, the juice industry would like to put them into practice as soon as possible. Process validation plays a key role in the use of novel technologies for production of safe juice products. However, the validation studies necessary to demonstrate a 5-log reduction of the pathogen of concern have not been performed.

In view of the need for such studies, the National Center for Food Safety and Technology (Summit-Argo, IL) organized a two-day workshop in Kissimmee, FL, in February 2003 on the validation of new processing technologies for juices. The objective of the workshop was to initiate development of general guidelines, for use by juice manufacturers, for validating processing technologies for juice. Representatives from the US FDA and the Cana-

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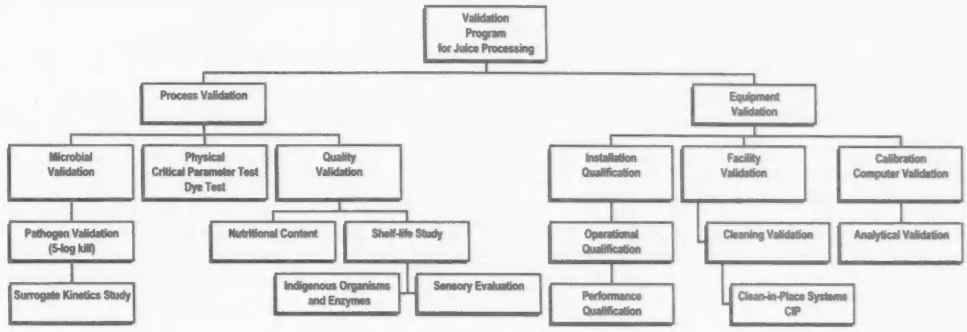
FIGURE 1. Chart of validation procedures of new technologies for juices



dian Inspection Agency participated. Cornell University, Duke University, Ohio State University, University of Florida, University of Hawaii, and Illinois Institute of Technology represented academia. Industry experts from Tropicana, Coca Cola, Praxair Inc., Silliker Labs, Aquionics Inc., Alfa Laval Co., Sun Orchard Inc., and others shared their experience on validation issues at laboratory, pilot, prototype, and commercial levels. Dr. Karl Linden, Duke University, gave an update on existing procedures and EPA protocols in UV radiation processing of water. Dr. Randy Worobo, Department. of Food Science, Cornell University, reported on recent developments in UV radiation processing for apple cider. Dr. Sevagan Palaniappan from Minute Maid and Dr. Kai-Lai Grace Ho from Praxair Inc. presented the case studies on validation of HPP and $DPCO_2$ processing, respectively, for orange juice. Moreover, major juice processors such as "Minute Maid" and "Tropicana" provided corporate sponsorship for the meeting. Three working groups were established by the workshop steering committee to discuss issues relating to validation of equipment, microbiological safety, and juice quality.

OUTCOME OF THE WORKSHOP

This article is based on the recommendations made by the workshop. Initially, the structure and key components of the validation process of new technology were identified. These included microbiolological safety; quality validation; equipment validation with respect to cleaning, calibration and analytical parts; and validation of facilities. All workshop participants recognized the importance of the scale-up process. Three working groups were formed in accordance with this principle, and guidelines were derived from the discussions in the working groups.

Basic considerations on the validation of processing technologies for juices will be discussed in the first part of this article. The second part will concentrate on the clarification of scale-up and the critical steps a juice company needs to take during the commercialization of new technologies. Critical aspects such as microbial safety, quality and equipment validation are also considered.

VALIDATION CONCEPT

According to the US FDA *(5)*, process validation involves establishing documented evidence that provides a high degree of assurance that a specific process will consistently produce a product meeting its pre-determined specifications and quality attributes. In essence, validation of new processing technologies for juices means providing evidence that a process will achieve at least a 5-log reduction of the pathogen of concern and that all essential juice quality attributes have been maintained. Documented evidence includes the validation protocol of performance. This protocol is comprised of the scope for the validation study and the detailed description of the procedures, acceptance criteria, and responsibilities associated with it. Acceptance criteria are governed by the pre-determined specifications of safety and quality attributes and should be closely related to the risk of the process steps. For instance, a defect rate parameter can serve as an acceptance criterion for the validation of a HPP system for packaged juice. The defect rate can be expressed as the number of juice packages with microbial count exceeding the set level at the end of shelf life per 100 packages (% units spoiled). In this case, the defect rate is a cumulative function of all individual process steps. The sample size for defect rate determination can be established based on statistical analysis and Poisson distribution.

The primary objective of validation is to demonstrate product and specific process consistency over time across scales in R&D and manufacture with various raw materials and operating ranges. **Process consistency** shows that the process, when operated according to manufacturing procedures, yields a product that consistently meets specifications. This type of validation usually is not required during early development. **Validation of operating ranges** illustrates that the process, when operated within established ranges for critical operating parameters, yields a product that meets released specifications.

VALIDATION AT DIFFERENT PHASES OF PROCESS DEVELOPMENT – SCALE-UP PROCESS

A critical component of process validation is the selection and qualification of scale-up models. Three important aspects of the scale up models — design, performance, and quality — must be considered during qualification, before process validation experiments are begun: **Design** refers to the use of scientifically valid principles in specifying conditions for the scale-up process. For example, all the materials that are used for the equipment must meet the US FDA Food Contact Surface Requirements. **Performance** of the various scale-up models must be

TABLE 1. Activity on different phases of scale-up process

Phase	Process Validation				
	Microbial	Quality	Equipment	Analytical	Cleaning
Bench top	X	X			
Pilot	X	X	X	X	
Prototype	X	X	X	X	X
Commercial	X	X	X	X	X

comparable and the differences among the models have to be quantified. The models must have sufficient sensitivity to detect changes when input variables are manipulated. The **quality** aspect calls for identical quality among the various scale-up models and, in the case of differences, they must be quantified.

The four phases of validation activity are common during the scale-up process of new technology for juices. R&D of a process goes through the four phases of bench-top, pilot model, prototype skid, and finally to the commercial system. The probability of success has to be evaluated step by step during the whole validation process.

Bench-top development in the laboratory includes the development of the principal process scheme, the definition and validation of process operating parameters, the inactivation kinetics studies, the establishment of the processing parameters for required log reduction on the pertinent pathogen, and the determination of shelf life and packaging requirements. At the end of this phase, a process has to be defined for the production of a high-quality product by the bench-top model. The **pilot model**, an important step during the upscaling of a production process, requires formal qualification of the equipment and the appropriate calibration of instruments. Process validation usually concentrates on the scalability and reproducibility of the process. If necessary, process modification should be performed to optimize the production process for full-scale manufacturing. Product derived from pilot and prototype production should possess high-quality attributes and be safe (hazard free). **On-site** validation is preferred in the juice industry. Equipment that will be used for **commercial scale** production has to be qualified according to GMPs and current industrial standards, and appropriate instrument calibration is required. Process validation should demonstrate that product produced by the commercial unit would be comparable to that produced by the pilot/prototype models and that the commercial unit can be operated within the predetermined process parameters and specifications. Minute Maid Co. has used the following **CRITERIA** for the HPP technology validation for orange juice, and these criteria can be suggested for practical use in commercial production. The first criterion calls for measurement and documentation of the performance of the commercial unit at established processing parameters: X [gpm], Y [s, processing time], Z [temperature, pressure, or dose]. The production efficiency must be calculated on the basis of the time for production, clean-in-place (CIP), sanitation, and inspection. The second criterion is the achievement of a less-than-1% defect rate at 90% confidence level, with at least a 90% mechanical efficiency for the equipment. The third criterion is a consistent performance over 4 consecutive weeks of 24 h/day, 5 days/week operation. In addition, a well-designed cleaning program and analytical methods established for in-process control must be fully validated. The juice processors should follow 3-A sanitary standards and 3-A accepted practices or Canadian dairy standards for their equipment. Equipment manufacturers, fabricators, users and sanitarians universally accept 3-A criteria. 3-A SSI formulates standards and practices for the sanitary design, fabrication, installation and cleanability of dairy and food equipment or systems used to handle, process and package consumable products for which a high degree of sanitation is required. Individual standards are now available in downloadable electronic format at http://www.3-a.org/main.htm.

KEY COMPONENTS OF VALIDATION PROCEDURES

The key components for the validation procedures of new technology include validation of microbiological safety, quality, equipment and calibration, facility, cleaning and analytical elements, as shown in Fig. 1. Each element has its own objective(s) and procedures.

Following are brief summaries of discussions that took place during the workshop regarding objectives and procedures of process and equipment validation for juices.

Process validation, accomplished by microbiological and/or physical methods, includes evaluation of product quality. **Physical validation** means that the critical process parameters must be measured within the processing range. For instance, temperature can be measured at the coldest point, or the least dose delivered to the product must be determined.

Microbiological safety

With respect to microbiological safety issues associated with validation of juice processing technologies, it is important to realize that most individuals charged with this responsibility in an industrial setting would not necessarily have all the prerequisite scientific knowledge or background to address the concerns. The following guidelines therefore aim to provide basic suggestions in order for such individuals to understand system requirements and identify the need to obtain additional professional help to assess the performance and product criteria regarding microbial safety related to the product.

In any process validation study, the target pathogen of concern must be identified. According to the juice HACCP regulation (21CFR120) *(4)*, this microorganism is called the "pertinent pathogen". To aid this process, guidance can be found in the Juice HACCP Alliance's standardized training curriculum and FDA's Hazards and Controls Guide. Once the pertinent pathogen(s) is (are) identified, a thorough search of the literature or discussions with experts will identify gaps in knowledge with respect to the level of treatment to yield the required 5-log inactivation of the microorganism by use of any particular processing technology. At this stage, various laboratory studies may be designed and performed to generate new data to close the gaps in knowledge.

In such challenge studies, a "cocktail" of at least three strains of the pertinent pathogen would be selected, based on previous association with the product or process in question (e.g., outbreak strains associated with a particular product). Use of a cocktail in this way gives assurance that the strain most resistant to the challenge would be the one that survives to be evaluated and hence would present the most conservative picture, at

TABLE 2. Levels of microbial and quality validation at different phases of scale-up

	Pathogen	Surrogate	Spoilage	Quality
Concept/Lab	X			X
Pilot	X			X
Prototype	X[1]	X	X	X
Commercial	X	X	X[1]	

least experimentally, of the efficacy of the process. Clearly, for any particular process there may be more resistant strains yet to be discovered in the environment. There may be even more resistant spoilage (i.e., not safety-related) organisms that may have to be considered as a final process is established. However, use of target pathogen strains in studies such as these is a conventional approach which, in a properly designed and executed study, will meet the need to demonstrate the efficacy of the process through inactivation of a target level of the pertinent pathogen according to the requirements of the juice HACCP regulation. Good experimental design will consider the number of replicate studies needed to provide data that can be analyzed for statistical validity, the number of variables to consider in such a design (i.e., the number of multiple treatment parameters), and the choice of adequate controls. Based on the most appropriate design, the ability to statistically evaluate data effectively, e.g., to determine statistical significance of results with respect to first order or linear inactivation, is determined. This relates to integrated lethal processes applied to apple juice, and the cumulative reductions that are part of the step-wise interventions allowed in the juice HACCP rule applied to whole citrus fruits. One important consideration regarding choice and application of challenge strains is the need to "adapt" them to their most resistant level. Obviously, in the wild or in the manufacturing environment, the would-be microorganisms of concern most likely would not exist in ideal conditions. Very often they survive, but may be "stressed" and very closed to death, under adverse conditions such as low environmental pH or near-starvation. Compare this with traditional microbiology laboratory techniques that grow cultures of microorganisms for inoculation studies under near-ideal conditions in overnight culture prior to inoculation into the food, with subsequent inactivation studies. So it is important to "stress-adapt" the strains used in inoculation studies, under conditions that simulate, as much as possible, the conditions imposed in the future challenge. Prior culture, for example, in nutrient-limiting (starvation) conditions, or other non-optimal growth conditions such as low pH, high or low temperatures, or reduced a_w, either alone or in combination with other adverse pretreatments, is often done. The exact inoculation method is critical. Of course this should, as much as possible, effectively resemble the most likely route of contamination or ingress of the pathogen into the product. This is most important with respect to surface inoculation of fresh fruit before pressing or extraction of the juice. This particular consideration is presently an area of considerable research activity, although some information regarding optimization of the inoculation process is currently available. Generally, the extremes of contamination levels are explored (i.e., high versus low inoculation levels). Although generally artificial with respect to the "normal" levels seen on fruit or in juice processing operations, use of the former (e.g., > 10^6/ml or g) can be applied under appropriate treatment conditions to give measurable levels of survivors, which facilitate comparisons of the effects of different process variables. The lower inoculum levels, although reflective of more "typical" anticipated levels found in the process, will provide lower levels of survivors under equivalent processing conditions. In these instances, specialized techniques (e.g., evaluation of large volumes of product combined with most probable number (MPN) or other sensitive techniques) must be used to enumerate survivors. A comparison of studies performed with high and low levels of inoculum will determine whether uncontrolled process effects produce key differences in predicted levels of inactivation. For routine enumeration of survivors, it is traditional to recover survivors on both selective and non-selective media. The difference in numbers counted between the two media will give a measure of the number of sub-lethally injured microorganisms surviving the process. The total count from the non-selective medium will provide the basis to evaluate process performance criteria, such as calculated D- and z-values. Note also that incubation conditions for the respective recovery media must be optimized as well.

Usually, inactivation models are developed in media designed to simulate the natural product as closely as possible, since use of such media is very often much easier than working with the natural product. The models are then validated in the actual food, usually using a smaller number of experimental variables, which is another benefit that the simulated modeling route often permits. With juices, which are generally easy and inexpensive products to work with, the need to develop models in simulated product media may not be a paramount consideration; inoculated studies very often are performed using the product in question directly. Finally, it is usually customary to monitor the viability and potential for growth of surviving microorganisms throughout the anticipated shelf life of the product. It is conceivable, but highly unlikely, given the low pH of most juice products, that sub-lethally injured microorganisms may repair to full viability and that fully viable survivors may actually increase in numbers with time.

Once processing parameters to inactivate the target level of pertinent pathogen have been established in laboratory studies, the process is usually scaled up through pilot plant development and then through prototype equipment/process development, and commercial roll-out and commissioning of the system. Obviously, unless working in a controlled environment (e.g., a Biosafety level, or BSL, 2/3 pilot scale containment facility), pathogens should not be used in an open processing environment where there is potential for contamination of equipment and facilities. In these situations, non-pathogenic "surrogate" organisms are selected for use in further studies *in lieu* of the pertinent pathogen. Obviously, such surrogate strains must have resistance traits that have been pre-determined in controlled studies to match as closely as possible those of the pertinent pathogen. Moreover, many will have a marker (e.g., natural antibiotic resistance) which will facilitate their identification as process survivors separate from any number of similar strains found as indigenous flora in the

natural product. Other desirable characteristics of the surrogate strains chosen have been described by IFT *(1)*. Very importantly, it is highly desirable that the chosen surrogate strain, if it survives the process, should not itself become a product spoilage organism and will not persist as a hard-to-remove, nuisance organism in the processing facility or the process waste stream. Suggested levels of microbial validation at four phases of process scale-up are summarized in Table 2.

Chemical and physical safety

As required in the juice HACCP regulation, potential chemical and physical hazards must also be addressed through application of the HACCP plan. During process validation, the production of toxic by-products, for example, and the use of unapproved additives and inadvertent introduction of potential allergens, must be avoided by proper process design and evaluation. Likewise, introduction of physical hazards, such as contamination of product by introduction of foreign objects during processing, must be prevented. Examples include introduction of glass fragments from bottles as a result of cracking through inappropriate temperature cycling, or the inclusion of metal shards from lids as a result of exceeding tolerance in filling operations. Again, properly designed and executed process validation studies will effectively consider the likelihood of such occurrences and lead to measures for their prevention, elimination, or reduction to acceptable levels.

Quality validation

In addition to ensuring the absence of pathogenic microorganisms, inactivating indigenous microorganisms and enzymes that are responsible for spoilage and quality deterioration is critical goal in juice processing. The quality of juice is defined by the indigenous microbial populations, indigenous enzyme activities, physical attributes (pH, Brix, color, viscosity, and cloud), chemical attributes (sugar profile, acid profile, minerals, and titratable acidity), nutritional content (ascorbic acid, folic acid, and beta-carotene), and organoleptic properties (aroma profile, flavor profile, and texture).

Shelf-life studies are commonly performed to assess the consistency of the treated juice quality throughout its targeted shelf life. During the shelf-life study, samples are periodically tested for indigenous microorganisms, indigenous enzymes, and other quality attributes evaluation. In addition, factors such as types of packaging materials (glass, PET, HDPE, paper carton, and pouch), storage temperature (abused and normal cold chain distribution refrigeration temperature), and transportation should be studied. Standard Plate Counting techniques are generally used to estimate the total number of viable cells in the treated juice. The yeast and mold populations and lactic acid bacteria counts are determined, as these microorganisms are important in juice spoilage.

Pectins, a group of colloidal carbohydrates naturally present in fruit juices, act as natural stabilizers and give the fruit juice a consistency that is generally referred to as "body" by the fruit juice industry. Pectinesterase is the indigenous enzyme that degrades the pectin colloid and decreases the cloud stability of the juice. The titration method using a pH stat system or the colorimeteric method developed by Rouse and Atkins *(2)* can be used to measure the activity of pectinesterase in citrus juice. Standard tests such as the official methods from AOAC or from the Department of Citrus, Florida, must be employed to analyze the physical, chemical, and nutritional attributes of the juice. Sensory evaluation by expert and consumer panels is used to document changes in sensory profile and consumer acceptance and is supplemented by analysis of the aroma profile by gas chromatography.

As there is uncertainty about the production of potentially toxic substances such as free radicals by novel processes, analysis for these unwanted byproducts is an essential part of the validation program. In addition, new categories of juice might be created concurrent with the development of new technologies. The shelf-life and sensory attributes of the treated juice may fall outside the specification of the current juice categories as defined by the federal regulation. Hence, prior to commercialization, open dialogue among regulatory agencies, juice processors, and technology developers must be initiated to address the labeling and grading issues for these new categories. Last but not least, variations due to the properties of raw materials (e.g., beginning/end of season fruits, varieties of fruit, amount of pulp) should also be analyzed and established.

Equipment validation

The key elements of equipment validation are initial inspection, installation and operational qualification, performance qualification, and commissioning. Prior to installation of equipment, a description of it, a checklist of the software, and accurate supporting documentation must be provided. During **installation and operational qualification**, sensors need to be calibrated against standards (e.g., National Institute of Standards, NIST) and control loops have to be tuned. For monitoring of critical processing parameters, especially for those that are difficult to control, redundant sensors are highly recommended. Alarms, interlocks, equipment communication protocols, utility cleaning, and consumable requirement should also be verified at the installation stage. For packaging equipment, filling and sealing parameters should be checked and secondary packaging and distribution equipment must be qualified. Analytical methods for in-process controls and release testing must be fully validated according to GMPs and current standards.

The **performance** of the system must be validated over the operating range of processing conditions for each specific product. Either the "worst-case scenario approach" or the "process steps approach" can be used to estimate the **performance qualification**. Inoculated pack studies can be performed for the selection of the appropriate microorganism. The worst-case approach is attractive because the validation can be accomplished in only a few experiments if these are successful. For efficient analysis, sampling plan and statistics must be used along with optimal experimental design. The process steps approach requires the establishment of the processing steps prior to the validation of the system performance. The set point values of process variables should be determined from process development studies. In practice, the exact control of a variable at the set point is seldom achieved and the variable is typically maintained within a range of values, or "normal operating range (NOR)." The magnitude of the NOR can be ascertained during a production trial and set at two or three standard deviations. To cover occasional excursions outside the NOR, it is desirable to establish a wider range known as the "maximum operating range, or MOR, within which product quality attributes have been shown to be acceptable and outside of which performance is at the edge of failure. The objective of process validation is not to determine the edge of failure but to demonstrate acceptable process operation. In juice validation studies, processing parameters must be varied to get (+)/(-) vs. microbial inactivation. To ensure that all system components are functioning, they need to be challenged on process deviations as well. Another key element of the system performance evaluation is demonstration of the uniformity of the process. Supporting

documentation should describe all aspects of the system that impact performance parameters.

At the **commissioning phase**, an equipment validation System Acceptance Test should be performed. Minute Maid has used its experience with the high-pressure aseptic filled unit to illustrate the required steps for a System Acceptance Test. First, normal CIP and sanitization steps were performed on the system, then environmental air samples were collected and critical areas were swabbed. The juice was passed through the system by use of the designed process. Samples (240) for microbiological counting were collected according to a statistical sampling plan at the beginning, middle, and end of the production. It is highly desirable to repeat the test at least three times and to collect 240 samples from each trial. In order to accept the system for production, the defective rate must be less than 1%.

Cleaning validation

Cleaning strategies adopted in multiuse facilities play a major part in the prevention of cross contamination of juice products. Government-approved chemicals must be used for cleaning and sanitation. Cleaning different pieces of equipment has to be evaluated on a case-by-case basis and justified according to performance qualification studies. The cleaning routine must be defined, validated, and set. The three main parameters used for evaluation of equipment cleanliness are analysis of final rinse water samples at the end of cleaning, analysis of surface swab samples, and visual inspection. The build-up of biofilms has to be considered in cleaning validation.

To pass an equipment sanitation test, the validation test must be performed three times. Initially, juice inoculated with mold spores is circulated through the system for 30 minutes. Then the system is drained, dried, and cleaned by use of normal CIP and sanitation cycles. After cleaning, the machine is disassembled and swabbed in pre-selected sites. Microbiological testing is then performed on the swabbed samples by use of standard procedures. Dye tests can be also used for determining cleaning effectiveness.

Automated clean-in-place (CIP) procedures can be used and validated against established cleaning regimes. The juice processors can consider two options for CIP validation. The first includes circulation of buttermilk in the system overnight, drying of the system for 4 hours, running of normal CIP cycles at proper conditions, addition of erythrosin dye during the final rinse, and finally disassembling of the machine for the diagnosis of dye residue. The second option involves circulating riboflavin in the system, drying the system for 4 hours, running the normal CIP cycles, and disassembling the machine for the diagnosis of fluorescent residue. The European Hygienic Equipment Design Group (EHEDG) may have other methods for CIP validation to assist industry in complying with European hygienic machinery directives.

Testing facility requirements

Manufacturing facilities require that key operational strategies be in place. Safety and worker safety do not need to be part of food safety validation but could be considered as a part of the overall plant validation program. Some of the basic requirements for a manufacturing facility are well-designed facilities and equipment; appropriate personnel, product, raw materials, and waste flows; and training programs for personnel with regard to cleaning. A cleaning validation program specifically for facilities and equipment is required for all GMP-regulated food facilities.

WHAT WILL HAPPEN NEXT?

Not all of the issues of validation of new processing technologies for juices were discussed at the workshop, but a major step forward occurred in understanding the needs and important steps for the future. The participants recognized that each process will be unique and that the results of the workshop are not the official viewpoints or recommendations of the FDA, the participating universities, and the industrial organizations. They also acknowledged that it is the responsibility of the juice processors to demonstrate the ability of their process to achieve the 5-log reduction of the pertinent microorganism in each portion of the juice produced. "Specific process" suggests that process validation studies are process and product-specific. Validation should lead to consistently high-quality products, with significant commercial benefits for the manufacturer. The risk of process failures can be decreased considerably by use of process validation.

NCFST will collect research information of case studies for new technologies that have been employed for juices, as a guide to provide juice producers with scientific principles to establish product and process consistency. The targeted audience of the document consists of juice processors, technology developers, equipment manufacturers, regulatory inspectors, and extension specialists.

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International Association for Food Protection®

Award Nominations

The International Association for Food Protection welcomes your nominations for our Association Awards. Nominate your colleagues for one of the Awards listed below. You do not have to be an IAFP Member to nominate a deserving professional. To request nomination criteria, contact:

International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2864
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
Web site: www.foodprotection.org
E-mail: info@foodprotection.org

You may make multiple nominations. All nominations must be received at the IAFP office by March 14, 2005.

- Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members. NFPA Food Safety Award nominees do not have to be IAFP Members.
- Previous award winners are not eligible for the same award.
- Executive Board Members and Awards Committee Members are not eligible for nomination.
- Presentation of awards will be during the Awards Banquet at IAFP 2005 – the Association's 92nd Annual Meeting in Baltimore, Maryland on August 17, 2005.

Nominations deadline is March 14, 2005

Nominations will be accepted for the following Awards:

Black Pearl Award — Award Showcasing the Black Pearl

Presented in recognition of a company for its outstanding commitment to, and achievement in, corporate excellence in food safety and quality.

Sponsored by Wilbur Feagan and F&H Food Equipment Company

Fellows Award — Distinguished Plaque

Presented to IAFP Members who have contributed to the Association and its Affiliates with distinction over an extended period of time.

Honorary Life Membership Award — Plaque and Lifetime Membership in IAFP

Presented to IAFP Members for their dedication to the high ideals and objectives of the International Association for Food Protection and for dedicated service to the Association.

Harry Haverland Citation Award — Plaque and $1,000 Honorarium

Presented to an active IAFP Member for many years of dedication and devotion to the Association and its ideals and objectives.

Sponsored by Zep Manufacturing Company

Harold Barnum Industry Award — Plaque and $1,000 Honorarium

Presented to an active IAFP Member for dedicated and exceptional service to IAFP, the public, and the food industry.

Sponsored by Nasco International, Inc.

Educator Award — Plaque and $1,000 Honorarium

Presented to an active IAFP Member for dedicated and exceptional contributions to the profession of the Educator.

Sponsored by Nelson-Jameson, Inc.

Sanitarian Award — Plaque and $1,000 Honorarium

Presented to an active IAFP Member for dedicated and exceptional service to the profession of Sanitarian, serving the public and the food industry.

Sponsored by Ecolab, Inc., Food and Beverage Division

Maurice Weber Laboratorian Award — Plaque and $1,500 Honorarium

Presented to an IAFP Member for dedicated and exceptional contributions in the laboratory. The Award recognizes a commitment to the development and/or application of innovative and practical analytical approaches in support of food safety.

Sponsored by Weber Scientific

International Leadership Award — Plaque, $1,000 Honorarium and Reimbursement to attend IAFP 2005

Presented to an IAFP Member for their dedication to the high ideals and objectives of the International Association for Food Protection and for promotion of the mission of the Association in countries outside of the United States and Canada.

Sponsored by Unilever – Safety and Environmental Assurance Centre

Food Safety Innovation Award — Plaque and $2,500 Honorarium

Presented to an individual or organization for creating a new idea, practice, or product that has had a positive impact on food safety, thus, improving public health and the quality of life.

Sponsored by 3M Microbiology

NFPA Food Safety Award — Plaque and $3,000 Honorarium

This Award honors an individual or a group or organization for preeminence in and outstanding contributions to the field of food safety. The award will be presented in 2005 to an individual in recognition of a long history of outstanding contributions to food safety research and education.

Sponsored by National Food Processors Association

International Association for Food Protection®

2005–2006 Secretary Election

The following page contains biographical information for the 2005-2006 Secretary candidates. Review the information carefully as you make your voting decision. Ballots were mailed to all International Association for Food Protection Members during the first week of February. Completed ballots are due back to the Association office by March 18, 2005. Sealed ballot envelopes are forwarded to the Tellers Committee for opening and counting. Watch for the election results in the May issue of *Food Protection Trends*.

If you have questions about the election process, contact David W. Tharp, CAE, Executive Director at 800.369.6337, or 515.276.3344, or E-mail dtharp@foodprotection.org.

J. STAN BAILEY

LEEANNE M. JACKSON

The Candidates

Biographical Information

J. STAN BAILEY, PH.D.

Dr. J. Stan Bailey is a Lead Scientist and Research Microbiologist for the United States Department of Agriculture, Agricultural Research Service where he is responsible for research directed toward monitoring, controlling, reducing and ultimately eliminating contamination of live poultry by human enteric pathogens. During his 31-year career, Dr. Bailey has authored or coauthored over 500 scientific publications in the area of food microbiology, concentrating on controlling *Salmonella* in poultry production and processing, *Salmonella* methodology, *Listeria* methodology, and rapid methods of identification.

Dr. Bailey's professional stature is recognized both nationally and internationally as is seen in: (1) his receiving the USDA, ARS award for Outstanding Senior Research Scientist for 2002; (2) receipt of the 2003 IAFP Maurice Weber Laboratorian Award; (3) election to the position of Chairman of the Food Microbiology Division of the American Society for Microbiology in 1992; (4) appointment to the position of Secretary of the Microbiological Methods Committee of the AOAC; (5) appointment to the position of Adjunct Professor in the Poultry Science Department at the University of Georgia and the Department of Food Science and Technology at Kansas State University; (6) national and international invitations to speak, teach, participate in committees, and symposia including appointment as Expert Consultant on Animal Feeding and Food Safety by the Food and Agriculture Organization of the United Nations; (7) serving as faculty for 21 years at the "Rapid Methods and Automation in Microbiology Workshop" taught at Kansas State University educating over 1,000 scientists from 50 countries; (8) being named Fellow of the American Academy of Microbiology; (9) appointment as Technical Advisor on Poultry Production to the National Advisory Committee on Microbiological Criteria in Foods; (10) appointment as Scientific Advisor to the International Life Sciences Institute; (11) winning the ARS Technology Transfer Award and Federal Laboratory Consortium Award for technology transfer; and (12) receiving 14 USDA Certificates of Merit.

Dr. Bailey has been an active Member of IAFP since 1987. In addition to organizing and convening numerous symposia, Dr. Bailey was a member of the Program Committee from 1997 to 2001 and was the Chairperson of this committee in 2001. He is currently a member of the Foundation Fund Committee, was Chairperson of the Poultry Safety and Quality Professional Development Group from 1993–95, and has served on the Editorial Board of the *Journal of Food Protection*.

Dr. Bailey has a B.S. in Environmental Health Sciences, M.S. in Food Science and Ph.D. in Poultry Science all from the University of Georgia. Other professional affiliations for Dr. Bailey include serving on the Editorial Boards of *Poultry Science, Journal of Rapid Methods and Automation in Microbiology*, and the *Journal of Applied Poultry Research* and membership in Southern Poultry Science Society, Worlds Poultry Science, American Society for Microbiology, American Academy of Microbiology, Poultry Science Society, Georgia Association for Food Protection, and AOAC International.

LEEANNE M. JACKSON, PH.D.

Dr. LeeAnne M. Jackson is currently a Health Science Policy Advisor within the Food and Drug Administration's Center for Food Safety and Applied Nutrition (FDA/CFSAN) where she serves as part of the Food Safety and Defense Staff. Prior to joining the FDA, Dr. Jackson accepted a post-doctoral assignment in 1990 with the United States Department of Agriculture, Eastern Regional Research Center, Philadelphia, PA where she conducted research with *Clostridium botulinum and Salmonella* spp. Dr. Jackson joined the FDA in 1991 as a Staff Fellow conducting research on *Vibrio* spp. In 1994, she joined the Division of HACCP within FDA/CFSAN and led two teams for piloting HACCP within the food industry. In 1996, she joined the Executive Operations Staff within FDA/CFSAN and coordinated science policy issues. In addition to her responsibilities on the Executive Operations Staff, in 2000, Dr. Jackson took on the responsibility of co-coordinating counter-terrorism issues for foods. In 2004, Dr. Jackson moved to the Food Safety and Defense Staff where CFSAN's counter-terrorism efforts were consolidated.

To ensure the safety and security of the nation's food supply, she serves on a variety of government working groups to discuss food defense activities. She is the Co-Chair of the Chemical, Biological, Radiological and Nuclear Countermeasures Subgroup of the Technical Support Working Group for the Department of Defense. She also serves on numerous working groups within the Department of Homeland Security.

Since joining IAFP in 1988, Dr. Jackson has been an active participant by speaking at symposia and workshops, serving on IAFP committees and professional development groups (PDGs). She served on the Program Committee from 2000–2003, *Food Protection Trends* Management Committee from 1998–2001, Developing Scientist Committee from 2001–2002, the Nominating Committee for 2003 and 2004, and is a member of the Food Hygiene and Sanitation PDG and the Fruit and Vegetable Safety and Quality PDG. She is also active in the Capital Area Food Protection Association, which was chartered in 2001.

Other professional affiliations for Dr. Jackson include: Professional Member of the Institute of Food Technologists, member of the American Society for Microbiology, and the FDA Liaison to the Executive Committee for the National Advisory Committee on Microbiological Criteria for Foods. Within the Institute of Food Technologists, Dr. Jackson has participated on numerous committees at the local and national level as well as served as the Chair of the Food Microbiology Division. She currently serves on the Executive Committee of the Institute of Food Technologists.

Dr. Jackson has also received a number of awards during her government career. She received the T.W. Edminster Research Award from USDA in 1990. She has received numerous awards during her FDA career, but most notably she received the FDA Award of Merit in 2003.

Dr. Jackson earned her Bachelor of Science Degree in Microbiology in 1984 from the College of Arts and Sciences at the University of Kentucky. She continued her education in the College of Agriculture, Department of Animal Sciences, Lexington, KY. She was awarded her Masters Degree in 1986 and her Doctor of Philosophy (Ph.D.) in 1990 with a degree in Food Science, specializing in food microbiology.

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 138) and fax or mail it to the IAFP office. Members may also find a Library listing and an order form online at the IAFP Web site at www.foodprotection.org.

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

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

How to Contribute to the Audiovisual Library ...

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

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

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

International Association for Food Protection

AUDIOVISUAL LIBRARY

as of January 10, 2005

A Member Benefit of IAFP

DAIRY

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

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

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 minute videotape). 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 minute videotape). Describes the ether extraction procedure to measure milkfat in dairy products. Included is an explanation of the chemical reagents used in each step of the process. (CA–1988) (Reviewed 1998)

D1050 **Food Safety: Dairy Details**–(18 minute videotape). 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 minute videotape). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients; emphasis is on what to look for in a plant inspection. Everything from receiving, through processing and cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA–1987) (Reviewed 1997)

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

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

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

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

D1105 **Milk Hauler Training** – (35 minute videotape). 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 minute videotape). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titrations are reviewed... alkaline wash, presence of chlorine and iodophor, and caustic wash and an acid wash in a HTST system. Emphasis is also placed on record keeping and employee safety. (1989)

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

D1125 **Ohio Bulk Milk Hauling** – (15 minute videotape). 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 minute videotape). This tape provides a summary of the public health reasons for pasteurization and a nonlegal definition of pasteurization. The components of an HTST pasteurizer, elements of design, flow-through diagram and legal controls are discussed. (Kraft General Foods–1990) (Reviewed 1998)

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

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

ENVIRONMENTAL

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

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

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

E3031 **Allergy Beware** – (15 minute videotape). 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 minute videotape). This videotape discusses the major types of asbestos and their current and past uses. Emphasis is given to the health risks associated with asbestos exposure and approved asbestos removal abatement techniques. (Industrial Training, Inc.–1988) (Reviewed 1998)

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

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

E3070 **EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)**–(15 minute videotape). A training tape that teaches environmental professionals about the Fathead Minnow Larval Survival and Growth Toxicity Test. The method described is found in an EPA document entitled, "Short Term Methods for Estimating the Chronic Toxicity of 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 minute videotape). Produced by the United States Environmental Protection Agency (EPA) in Washington, D.C., this videotape focuses on reporting and handling hazardous waste sites in our environment. The agency emphasizes community involvement in identifying chemical waste sites and reporting contaminated areas to the authorities. The primary goal of the "Super Fund Site Process" is to protect human health and to prevent and eliminate haz-

ardous chemicals in communities. The film outlines how to identify and report abandoned waste sites and how communities can participate in the process of cleaning up hazardous sites. The program also explains how federal, state and local governments, industry and residents can work together to develop and implement local emergency preparedness/response plans in case chemical waste is discovered in a community.

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

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

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

E3125 **Good Pest Exclusion Practices**–(28 minute videotape). 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 minute videotape). 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 & Bathing Facilities**–(38 minute videotape). Developed by the Lincoln Trail District Health Department in Kentucky and includes all of their state regulations which may be different from other states, provinces and countries. This tape can be used to train those responsible for operating pools and waterfront bath facilities. All aspects are included of which we are aware, including checking water conditions and filtration methods. (1987). (Reviewed 1998)

E3131 **Key Pests of the Food Industry**–(28 minute videotape). 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)

E3161 **The Kitchen Uncovered Orkin Sanitized EMP**–(13 minute videotape). 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 Pest Control–1997)

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

E3170 **Tape 1–Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements**–(62 minute videotape). A general overview of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and the challenge of its implementation. The remedy process — long-term and permanent clean-up is illustrated step-by-step, with emphasis on the new mandatory clean-up schedules, preliminary site assessment petition procedures and the hazard ranking system/National Priority List revisions. The major role of state and local government involvement and responsibility is stressed.

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

E3190 **Tape 3–Enforcement & Federal Facilities**–(52 minute videotape). Who is responsible for SARA clean-up costs? Prin-

ciples of responsible party liability; the difference between strict, joint and several liability; and the issue of the innocent land owner are discussed. Superfund enforcement tools-mixed funding, De Minimis settlements and the new nonbinding preliminary allocations of responsibility (NBARs) are explained.

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

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

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

E3133 **Physical Pest Management Practices**–(28 minute videotape). Do you feel that you can not 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 pest population, causing them to leave or die. (CTI Publications – 2004)

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

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

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

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

E3235 **Regulatory and Good Manufacturing Practices**–(42 minute videotape). 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 minute videotape). A presentation on the rationale and techniques for effective handwashing in health care institutions. Uses strong imagery to educate hospital personnel that handwashing is the single most important means of preventing the spread of infection. (The Brevis Corp.–1986). (Reviewed 1998)

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

E3250 **Waste Not: Reducing Hazardous Waste**–(35 minute videotape). This tape looks at the progress and promise of efforts to reduce the generation of hazardous waste at the source. In a series of company profiles, it shows activities and programs

within industry to minimize hazardous waste in the production process. Waste Not also looks at the obstacles to waste reduction, both within and outside of industry, and considers how society might further encourage the adoption of pollution prevention, rather than pollution control, as the primary approach to the problems posed by hazardous waste. (Umbrella films)

E3251 **Would Your Restaurant Kitchen Pass Inspection?**–(29 minute videotape). 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)

FOOD

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

F2265 **A Day in the Deli**–(22 minute videotape). 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)

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

F2451 **A HACCP-based Plan Ensuring Food Safety in Retail Establishments** – (11 minute CD). This is an educational CD 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)

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

F2007 **The Amazing World of Microorganisms**–(12 minute videotape). 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., Homewood, IL– 2001)

F2011 **Available Post Harvest Processing Technologies for Oysters**–(8 minute videotape). 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)

F2008 **A Recipe for Food Safety Success**–(30 minute videotape). 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 minute videotape). 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)

F2012 **Better TEDs for Better Fisheries** – 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)

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

F2010 **Close Encounters of the Bird Kind**–(18 minute videotape). A humorous but in-depth look at *Salmonella* bacteria, their sources, and their role in

foodborne disease. A modern poultry processing plant is visited, and the primary processing steps and equipment are examined. Potential sources of *Salmonella* contamination are identified at the different stages of production along with the control techniques that are employed to insure safe poultry products. (Topek Products, Inc.) (Reviewed 1998)

F2013 **Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments**–(26 minute videotape). 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 contamination, inplant sampling, and microbiological testing. (Penn State College of Ag Sciences–2003)–(Available in Spanish)

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

F2111 **Controlling *Salmonella*: Strategies That Work**–(13 minute videotape). 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 Labs– 2002)

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

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

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

F2021 **Egg Production**–(46 minute videotape). 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)

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

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

FastTrack 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. (DiverseyLever/American Hotel & Lodging Educational Institute – 1994)

F2500 **Tape 1–Food Safety Essentials**–(23 minute videotape). 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 minute videotape). 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 minute videotape). 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 minute videotape). 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 minute videotape). Proper sanitation starts with clean dishes! With this video, warewashers will learn how to ensure safe tableware for guests and safe kitchenware for coworkers.

F2039 **Food for Thought–The GMP Quiz Show**–(16 minute videotape). In the grand tradition of television quiz shows, three food industry workers test their knowledge of GMP principles. As the contestants jockey to answer questions, the video provides a thorough and timely review of GMP principles. This video is a cost-effective tool to train new hires or sharpen the knowledge of veteran employees. Topics covered include employee practices, including proper attire, contamination, stock rotation, pest control, conditions for microbial growth and employee traffic patterns. Food safety terms such as HACCP, microbial growth niche, temperature danger zone, FIFO and cross-contamination, are also defined. (Silliker Laboratories–2000)

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

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

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

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

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

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

F2081 **Food Safety Begins on the Farm**–(DVD PowerPoint presentation). From planting to consumption, there are many opportunities for bacteria, viruses, and parasites to contaminate produce. This CD 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)

F2134 **Food Safety: Fish and Shellfish Safety Video**–(21 minute videotape). 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)

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

Food Safety for 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 minute videotape). Provides the basic information needed to ensure integrity and safety in foodservice operations. Explains proper practices and procedures to prevent, detect and eliminate cross contamination.

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

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

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

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, Neenah, WI– 2002)

F2104 **Tape 1–Basic Microbiology and Foodborne Illness**–(10 minute videotape). 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 minute videotape). 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 minute videotape). 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 minute videotape). 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.

F2133 **Food Safety First**–(50 minute video and DVD available). Presents causes of foodborne illness in foodservice and ways to prevent foodborne illness. Individual segments include personal hygiene and handwashing, cleaning and sanitizing, preventing cross contamination and avoiding time and temperature abuse. Foodhandling principles are presented through scenarios in a restaurant kitchen. Video available in English and Spanish. DVD contains both English and Spanish versions. (Glo-Germ – 1998)

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

F2110 **Food Safety is No Mystery**–(34 minute videotape). This is an excellent training visual for 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 food-service worker with all the bad habits are featured. The latest recommendations on personal hygiene, temperatures, cross-contamination, and storage of foods are included. (USDA–1987). (Reviewed 1998)

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

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

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

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

emphasis is that prevention is the key to eliminating cross contamination.

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

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

F2129 **Food Technology: Irradiation**–(29 minute videotape). 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. (Chipbooks– 2001)

F2124 **Fruits, Vegetables, and Food Safety: Health and Hygiene on the Farm**–(15 minute video and DVD available). 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. Contains both English and Spanish versions. (Cornell University – 2004)

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

F2136 **GLP Basics: Safety in the Food Micro Lab**–(16 minute videotape). 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 Group, Inc., Homewood, IL–2001)

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

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

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

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

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

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

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 (GMPs), 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**–(11:40 minute videotape). Provides the definitions necessary to understand the meaning of the GMPs.

F2152 **Tape 2–Personnel and Personnel Facilities**–(11:20 minute videotape). Covers selection of personnel, delegation of responsibilities, development of plant policies for employees, and operational practices.

F2153 **Tape 3–Building and Facilities**–(15:50 minute videotape). Discusses guidelines for the construction and maintenance of the manufacturing plant and grounds around the plant.

F2154 **Tape 4–Equipment and Utensils**–(12:30 minute videotape). Provides guidelines for the construction, installation, and maintenance of processing equipment.

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

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

GMPs for Food Plant Employees; 5 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 minute videotape). 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 minute videotape). Selecting personnel, delegating responsibilities, developing plant policies for employees and visitors, and establishing operational practices.

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

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

F2165 **Tape 5–Production/Process Controls**–(22 minute videotape). 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.

F2266 **HACCP: A Basic Understanding**–(32 minute videotape). 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. (Chipsbooks Company–2003)

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

F2169 **HACCP: Training for Employees — USDA Awareness**–(15 minute videotape). 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 principles; HACCP plan checklist, and an HACCP employee training program. (J.J. Keller & Associates–1999)

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

F2170 **The Heart of HACCP**–(22 minute videotape). A training video designed to give plant personnel a clear understanding of the seven HACCP principles and practical guidance on how to apply these principles to their own work environment. This video emphasizes the principles of primary concern to plant personnel such as critical limits, monitoring systems, and corrective actions that are vital to the success of a HACCP plan. (Silliker Laboratories Group–1994)

F2171 **HACCP: The Way to Food Safety**–(53 minute videotape). The video highlights the primary causes of food poisoning and stresses the importance of self-inspection. Potentially hazardous foods, cross-contamination and temperature con-

trol 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)

F2173 **Inside HACCP: Principles, Practices & Results**–(15 minute videotape). 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 Group, Inc., Homewood, IL–2001)

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

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

F2191 **Microbial Food Safety: Awareness to Action**–(DVD PowerPoint presentation). 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 many 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 minute videotape). A promotional video that explores the wide variety of foods and beverages produced by the Canadian food industry. General in nature, this tape presents an overview of Canada's food industry and its contribution to the world's food supply. (Ternelle Production, Ltd.) (Reviewed 1998)

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

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

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

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

F2271 **Preventing Foodborne Illness**–(10 minute videotape). 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)

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

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

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

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

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

F2325 **Safe Practices for Sausage Production**–(3 hour videotape). This videotape is based on a series of educational broadcasts on meat and poultry inspections at retail food establishments produced by the Association of Food and Drug Officials (AFDO) and USDA's Food Safety and Inspection Service (FSIS), along with FDA's Center for Food Safety and Applied Nutrition. The purpose of the broadcast was to provide training to state, local, and tribal sanitarians on processes and procedures that are being utilized by retail stores and restaurants, especially those that were usually seen in USDA-inspected facilities. The program will cover the main production steps of sausage products, such as the processes of grinding, stuffing, and smoking, and typical equipment used will 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)

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

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

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

F2341 **Science and Our Food Supply**–(45 minute videotape). Becoming food safety savvy is as easy as A-B-C! This video includes step-by-step journey 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 and Applied Nutrition–2001)

F2342 **Seafood HACCP Internet Training Course**–(Interactive DVD). This CD 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**–(Video and DVD available). The ServSafe® food safety series consists of six videos that illustrate and reinforce important food safety practices in an informative and entertaining manner. The videos provide realistic scenarios in multiple industry segments. English and Spanish are provided on each tape and DVD. (National Restaurant Association Education Foundation –2000)

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

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

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

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

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

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

F2430 **Smart Sanitation: Principles & Practices for Effectively Cleaning Your Food Plant**–(20 minute videotape). A practical training tool for new sanitation employees or as a refresher for veterans. Employees will understand the food safety impact of their day-to-day cleaning and sanitation activities and recognize the importance of their role in your company's food safety program. (Silliker Laboratories Group–1996)

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

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

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

F2391 **Understanding Foodborne Pathogens**–(40 minute videotape). 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 minute videotape). Discusses the importance of cleaning and sanitizing as a means to prevent and control foodborne illness. Special emphasis is given to proper cleaning and sanitizing procedures and the importance of having properly designed and constructed equipment (brushes) for food preparation and equipment cleaning operations. (1989) (Reviewed 1998)

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

OTHER

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

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

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

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

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

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

M4071 **Understanding Nutritional Labeling**–(39 minute videotape). 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, serving size, percentage of daily value, and standard calorie reference/comparison. (Chipsbooks Company–2003)

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- ❒ D1050 Food Safety: Dairy Details
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- ❒ D1070 The Gerber Butterfat Test
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- ❒ D1130 Pasteurizer – Design and Regulation
- ❒ D1140 Pasteurizer – Operation
- ❒ D1150 Processing Fluid Milk (slides)

ENVIRONMENTAL

- ❒ E3010 The ABCs of Clean – A Handwashing & Cleanliness Program for Early Childhood Programs
- ❒ E3020 Acceptable Risks?
- ❒ E3030 Air Pollution: Indoor
- ❒ E3031 Allergy Beware
- ❒ E3040 Asbestos Awareness
- ❒ E2012 Better TEDs for Better Fisheries
- ❒ E3055 Effective Handwashing–Preventing Cross-Contamination in the Food Service Industry
- ❒ E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- ❒ E3070 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)
- ❒ E3075 EPA: This is Superfund
- ❒ E3080 Fit to Drink
- ❒ E3110 Garbage: The Movie
- ❒ E3120 Global Warming: Hot Times Ahead
- ❒ E3125 Good Pest Exclusion Practices
- ❒ E3128 Integrated Pest Management (IPM)
- ❒ E3130 Kentucky Public Swimming Pool & Bathing Facilities
- ❒ E3131 Key Pests of the Food Industry
- ❒ E3161 The Kitchen Uncovered Orkin Sanitized EMP
- ❒ E3170 The New Superfund: What It is & How It Works–(1) Changes in the Remedial Process: Clean-up Standards & State Involvement Requirements
- ❒ E3180 The New Superfund: What It is & How It Works–(2) Changes in the Removal Process: Removal & Additional Program Requirements
- ❒ E3190 The New Superfund: What It is & How It Works – (3) Enforcement and Federal Facilities
- ❒ E3210 The New Superfund: What It is & How It Works – (4) Emergency Preparedness & Community Right-to-Know
- ❒ E3220 The New Superfund: What It is & How It Works – (5) Underground Storage Tank Trust Fund & Response Program
- ❒ E3230 The New Superfund: What It is & How It Works – (6) Research & Development/Closing Remarks
- ❒ E3133 Physical Pest Management Practices
- ❒ E3135 Plastic Recycling Today: A Growing Resource
- ❒ E3140 Putting Aside Pesticides
- ❒ E3150 Radon
- ❒ E3160 RCRA – Hazardous Waste
- ❒ E3235 Regulatory and Good Manufacturing Practices
- ❒ E3236 Rodent Control Strategies
- ❒ E3240 Sink a Germ
- ❒ E3245 Wash Your Hands
- ❒ E3250 Waste Not: Reducing Hazardous Waste
- ❒ E3251 Would Your Restaurant Kitchen Pass Inspection?

FOOD

- ❒ F2260 100 Degrees of Doom...The Time & Temperature Caper
- ❒ F2265 A Day in the Deli
- ❒ F2450 A Guide to Making Safe Smoked Fish
- ❒ F2451 A HACCP-based Plan Ensuring Food Safety in Retail Establishments (DVD only)
- ❒ F2005 A Lot on the Line
- ❒ F2007 The Amazing World of Microorganisms
- ❒ F2011 Available Post Harvest Processing Technologies for Oysters
- ❒ F2008 A Recipe for Food Safety Success
- ❒ F2009 Basic Personnel Practices
- ❒ F2440 Cleaning & Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!
- ❒ F2010 Close Encounters of the Bird Kind
- ❒ F2013 Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments
- ❒ F2015 Controlling *Listeria*: A Team Approach
- ❒ F2111 Controlling *Salmonella*: Strategies that Work
- ❒ F2057 Cooking and Cooling of Meat and Poultry Products (2 Videos)
- ❒ F2030 "Egg Games" Foodservice Egg Handling and Safety
- ❒ F2020 Egg Handling & Safety
- ❒ F2021 Egg Production
- ❒ F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef (2 Videos)
- ❒ F2035 Fabrication and Curing of Meat and Poultry Products (2 Videos) *FastTrack Restaurant Video Kit*
- ❒ F2500 Tape 1–Food Safety Essentials
- ❒ F2501 Tape 2–Receiving and Storage
- ❒ F2502 Tape 3–Service
- ❒ F2503 Tape 4–Food Production
- ❒ F2504 Tape 5–Warewashing
- ❒ F2059 Food for Thought – The GMP Quiz Show
- ❒ F2040 Food Irradiation
- ❒ F2045 Food Microbiological Control (6 Videos)
- ❒ F2050 Food Safe – Food Smart – HACCP & Its Application to the Food Industry (Part 1&2)
- ❒ F2060 Food Safe – Series I (4 Videos)
- ❒ F2070 Food Safe – Series II (4 Videos)
- ❒ F2080 Food Safe – Series III (4 Videos)
- ❒ F2081 Food Safety Begins on the Farm (DVD only)
- ❒ F2154 Food Safety: Fish and Shellfish Safety Video
- ❒ F2090 Food Safety: An Educational Video for Institutional Food-Service Workers *Food Safety for Food Service – Series I*
- ❒ F2100 Tape 1–Cross Contamination
- ❒ F2101 Tape 2– HACCP
- ❒ F2102 Tape 3–Personal Hygiene
- ❒ F2103 Tape 4–Time and Temperature Controls *Food Safety for Food Service – Series II*
- ❒ F2104 Tape 1–Basic Microbiology and Foodborne Illness
- ❒ F2105 Tape 2– Handling Knives, Cuts and Burns
- ❒ F2106 Tape 3–Working Safely to Prevent Injury
- ❒ F2107 Tape 4–Sanitation
- ❒ F2133 Food Safety First (Also in DVD)
- ❒ F2120 Food Safety: For Goodness Sake, Keep Food Safe
- ❒ F2110 Food Safety is No Mystery
- ❒ F2130 Food Safety: You Make the Difference
- ❒ F2125 Food Safety Zone: Basic Microbiology
- ❒ F2126 Food Safety Zone: Cross Contamination
- ❒ F2127 Food Safety Zone: Personal Hygiene
- ❒ F2128 Food Safety Zone: Sanitation
- ❒ F2129 Food Technology: Irradiation
- ❒ F2124 Fruits, Vegetables, and Food Safety: Health and Hygiene on the Farm (Also in DVD)
- ❒ F2135 Get With a Safe Food Attitude
- ❒ F2135 Get With a Safe Food Attitude
- ❒ F2136 GLP Basics: Safety in the Food Micro Lab
- ❒ F2137 GMP Basics: Avoiding Microbial Cross-Contamination
- ❒ F2140 GMP Basics: Employee Hygiene Practices
- ❒ F2143 GMP Basics: Guidelines for Maintenance Personnel
- ❒ F2148 GMP – GSP Employee
- ❒ F2150 GMP: Personal Hygiene and Practices in Food Manufacturing
- ❒ F2147 GMP Basics: Process Control Practices *GMP Food Safety Video Services*
- ❒ F2151 Tape 1: Definitions
- ❒ F2152 Tape 2: Personnel and Personnel Facilities
- ❒ F2153 Tape 3: Building and Facilities
- ❒ F2154 Tape 4: Equipment and Utensils
- ❒ F2155 Tape 5: Production and Process Controls
- ❒ F2160 GMP: Sources & Control of Contamination during Processing *GMPs for Food Plant Employees: 5 Volume Video Series Based on European Standards and Regulations*
- ❒ F2161 Tape 1: Definitions
- ❒ F2161 Tape 2: Personnel and Personnel Facilities
- ❒ F2163 Tape 3: Building and Facilities
- ❒ F2164 Tape 4: Equipment and Utensils
- ❒ F2165 Tape 5: Production/Process Controls
- ❒ F2266 HACCP: A Basic Understanding
- ❒ F2180 HACCP: Safe Food Handling Techniques
- ❒ F2169 HACCP: Training for Employees–USDA Awareness
- ❒ F2172 HACCP: Training for Managers
- ❒ F2170 The Heart of HACCP
- ❒ F2171 HACCP: The Way to Food Safety
- ❒ F2173 Inside HACCP: Principles, Practices & Results
- ❒ F2175 Inspecting for Food Safety – Kentucky's Food Code
- ❒ F2190 Is What You Order What You Get? Seafood Integrity
- ❒ F2191 Microbial Food Safety: Awareness to Action (DVD only)
- ❒ F2210 Northern Delight – From Canada to the World
- ❒ F2240 On the Front Line
- ❒ F2250 On the Line
- ❒ F2270 Pest Control in Seafood Processing Plants
- ❒ F2271 Preventing Foodborne Illness
- ❒ F2280 Principles of Warehouse Sanitation
- ❒ F2290 Product Safety & Shelf Life
- ❒ F2220 Proper Handling of Peracidic Acid
- ❒ F2230 Purely Coincidental
- ❒ F2310 Safe Food: You Can Make a Difference
- ❒ F2320 Safe Handwashing
- ❒ F2325 Safe Practices for Sausage Production
- ❒ F2460 Safer Processing of Sprouts
- ❒ F2330 Sanitation for Seafood Processing Personnel
- ❒ F2340 Sanitizing for Safety
- ❒ F2341 Science and Our Food Supply
- ❒ F2342 Seafood HACCP Internet Training Course (DVD only)
- ❒ F2350 ServSafe® Steps to Food Safety (6 Videos) (Also in DVD)
- ❒ F2430 Smart Sanitation: Principles & Practices for Effectively Cleaning Your Food Plant
- ❒ F2370 Supermarket Sanitation Program – "Cleaning & Sanitizing"
- ❒ F2380 Supermarket Sanitation Program – "Food Safety"
- ❒ F2390 Take Aim at Sanitation
- ❒ F2391 Understanding Foodborne Pathogens
- ❒ F2410 Wide World of Food-Service Brushes
- ❒ F2420 Your Health in Our Hands – Our Health in Yours

OTHER

- ❒ M4010 Diet, Nutrition & Cancer
- ❒ M4020 Eating Defensively: Food Safety Advice for Persons with AIDS
- ❒ M4030 Ice: The Forgotten Food
- ❒ M4050 Personal Hygiene & Sanitation for Food Processing Employees
- ❒ M4060 Psychiatric Aspects of Product Tampering
- ❒ M4070 Tampering: The Issue Examined
- ❒ M4071 Understanding Nutritional Labeling

NEW MEMBERS

BRAZIL

Evelise Luciano
University Santa Catarina
Florianopolis, Santa Catarina

CANADA

Wendy Fairs
Canadian Food Inspection Agency
Mississauga, Ontario

Katherine L. Wilson
E.I. DuPont Canada Company
Mississauga, Ontario

JAPAN

Shinichi Kawamoto
National Food Research Institute
Tsukuba, Ibaraki

SERBIA AND MONTENEGRO

Dragoslava Radin
University of Belgrade
Belgrade-Zemun

SOUTH AFRICA

Elna M. Buys
University of Pretoria
Pretoria

TURKEY

Mete Udur
As. Vet. Okl.ve Egt. Mrk. Kiligi
Gemlik, Bursa

UNITED STATES

ARIZONA

Faezeh D. Manshadi
Arizona State University
Tempe

CALIFORNIA

Mark A. Jarvis
The Steritech Group, Inc.
San Diego

MARYLAND

Robert L. Buchanan
DHHS/FDA/CFSAN
College Park

Laura L. Hungerford
University of Maryland Baltimore
Baltimore

MASSACHUSETTS

Katherine P. Lemon
Children's Hospital Boston
Boston

MISSOURI

Richard D. Hendricks
The Solae Company
St. Louis

OHIO

Eugene M. Peters, Jr.
Cargill
Dayton

PENNSYLVANIA

Katherine L. Bialka
Penn State University
University Park

Michelle Katrinak
Giant Eagle, Inc.
Pittsburgh

Anna C. S. Porto-Fett
USDA
Wyndmoor

TEXAS

Peter Ha
Palo Duro Meat Co.
Amarillo

Louise Maranzana
Farmers Branch
Farmers Branch

WASHINGTON

Mengshi Li
Washington State University
Pullman

UPDATES

Silliker, Inc. Appoints Dr. Gustavo González Program Manager for Education Services

Dr. Gustavo González was named education program manager for Silliker, Inc. He is responsible for managing public course curriculum, preparing customized courses, coordinating technical instructors, and expanding Spanish language offerings of Silliker education services and products. He reports to education director C. J. Reynolds.

Before joining Silliker, Dr. González served as an extension meat associate, Dept. of Animal Science, at Iowa State University (ISU). In this role, he provided educational and consulting services to food processing companies in Iowa. González obtained a Ph.D. and M.S. in meat science from ISU. Prior to ISU, he worked for an agricultural business agency and the second largest meat company in Mexico. A native of Mexico, González possesses an extensive background in meat processing, food safety, and HACCP programs.

"Gustavo will bring an excellent technical and regulatory perspective, combined with practical in-plant experience and training expertise," said Reynolds. "He will be instrumental in developing education programs that help our clients meet their food safety and quality assurance objectives."

Roy Riley and Iain Grant Join Chr. Hansen Sales Team

Chr. Hansen announces the appointment of Roy Riley as technical sales representative for the company's fermented dairy ingredient products. He supports the Chr. Hansen fermented ingredient sales team's effort throughout the US. Mr. Riley has over 22 years of sales and technical service experience with cheese and fermented milk ingredients. He most recently worked for Danisco (Rhodia) as a senior account representative.

Iain Grant joins Chr. Hansen as account manager in Ontario and Quebec, Canada. Mr. Grant provides ingredient sales, service and support to the company's food customers. He most recently was with Nestlé Canada as National Accounts Culinary Sales.

Jim Begg – New IDF President

The International Dairy Federation (IDF) has announced that Jim Begg (United Kingdom) has been elected as its President.

Mr. Begg was elected at the IDF's General Assembly in Melbourne, Australia, for a four-year term.

Mr. Begg is currently the director general of Dairy UK, the recently created organization that represents and promotes the interests of the entire dairy industry in the UK.

Educated at Strathclyde University in Glasgow, Scotland, where he graduated with a degree in economics and marketing, Mr. Begg joined the Scottish Milk Marketing Board in 1972, where he spent 10 years until joining the Milk Marketing Board for England and Wales as Head of Milk Prices.

Prior to the creation of Dairy UK, Mr. Begg was director general of both the Dairy Industry Federation (DIF) (1998–2002) and its successor organization, The Dairy Industry Association (DIAL) (2002–2004). He sits on a number of dairy-related Boards and representative committees, both in the UK and in the EU.

International Association for Food Protection® NEWS

Emerging Infectious Diseases: Review of State and Federal Disease Surveillance Efforts

The threat posed by infectious diseases has grown. New diseases, unknown in the United States just a decade ago, such as West Nile virus and severe acute respiratory syndrome (SARS), have emerged. To detect cases of infectious diseases, especially before they develop into widespread outbreaks, local, state, and federal public health officials as well as international organizations conduct disease surveillance. Disease surveillance is the process of reporting, collecting, analyzing, and exchanging information related to cases of infectious diseases. In this report GAO was asked to examine disease surveillance efforts in the United States. Specifically, GAO described how state and federal public health officials conduct surveillance for infectious diseases and initiatives intended to enhance disease surveillance. GAO reviewed documents, such as policy manuals and reports related to disease surveillance, and interviewed officials from selected federal departments and agencies, including the Departments of Defense (DOD), Agriculture (USDA), and Homeland Security (DHS) as well as the Food and Drug Administration (FDA), and the Centers for Disease Control and Prevention (CDC). GAO conducted structured interviews of state public health officials from 11 states.

Surveillance for infectious diseases in the United States comprises a variety of efforts at the state and federal levels. At the state level, state health departments collect and analyze data on cases of infectious diseases. These data are required to be reported by health care providers and others to the state. State public health departments verify reported cases of diseases, monitor disease incidence, identify possible outbreaks within their state, and report this information to CDC. At the federal level, agencies and departments collect and analyze disease surveillance data and maintain disease surveillance systems. For example, CDC uses the reports of diseases from the states to monitor national health trends, formulate and implement prevention strategies, and evaluate state and federal disease prevention efforts. FDA analyzes information on outbreaks of infectious diseases that originate from foods that the agency regulates.

Some federal agencies and departments also fund and operate their own disease surveillance systems and laboratory networks and have several means of sharing surveillance information with local, state, and international public health partners. State and federal public health officials have implemented a number of initiatives intended to enhance disease surveillance, but challenges remain. For example, officials have implemented and expanded syndromic surveillance systems, which monitor the frequency and distribution of health-related symptoms among people within a specific geographic area. Although syndromic surveillance systems are used by federal agencies and departments and in all of the states whose officials GAO interviewed, concerns have been raised about this approach to surveillance. Specifically, syndromic surveillance systems are relatively costly to maintain compared to other types of surveillance and are still largely untested. Public health officials are also implementing initiatives designed to enhance public health communications and disease reporting. For example, CDC is working to increase the number of participants using its public health communication systems. In addition, state public health departments and CDC are implementing an initiative designed to make electronic disease reporting more timely, accurate, and complete. However, the implementation of this initiative is incomplete.

Finally, federal public health officials have enhanced federal coordination on disease surveillance and expanded training programs for epidemiologists and other public health experts. In commenting on a draft of this report, the Department of Health and Human Services (HHS) said the report captures many important issues in surveillance. HHS also provided suggestions to clarify the discussion.

The full report can be found at: http://www.gao.gov/cgi-bin/getrpt?GAO-04-877.

Feedlot Study Indicates No Major Links to Antimicrobial Resistance in Humans

The use of antimicrobial drugs in Canadian cattle production is not currently a major contributor to the development of resistant bacteria that threaten human health. That's the indication of a much-anticipated, five-year study investigating antimicrobial resistance in Alberta feedlot cattle, led by the University of Calgary and Agriculture and Agri-Food Canada.

"The most significant resistance concerns that we went into the project looking for, turned out not

to be an issue," says study leader Dr. Ron Read of the University of Calgary. Most notably, bacteria with resistance to vancomycin and methicillin, the top human health concerns speculatively linked to cattle production, were not found in Alberta feedlot cattle.

Salmonella, with multiple forms of resistance, widely thought to be in outbreak situations in food animals, were also not found. "Our study was helpful in closing the book on a number of resistance issues," says Read. Only one form of resistance of potential concern for human medicine was found – *E. coli* strains with resistance to cephalosporins. However, the prevalence of this type of resistance in humans is extremely low and researchers consider the potential for relevant transfer from cattle to humans unlikely at this point. "We're in a situation where we've identified something that needs to be monitored," says Read. "We're fortunate that we have time to keep an eye on this situation and deal with it, because we're not seeing this resistance occurring in humans."

More on the study and Read's views are available in a new article on the Meristem Land and Science Web site, www.meristem.com. *Land and Science* is a service featuring information on the sustainability of agriculture, food production and the environment. It is presented by Meristem Information Resources Ltd., in co-operation with partners in agriculture, food, environment and life sciences.

The current edition of *Land and Science* also includes excerpts from Read's responses at a press conference held following his presentation on the antimicrobial resistance study, at the National Beef Science Seminar in Calgary, Nov. 16.

Over the past decade, a disturbing trend worldwide has been the emergence of microbe populations that are resistant to important antimicrobial agents used in veterinary and human medicine. "It's a very serious issue," says Read, associate professor, medicine and microbiology and infectious diseases, University of Calgary, Faculty of Medicine. "Obviously, as more agents are rendered less effective due to increased populations of antimicrobial resistant microbes, humans and animals that depend on those agents to battle disease become more vulnerable."

The more widely and frequently an antimicrobial is used, the greater the risk of antimicrobial resistance developing. This is because antimicrobial use places selection pressure on target microbe populations to evolve survival mechanisms.

Antimicrobial resistance that threatens human health is primarily associated with antimicrobial use in human medicine and the role of hospitals as reservoirs of resistant organisms. However, there has been widespread concern that antimicrobial use in livestock production is also a contributing factor, with resistant microbes transferred to humans through direct contact, the environment – including water channels – and through food products.

The new study was the most comprehensive of its kind and the first to examine Canadian cattle. The one potential issue identified, cephalosporin resistance, was a surprise finding and its significance is unknown, says Read. "The most important thing we can do is to continue to keep an eye on this phenomenon."

Health Canada is currently establishing a surveillance system for antimicrobial resistant organisms in agriculture. Read and colleagues have proposed that the resistant microbes identified in their study be included in this monitoring program. Production management changes may also be warranted, say the researchers.

Government Introduces New Food Inspection and Enforcement Bill in the House of Commons

The Honorable Andy Mitchell, Minister of Agriculture and Agri-Food and Minister responsible for the Canadian Food Inspection Agency (CFIA), introduced the Canadian Food Inspection Agency Enforcement Act in the House of Commons. The new Act is intended to provide a more consistent and comprehensive overall approach to inspection, enforcement and compliance activities, thus contributing to the enhanced safety and security of Canada's food supply, animal health and plant resources.

"Canadians have one of the best food inspection systems in the world and the proposed Canadian Food Inspection Agency Enforcement Act is designed to further strengthen this system," Minister Mitchell said. "The proposed new law creates a more efficient and effective legislative framework so that our inspection system can better protect Canadians and our animal and plant resources."

Modernized and consolidated inspection and enforcement legislation will contribute to increased harmonization, and reduce overlap and duplication of inspection and enforcement authorities by allowing inspectors to be guided by a single piece of enforcement and inspection legislation. As well, a number of existing inconsistencies will be addressed with new and enhanced enforcement and inspection powers and authorities. It is also intended to provide the CFIA with new enforcement and inspection tools similar to border enforcement provisions introduced by our major trading partner, the United States. The

Canadian Food Inspection Agency is responsible for the administration and enforcement of ten acts dealing with the regulation of food, animals, plants and their products. These include the Food and Drugs Act as it relates to food, and the Consumer Packaging and Labeling Act as it relates to food. The proposed act will not alter the respective roles of the Ministers of Health and Agriculture and Agri-Food as they relate to food safety. Health Canada maintains responsibility for setting policy and standards relating to food safety and nutritional quality. The CFIA will continue to enforce the food safety provisions of the Food and Drugs Act, and administer and enforce non-health and safety provisions related to food, as it does now. The Bill and other background material are available on the CFIA's web site at www.inspection.gc.ca.

Institute's "Wash Your Hands" Campaign Aimed at School Children

According to the Centers for Disease Control, hand washing is the single most important means of preventing the spread of infection and germs that can cause colds and flu. The United States Department of Agriculture through the National Food Service Management Institute (NFSMI) at the University of Mississippi is promoting a national campaign to help ensure that schoolchildren understand the importance of hand washing. The project embraces NFSMI's mission to provide research-based education and training resources to child nutrition programs nationally.

During November, NFSMI distributed more than 56,000 "Wash Your Hands: Educating the School Community" kits to school nutrition professionals nationwide. Each teaching package contains a booklet that explains the importance of hand washing and lists strategies to promote hand washing at schools; a formulated "invisible" ultraviolet powder, potion and miniature light to use in hands-on learning activities; and a training video, posters and compact disc with a PDF format of the information.

"Since we began the nationwide distribution to child nutrition professionals, we have received a remarkable amount of positive feedback," said Theresa Stretch, a food and nutrition specialist at the institute. "Schools throughout the nation are utilizing the 'Wash Your Hands' resource by implementing hand washing efforts in classrooms, training the school staff and promoting hand washing in local communities. We recently learned that the Connecticut State Department of Education is implementing a statewide hand washing effort," she said. That state's child nutrition leaders have involved state officials, superintendents and other school nutrition professionals in the campaign.

"Food safety is extremely important to school nutrition professionals," Stretch continued. "They provide more than 27 million healthful meals to children each day and understand the importance of hand washing. Despite the simplicity of hand washing, the reality is many people just do not wash their hands frequently and at appropriate times." As part of research conducted by the American Society for Microbiology, 97 percent of females and 92 percent of males said they always wash their hands after using public restrooms. Later research suggests that only 75 percent of females and 58 percent of males were observed doing so.

"Hand-washing practices of children are even more alarming," Stretch said. "Approximately 50 percent of middle-grade students wash their hands after using the restrooms, which means approximately 50 percent do not." Stretch said that proper hand-washing habits and messages have been a part of child nutrition programs for years. Prominently posted hand-washing messages are encouraged in food preparation areas, near sinks, in bathrooms and on trash cans and refrigerator doors.

"With so many reminders, school nutrition professionals will wash their hands several times a day," Stretch said. "As food safety leaders, they are in the position to uniquely influence and promote hand-washing skills to students, principals, teachers and other school staff."

Each "Wash Your Hands" teaching kit encourages school nutrition professionals to take charge and set an example, train fellow food service co-workers and educate the school and entire community about the importance of hand washing.

Irradiation Improves Safety of Food Supply

Food irradiation is a proven, beneficial method of improving the safety of the food supply and poses no human health threat. This according to the latest Scientific Status Summary Irradiation and Food Safety published by the Institute of Food Technologists.

The report specifically addresses and counters misleading claims that irradiation produces worrisome carcinogenic byproducts, is harmful to the environment, substantially reduces food macro- and micro-nutrients, or that its use allows for sloppy practices elsewhere in the food processing line.

The summary supports the use of this technology as a means to inactivate pathogens, maintain quality, and increase shelf life, as part of an effective overall food processing management system. The report calls for further research to focus on: Pathogen reduction protocols allowing for standards in pathogen control levels; Inactivation of viruses in ready-to-eat foods and minimally processed fruits and vegetables; Irradiating packaged meals; Packaging advancements affecting sensory attributes, and more.

Approved for use since 1963 to control mold and insect infestation in wheat and to inhibit the growth of sprouts on potatoes, irradiation is also used today on fruits, vegetables, meats, poultry and seafood to delay ripening, control microbiological pathogens, and even improve the safety of animal and pet foods.

The purpose of this Scientific Status Summary is to review the activity surrounding irradiation as a food safety measure and address issues of concern for consumers, activists, and government to provide a greater understanding of the technology.

This and other recent IFT Scientific Status Summaries also can be accessed directly via the Web at www.ift.org/science.

The Economics of Food Safety: The Case of Green Onions and Hepatitis A Outbreaks

Using the example of recent foodborne illness outbreaks in the United States associated with green onions from Mexico, this report examines the economics of food safety. Incentives for growers to adopt additional food safety practices are somewhat weak. Because of asymmetric information problems, produce grown with more food safety practices does not receive higher prices. Growers that adopt more food safety practices do so to maintain markets and to reduce risk. Results from a survey before the outbreaks provide a view of the incentives for adopting more food safety practices.

Interviews with growers after the outbreaks indicate how the costs of an outbreak vary depending on the food safety practices growers had already adopted. According to growers, the market impact lasted 1–4 months. Policy responses by growers, retailers and food-service buyers, and governments conclude the report.

KSU Process Protects Ready-to-Eat Beef from Pathogen

The good news for consumers is that there are more ready-to-eat meat products on the market and that vacuum packaging has made it possible to keep them fresh in appearance and taste. The problem is that pathogenic bacteria can grow on the meat in this packaging at both room and refrigeration temperatures.

The better news is that Food Safety Consortium researchers at Kansas State University have found that a solution of sodium citrate can inhibit the growth of the bacterium *Clostridium perfringens* on restructured roast beef.

Ready-to-eat meats go through a mild heat treatment, but the treatment stimulates rather than reduces the growth of the bacterium in vacuum packaging. One way to prevent the problem would be to follow federal guidelines to sharply cool down the meat within five hours. But not all of the current refrigeration technology makes that possible. So, according to KSU food science professor Daniel Fung, "there is a need for additional secondary safety barriers in vacuum-packaged meat products that will help prevent the growth of anaerobic bacteria such as *C. perfringens* during cooling procedures."

C. perfringens is a common foodborne bacterium that the federal government reported was responsible for more than 6 percent of bacterial foodborne disease outbreaks in 2000. Its significance lies also in its designation by the Centers for Disease Control and Prevention as an organism that can produce toxin that could potentially be used in a bioterrorist attack. Fung's experiments showed that all sodium citrate treatments reduced *C. perfringens* after the cooking step and before the end of the 18-hour cooling step and suppressed its further growth.

The process would be particularly beneficial to smaller meat processors that may not have the equipment to cool down their meat far enough fast enough. Fung said sodium citrate would create another hurdle to block the growth of *C. perfringens*.

"It's another safety measure in case something goes wrong," Fung said. "The antimicrobials would help control the food to make it safer." With ground beef, results were similar after heating followed by cooling. "The combination of heat and sodium citrate proved to be an effective preventive method against *C. perfringens* growth by damaging the bacterium's cell structure," Fung said.

Fung said his research team continues to examine the issue by using electron microscope transmissions to study the mechanism of killing the pathogen. "We want to see whether the organisms disintegrate or whether the cell structure

changes," he said, noting that industry could likely use such data.

ISU Reviews, Seeks to Improve Students' Ideas of Food Safety

High school students – who may prepare food at home or as restaurant employees – have their own perceptions about food safety. They're not always right. According to an Iowa State University (ISU) Food Safety Consortium survey published in the April 2004 issue of *Food Protection Trends*, students know that processed meat products can be sources of foodborne illness, but their concern was just average at 3.2 on a scale of 7. They also believe that food eaten at home is the least likely to cause illness, although evidence by researchers shows that consumers can make enough mistakes in the kitchen to endanger their food.

"Overall, students are inadequately and inconsistently informed about foodborne illness sources," said Jason Ellis, a researcher in ISU's Hotel, Restaurant and Institution Management (HRIM) program. "Students know which food products are most likely to cause foodborne illness, but have little concern about getting sick from these products."

The survey, completed by 289 high school students, indicated that students believe the food handled at their school cafeterias is less likely to cause illness than food handled in restaurants. However, the students said they had more control over the safety of restaurant food compared to school food.

"I asked these questions multiple ways and it was reported that the home was identified as the safest source of food followed by schools and restaurants," Ellis said. Students thought they had more control over food served in restaurants compared to schools. Ellis said one hypothesis would be that consumers have some choice over what to order and how it is cooked in restaurants, but schools typically do not serve food to order.

"The results show that there is a need for additional food safety education in that population. The 16-18 age group makes up 30 to 32 percent of the food service work force. You want that population to be somewhat knowledgeable of the impact they can have through their work in service establishments," Ellis said.

This is where ISU's efforts to make more food safety information available on the World Wide Web fit well into potential food safety education for secondary schools. Dan Henroid, also a Hotel, Restaurant and Institution Management researcher, explained that food safety is already being covered to some extent in high schools with more than 95 percent of Iowa family and consumer science teachers who responded to a survey reporting they include food safety topics in their curriculum. They mostly use textbooks, video tapes, and self-developed materials as food safety resources for instruction.

Henroid's research group is developing other resources that can be plugged into the secondary schools and other forums. One approach for disseminating food safety information is to visually demonstrate basic food safety concepts. Based on seven key food safety concepts, the ISU research team developed a Food Safety Education Fair (FSEF) in partnership with the Iowa Hospitality Association Educational Foundation.

"We developed many hands-on activities for seven basic food safety concepts, such as how to use a thermometer and hand washing. Each of the seven concepts was a booth with an instructor at each booth. Participants were divided into small groups. The students could see how to calibrate a thermometer and how to wash hands properly and they could ask questions. Each booth had very teachable moments as everybody rotated through all the concepts," Henroid said.

The ISU group plans to help secondary schools integrate these hands-on activities into their curriculum. FSEF materials and teaching guides can be downloaded at http://www.extension.iastate.edu/hrim/training/fsef/. Henroid indicated that food safety trainers could and do use many of the food safety demonstrations in their training programs such as ServSafe®, a national food safety training program for food service workers developed by the National Restaurant Association Educational Foundation.

"Students represent a third of the food service work force. In secondary schools, many students are getting food safety training and other skills that are marketable to potential employers. We hope they will make better decisions about how they handle food in the food service operation because they have additional training" Henroid said.

Nominate a Colleague Today for the Association Fellows Award

The nominee must be a current International Association for Food Protection Member, and must have been a Member of the Association for 15 or more consecutive years.

The purpose of the Fellows Award is to honor and recognize Association Members who have contributed to the International Association for Food Protection and its Affiliates with distinction over an extended period of time.

Nomination deadline is March 14, 2005.

Nomination criteria available
at our Web site or call our office at 800.369.6337; 515.276.3344

www.foodprotection.org

International Association for Food Protection®

6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337 • 515.276.3344
Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

Southwest Food Safety Conference and Exhibition

February 16 & 17, 2005
Laughlin, Nevada

A smorgasbord of food safety information!

For more information contact:
Chris Reimus at (480) 820-7655, x202
Or creimus@mail.maricopa.gov

Sponsored by: The Arizona County Directors of Environmental Health Services and Arizona Environmental Health Association

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Sponsorship Opportunities Available for IAFP 2005

Sponsor an event to promote your company as a supporter of IAFP!
contact Dave Larson
at 515.440.2810
E-mail: larson6@mchsi.com

INDUSTRY PRODUCTS

Aquionics

Aquionics Quantum UV-Disinfection System Improves Food and Beverage Quality

UV disinfection specialist, Aquionics, introduces the Quantum, a compact, low-cost UV disinfection system specifically designed for small flow process water applications (up to 520 gpm) in the food and beverage industries. UV disinfection improves product quality by controlling microbial contamination in rinse, chase, dilution and product water, and clean in place rinses.

The Quantum employs medium pressure UV technology to combat contamination and spoilage, destroying virtually all microorganisms, including bacteria, yeasts, molds, and viruses. The system is simple to operate, requires no chemicals, and has no effect on the taste or odor of the treated liquids. Additionally, the system can be used for dechlorination and deozonation, eliminating the byproducts of alternate disinfection systems.

A radical new design positions the Quantum's UV lamp at a 25° angle to the process water flow, maximizing contact time. This in-line design minimizes headloss and achieves optimum disinfection by ensuring all the fluid passing through the chamber receives the minimum required UV dose. In addition, the angled lamp design lowers the power per unit length, resulting in extended UV lamp life.

The Quantum's compact in-line design simplifies installation as the chamber can typically be mounted within existing pipe work with minimal disruption to the plant. To further maximize installation flexibility, its local control unit, which displays UV intensity, alarm status and an hours-run counter, can be positioned in wet areas (adjacent to the UV chamber) while the power unit can be located up to 100 meters away in a dry area. Options with the Quantum include a manual UV lamp wiper and auto-bleed facilities. The system's lamp replacement can be performed quickly and easily by plant personnel.

Aquionics
800.925.0440
Erlanger, KY
www.aquionics.com

Strahman Valves New Sanitary Valve Announced for Food and Beverage, Pharmaceutical and API Processing Industries

Strahman Valves, Inc. has announced a new product, the SR-800 (Sanitary RAM-800), designed for sanitary applications.

The design of the SR-800 valve eliminates the interior spaces where liquids and foreign matter can accumulate. Specifically, the SR-800 has a unique piston design using O-rings behind a Teflon wall to significantly improve sealing and self-cleaning. The piston completely fills the valve interior, making it impossible for matter to collect. It does this by closing flush to the valve end, eliminating any recesses or cavities.

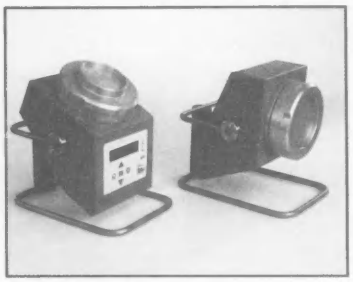
According to William Doll, product manager with Strahman Valves, "Our Sanitary RAM has been designed for use in food and beverage, pharmaceutical and API manufacturing industries and meets the requirements of the ASME BPE-2002 standard."

The fabricated SR-800 valve body is constructed of BPE and 3-A compliant, low sulfur content 316 stainless steel to eliminate rouging. (Strahman Valves offers a complete range of internal and external finishes that are compliant with 3-A and BPE standards as well.)

The SR-800 valve can be autoclaved for critical sanitation control, and it comes with sanitary/hygienic clamp connectors for easy disassembly. Rated for 150 psig, the SR-800 operates in a temperature range from 32°F to 300°F. It comes standard with 1" sanitary clamp connections.

Strahman Valves, Inc.
877.787.2462
Florham Park, NJ
www.strahmanvalves.com

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



Hardy Diagnostics

Hardy Diagnostics Introduces the Spin Microbial Air Sampler

The Spin Microbial Air Sampler features portability, accuracy, and ease-of-use. The unit spins the petri dish while drawing in air from the environment. This results in the sampled air having full coverage over the entire agar surface. Unlike traditional air samplers, the Spin Air Sampler ensures that the microbial counts are extremely accurate by reducing the probability of two or more particles impacting the plate in the same location. This can result in a falsely lowered microbial count. The unit can be used with a bar code reader for speed, and the results can be printed out on most printers. The system is battery powered and comes with an optional slave unit for duplicate sampling, in order to improve accuracy over current systems.

The Spin Air Sampler can be fitted with a 100 mm or 60 mm petri-dish adapter. The entire unit comes in a rigid hard shell carrying case.

Hardy Diagnostics
800.266.2222
Santa Maria, CA
www.hardydiagnostics.com

Key Technology Introduces Impulse™ Compact, Small Electromagnetic Shakers That Achieve Precise Metering and Reduce Maintenance

Key Technology introduces Impulse™ Compact, a new family of small electromagnetic shakers designed specifically for tight fitting processing and packaging distribution lines that require precise metering and low maintenance drives. Ideal for product mixing lines, ingredient feeding, and scale feeding, Impulse Compact starts and stops quickly to accurately meter product.

Impulse Compact maximizes production flexibility with dedicated solid-state controls that allow conveying pan amplitudes to range from zero to 100 percent to adjust for different products or processing conditions. The electromagnetic shakers can be adjusted from low stroke, high cycle mode for gentle product handling to high stroke, low cycle mode for faster throughput or to handle heavier product.

Key offers the new Impulse Compact in sizes ranging from 200 to 400 mm (8 to 15.7 inches) wide and from 1500 to 2000 mm (5 to 6.5 feet) long. For higher volume applications, Key also offers larger electromagnetic Impulse shakers up to 610 mm (24 inches) wide and up to 3500 mm (11 feet) long. An assortment of drive sizes, product conveying surfaces, and system configurations allow for a wide variety of applications.

The efficient electromagnetic drives featured on Impulse Compact enable precise metering and gentle product handling while minimizing maintenance and maximizing product quality. There are no sliding or rotating parts to wear and no belts or bearings to fail. Furthermore, the electromagnetic drives are oil-free, helping to insure food safety and product quality, particularly when installed above open product zones. Rugged construction makes Impulse Compact shakers ideal for industrial applications that have harsh operating environments. All units are dust and moisture resistant with controls housed in a NEMA 4X rated enclosure to ensure years of trouble-free operation.

Key manufactures the new stainless steel Impulse Compact shakers to satisfy the most stringent sanitation demands in the industry, meeting 3-A Dairy Sanitary Standards, USDA, HACCP, and FDA requirements.

Key Technology, Inc.
509.529.2161
Walla Walla, WA
www.key.net

B&H Introduces the High-speed Marathon XL Roll-fed Labeler with Smart Drive

B&H Labeling Systems introduces the new Marathon XL, the fastest labeler in the successful Marathon family of roll-fed labelers, which features Smart drive, the industry's first all-electronic drive train. With a servomotor-driven feedscrew and container stabilization features, the Marathon XL handles containers from 8 oz to 3 liters at speeds up to 650 containers per minute.

Compared to the complex, high-speed rotary machines, the advanced in-line design of the Marathon XL greatly simplifies operations. As a re-

sult, Marathon XL improves productivity and reduces the total cost of ownership.

Marathon XL features Smart drive, an advanced digital, multi-axis servomotor control. Five independent servomotors communicate on a high-speed digital bus to precisely synchronize component operations such as label feeding, cutting, gluing and container transport. Eliminating the gears, belts and chains found on traditional labelers, Smart drive improves labeling accuracy over the life of the machine. B&H guarantees labeling defect rates of less than 0.05 percent with all Marathon roll-fed labelers. Fewer moving parts improve reliability, ease maintenance and increase uptime.

With its all-electronic, servomotor-based design, Marathon XL achieves the fastest changeover in the industry by eliminating time-consuming machine adjustments. Recipe downloads for each new container allow Marathon XL to automatically adjust the needed machine settings. Lightweight, color-coded RCO (Rapid Changeover) change parts further ease changeover. As a result, the Marathon XL sets a new industry record for high speed changeovers: less than 15 minutes from one full production speed to another, including the replacement of change parts.

Built-in intelligence and 24/7 self-monitoring diagnostics reduce maintenance, ease troubleshooting and simplify repairs to maximize Marathon's reliability and uptime. Designed for ease of use, the Marathon XL features a ten-inch color touchscreen monitor with intuitive drop-down menus, graphics, navigation bars and drop-down keyboard for data entry.

Marathon XL features B&H's powerful ProWatch, the monitoring tool that tracks labeler productivity and scrap by container type, operator, shift, day and week. Screen and hard-copy summary reports provide data for process improvements. Optional Ethernet connectivity allows access to labeling machine data from plant-wide host computers. Monitoring and reporting critical data in real time enables packagers to maximize the productivity and the efficiency of the labeling operation.

B&H Labeling Systems
209.537.5785
Ceres, CA
www.bhlabeling.com

Parker Hannifin's New Balston Smart Dryer™ 5000 Series Membrane Air Dryers Provide Pure, Dry Compressed Air

New, full-featured Balston Smart Dryer membrane air dryers for applications requiring 35°F dewpoints and flow rates up to 600 SCFM are now available from Parker Hannifin Corporation.

Proven to be the best performing dryers for the most sensitive applications, the Balston Smart Dryer Membrane Air Dryers offer lower operating costs and better performance than both non-cycling and cycling refrigerant air dryers and eliminate downtime and costly repairs resulting from dirty, wet compressed air supplies.

The Balston drying system produces a guaranteed dewpoint of 35°F and removes all other compressed air contaminants down to 0.01 micron in size. The system utilizes sophisticated technology to monitor the air consumption and automatically adjusts the regenerative sweep flow as required, without the need of electricity. Unsurpassed in performance and durability to dehydrate and purify compressed air, the Balston Smart Dryer significantly outperforms refrigerant air dryers in dewpoint reduction and is far less expensive to operate.

The Balston Smart Dryer™ 5000 Series Air Dryers are shipped complete with prefilters, auto drains and membrane modules all assembled in a cabinet with inlet and outlet ports mounted on top for easy installation.

Parker Hannifin Corporation
800.343.4048
Haverhill, MA
www.parkerhannifin.com

Supelco Introduces the New Ascentis™ Family of HPLC Columns Using Surface-optimized Technology

Supelco, a division of Sigma-Aldrich Corporation has introduced a new family of HPLC columns designed to help researchers achieve high-quality chromatography separations in the life sciences and other analytical sciences.

The Ascentis family of HPLC columns is the fourth and newest generation of HPLC columns from Supelco. Our scientists have combined proprietary advances in bonding chemistry, a unique revolutionary approach to endcapping, and ultra high purity silica to create Surface-Optimized Technology.

Featuring C18 and RP-Amide phases, the Ascentis column family is engineered with high surface coverage to provide maximum HPLC performance. Ascentis HPLC columns offer near-perfect peak symmetry; excellent retention, even for many difficult to retain compounds; orthogonal selectivity between C18 and RP-

Amide; ultra low MS detectable bleed; and the new RP-Amide is compatible with 100% aqueous mobile phases.

"We designed the Ascentis HPLC phases to provide retention and selectivity choices for HPLC method developers and chromatographers in all industries," said Dr. William Campbell, R&D manager at Supelco in Bellefonte, PA. "Our research into bonding chemistry has led to the development of our optimized-surface technology ensuring the Ascentis phases deliver stable and reliable analyses and purifications."

Supelco
800.521.8956
St. Louis, MO
www.sigma-aldrich.com

Thermo Electron Corporation's Spectra-Quad Analyzer Provides Real-time Information on Moisture and Other Critical Product Parameters

Thermo Electron Corporation's Spectra-Quad On-Line Moisture and Constituent Analyzer incorporates a patented, industry-proven optical system and other quality innovations, making the Spectra-Quad an industry standard for on-line process analysis.

Using advanced filter technology and specialized measurement algorithms, the Spectra-Quad offers the highest performance on a broad range of applications. The system will measure product constituents such as moisture, coating weight, film thickness as well as many others.

Continuous product monitoring of the various key process variables allows immediate production line adjustments to be made. This avoids extended periods of off-specification production that can occur with manual sampling and analysis. Production line start-ups can be controlled to reach optimum conditions in the shortest possible time.

Thermo Electron Corporation
814.359.3441
Minneapolis, MN
www.thermo.com

International pbi S.p.a.

International pbi S.p.a. "Superchemo" Cupboards Safety for Chemists

The chemist is always at chemical risk in his daily laboratory activity for possible breathing of toxic, irritant or allergy-inducing chemical substances. Diseases like gastric lesions, anaemia, lung oedemas, bronchitis, burnings may be present when the "TLV" are exceeded.

The new generation of cupboards "Superchemo" of International "pbi" avoids the risk of chemical contamination and in all cases where it is not practical or convenient to install a fixed extraction ducting.

The operating principle is based on a constant flow of air which is drawn into the cupboard through the front, runs parallel to the work surface removing toxic fumes and is forced through the filter unit consisting of an electrostatic prefilter which retains particles and then through an active carbon filter in which contaminating chemicals are neutralized and adsorbed.

The filtered air may be reintroduced in the working environment or ducted to the outside.

The "Superchemo" cupboards protect operator, process, environment from toxic vapor, fumes, gases or particulates.

International pbi S.p.a.
39.024.877.9245
Milano, Italy
www.internationalpbi.it

Thomas Scientific Offers Pipet Tips for Every Liquid Handling Application

Precision molded from medical grade, virgin polypropylene, tips are certified to be free of DNase, RNase and endotoxins and can be autoclaved at 122 degrees C for 15 minutes at 15 psi.

General purpose tips fit 1-200 µL or 200-1,000 µL single- or multichannel pipettors. Thomas offers a variety of tip styles for micro to macro volumes (0.1 µL to 10 mL).

Hinged racks allow convenient one-handed access to upright tips arranged in 8 x 12 or 8 x 24 (192) formats for standard size tips (1-200 µL), a format useful when working with multiwell plates and multichannel pipettors. Most tips are available individually wrapped or in bulk packaging.

Thomas Scientific
856.467.2000
Swedesboro, NJ
www.thomassci.com

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

2005 Proposed Symposium Topics

1. Enrichment Media and Sample Preparation: What's New?
2. Pathogen Survival in Dried Fermented Meat and Partially Cooked Products
3. Microbiological Predictive Models: Development, Use and Misuses
4. Food Safety Objectives – Now We Have Decided to Have Them, How Do We Think They Will be Used in Food Safety Management?
5. 2005 Foodborne Disease Symposium
6. Food Allergens: Concerns for the Food and Food Service Industries
7. Global Water Quality Concerns
8. Food Toxicology
9. Dairy Regulations Issue & Updates
10. Practical Verification Tools for Seafood
11. Intentional Foodborne Contamination
12. Risk Communication – Practice and Challenges
13. International Food Safety: Opportunities and Challenges in the Developing World
14. Pre-Harvest and Post-Harvest Produce Microbiological Safety: Lessons We are Learning from Multistate Projects
15. Testing and Evaluation of Multi-Use Food Contact Surface
16. Managing the Risk of *Listeria monocytogenes* at Retail/Restaurants
17. Microarray Technology
18. A Behavioral Approach to Performance Based Food Safety
19. Risk Profiling and Risk Ranking for Foodborne Pathogens
20. Microbiological Sampling: The Risk; The Reality
21. Yeast and Molds
22. Improvement of Cold Chain Management in Dairy Products
23. Pre-Harvest Issues Associated with the Transmission of Viruses and Parasitic Protozoa
24. Risk and Control of *Salmonella* in Raw Nuts
25. The Safety of Raw Milk Cheese – A European Perspective

Subject to change

2005 Workshops

1. Detection and Verification of Methods
2. Statistics as a Tool in Microbial Evaluation of Foods
3. Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data
4. Foodborne Illness Epidemiology, Surveillance and Outbreak Investigation

IAFP 2005 Networking Opportunities

IAFP FUNCTIONS

NEW MEMBER RECEPTION
Saturday, August 13, 2005 • 4:30 p.m. –5:30 p.m.

If you recently joined the Association or if this is your first time attending an IAFP Annual Meeting, welcome! Attend this informal reception to learn how to get the most out of attending the Meeting and meet some of today's leaders.

AFFILIATE RECEPTION
Saturday, August 13, 2005 • 5:30 p.m. –7:00 p.m.

Affiliate Officers and Delegates plan to arrive in time to participate in this educational reception. Watch your mail for additional details.

COMMITTEE MEETINGS
Sunday, August 14, 2005 • 7:00 a.m. –5:00 p.m.

Committees and Professional Development Groups (PDGs) plan, develop and institute many of the Association's projects, including workshops, publications, and educational sessions. Share your expertise by volunteering to serve on any number of committees or PDGs. Everyone is invited to attend.

STUDENT LUNCHEON
Sunday, August 14, 2005 • 12:00 p.m. –1:30 p.m.

The mission of the Student PDG is to provide students of food safety with a platform to enrich their experience as Members of IAFP. Sign up for the luncheon to help start building your professional network.

OPENING SESSION AND IVAN PARKIN LECTURE
Sunday, August 14, 2005 • 7:00 p.m. –8:00 p.m.

Join us to kick off IAFP 2005 at the Opening Session. Listen to the prestigous Ivan Parkin Lecture. Lecturer to be announced in March.

CHEESE AND WINE RECEPTION
Sunday, August 14, 2005 • 8:00 p.m. –10:00 p.m.
Sponsored by Kraft Foods, Inc.

An IAFP tradition for attendees and guests. The reception begins in the Exhibit Hall immediately following the Ivan Parkin Lecture on Sunday evening.

IAFP JOB FAIR
Sunday, August 14 through Wednesday, August 17, 2005

Employers, take advantage of recruiting the top food scientists in the world! Post your job announcements and interview candidates.

COMMITTEE AND PDG CHAIRPERSON BREAKFAST (By invitation)
Monday, August 15, 2005 • 7:00 a.m. –9:00 a.m.

Chairpersons and Vice Chairpersons are invited to attend this breakfast to report on the activities of your committees.

EXHIBIT HALL RECEPTION
Monday, August 15, 2005 • 5:00 p.m. –6:30 p.m.
Sponsored in part by REMEL, Inc.

Join your colleagues in the Exhibit Hall to see the most up-to-date trends in food safety techniques and equipment. Discuss with exhibitors their latest products or use this time to view the poster presentations. Take advantage of this great networking reception.

JOHN H. SILLIKER LECTURE
Tuesday, August 16, 2005 • 3:45 p.m. – 4:30 p.m.

Lecturer to be announced in March.

BUSINESS MEETING
Tuesday, August 16, 2005 • 4:45 p.m. –5:30 p.m.

You are encouraged to attend the Business Meeting to keep informed of the actions of YOUR Association.

PRESIDENT'S RECEPTION (By invitation)
Tuesday, August 16, 2005 • 6:00 p.m. – 7:00 p.m.

This by invitation event is held each year to honor those who have contributed to the Association during the year.

PAST PRESIDENTS' DINNER (By invitation)
Tuesday, August 16, 2005 • 7:00 p.m. – 9:30 p.m.

Past Presidents and their guests are invited to this dinner to socialize and reminisce.

AWARDS BANQUET
Wednesday, August 17, 2005 • 7:00 p.m. –9:30 p.m.

Bring IAFP 2005 to a close at the Awards Banquet. Award recipients will be recognized for their outstanding achievements and the gavel will be passed from Dr. Kathy Glass to Incoming President Dr. Jeffrey Farber.

IAFP 2005 Event Information

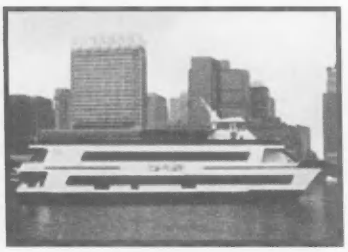
EVENING EVENTS

Orioles Baseball Game
Saturday, August 13, 2005 • 3:30 p.m. –7:30 p.m.

Play Ball! Join the fun as the Orioles take on the Toronto Blue Jays. Oriole Park at Camden Yards became the official home of the Orioles on April 6, 1992. The one-time railroad center is only 2 blocks from the birth-place of baseball's most legendary hero, George Herman "Babe" Ruth. Ruth's father operated Ruth's Cafe on the ground floor of the family residence, now center field at Oriole Park.

Oriole Park is state-of-the-art yet unique, traditional and intimate in design. It blends with the urban context of downtown Baltimore while taking its image from baseball parks built in the early 20th century. Ticket price includes admission to the game and transportation between the Baltimore Marriott Waterfront Hotel and Camden Yards.

Monday Night Social – Harbor Cruise
Monday, August 15, 2005 • 6:30 p.m. – 10:00 p.m.



Let the good times float on a Harbor Cruise. After a short walk from the Baltimore Marriott Waterfront to the Pier, the Bay Lady will be waiting for you to come on board and enjoy the evening. The Bay Lady will take you across the harbor and along the Patapsco River, with the city skyline in view. Enjoy a fabulous spread of food within the enclosed air-conditioned deck or go up to the top deck for a refreshing breeze and the most gorgeous panoramic view of Baltimore's Historic Harbor. Get your ticket today to reserve your spot aboard the Bay Lady! Everyone is welcome.

Little Italy Walking Tour and Dinner
Tuesday, August 16, 2005 • 6:30 p.m. – 10:30 p.m.

Take a guided walking tour through Little Italy, founded in 1849 and located in the heart of the downtown renaissance in Baltimore. Nestled between the Inner Harbor and Historic Fells Point, the area boasts more than 20 of Maryland's best Italian restaurants and trattorias. It's so hard to pick just one of the fabulous restaurants –so tonight you'll try three! Appetizer, entrée and dessert are served in charming trattorias for which this neighborhood is known regionally. Limited tickets available.

GOLF TOURNAMENT

Golf Tournament
Saturday, August 13, 2005 • 8:45 a.m. – 4:00 p.m.

Begin IAFP 2005 with a relaxing round of golf with your friends. This year's tournament will be held at Waverly Woods Golf Club, which was recognized as the "2002 Maryland Course of the Year" for its unique design and playability. The appeal of this new but mature and lush course is its wide-landing areas for tee shots while much of the challenge comes from the small, undulating greens. Course designer Arthur Hills was selected by *Golf Digest* magazine as one of their "Top Five Favorite Present-Day Architects." Everyone is welcome to play in this fun best-ball tournament. Registration fee includes green fees, cart, range balls, transportation to and from the course, a box lunch and prizes!

DAYTIME TOURS

Welcome to Washington
Saturday, August 13, 2005 • 9:00 a.m. -5:00 p.m.

Welcome to America's most unique city! One of the few capitals founded as a show-place and a seat of government, Washington is really several cities in one and you will get a chance to experience something of each.

This all-encompassing tour of Washington is designed to introduce you to the most magnificent monuments, memorials and architectural structures of the city. You will ride by the White House, Washington Monument, Capitol Building, Supreme Court, Library of Congress, Smithsonian Complex, as well as many other Washington attractions. You will stop at the Lincoln Memorial, World War II Monument, Vietnam Veterans Memorial, Korean War Veterans Memorial, and the Jefferson Memorial.

While visiting these sites, you will hear the story of Washington's unique city plan devised by the gifted architect, Pierre L'Enfant. L'Enfant was the master architect who envisioned placing broad avenues, dramatic vistas and plentiful parkland in what was then a swamp.

Lunch will be at Washington, D.C.'s historic Union Station, a Beaux Arts national landmark. After lunch, guests may enjoy over 100 stores in which to browse and window shop.

Baltimore City Tour by Land and by Sea
Sunday, August 14, 2005 • 10:00 a.m. -2:00 p.m.

Guests will take a guided tour through the historic Mt. Vernon, Federal Hill and Fells Point neighborhoods. Once arriving in Fells Point, the original harbor of Baltimore, a costumed Living-History Narrator brings to life Baltimore's colorful history with stories about real people. Lunch in an authentic Fells Point pub is also included.

Then sail aboard a blue and white Water Taxi out to the place where Francis Scott Key wrote our nation's anthem. From the water, you'll see where British ships fired on Fort McHenry in 1814.

From the fastest sailing vessels in the history of the Navy to the arrest of Southern sympathizers in City Hall at the beginning of the "War between the States", to the oldest continually working waterfront in the country, you'll take home a new opinion of Baltimore as a stalwart city of national importance.

Annapolis Past and Present
Monday, August 15, 2005 • 9:00 a.m. -2:00 p.m.

The brick streets, the charming church, state circles around which colonial era homes and inns are built, and the history that breathes from every antique house all contribute to a fascinating day's adventure in Maryland's Capital, Annapolis.

You'll begin with a walking tour of the historic center of Annapolis. Led by costumed guides you will hear fascinating stories.

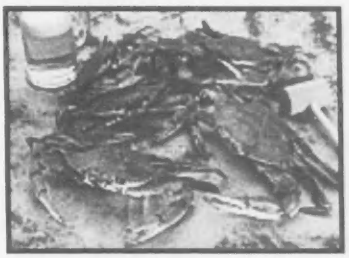
The State House, the oldest continually operating in the US, is another highlight of your visit. It is where George Washington resigned as Commander-in-Chief of the Continental Armies.

There's much more to this quaint seaport town, and as you continue your exploration, you'll walk through the US Naval Academy, with its stately brick campus, and passing Bancroft Hall Dormitory, where thousands of midshipmen are fed in a matter of minutes; the famous Tecumseh statue, which serves as an Academy mascot; and stopping at the Chapel and at the dolphin-supported grave of Naval hero John Paul Jones.

Lunch will be served at the historic Maryland Inn. The Maryland Inn has a rich history - dating back to our country's revolutionary era.

PLEASE NOTE: Photo Identification is required for admittance to the US Naval Academy.

A Taste of Baltimore from the Inside
Tuesday, August 16, 2005 • 9:00 a.m. -1:00 p.m.



Take a guided tour through the new world headquarters of Phillips Foods in Baltimore, where millions of crab cakes and seafood products are prepared for distribution across the country. Known for award-winning Maryland style crab cakes and simple dedication to quality, Phillips has served millions of seafood lovers from around the world.

Guests will see how Phillips produces more than 150 crab cakes per minute -80,000 crab cakes a day -20 million crab cakes per year! Then, get a true taste for blue crab with a Maryland crab cake sandwich.

Next, it's on to Clipper City Brewing Company. Clipper City is Baltimore's largest brewing facility producing hand-crafted draught and bottled beers. Enjoy complimentary samples after the tour featuring Baltimore's "best locally brewed beer."

Chesapeake Bay Cooking Class
Wednesday, August 17, 2005 • 10:00 a.m. -1:00 p.m.

Executive Chef Jerry Pellegrino is fascinated by food and wine, and the way they work in harmony on the palate. His understanding of the two goes all the way to the molecular level, drawing on his advanced education in molecular biology. His cuisine is simple and surprising, pairing unexpected ingredients together to work with wines from the US.

Participate and observe as the Chef prepares regional specialties step-by-step. You will dine on the chef's creations and learn about what makes a wine complement or clash with cuisine.

Each course will be served with Maryland wines - Cheers!

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

MEETING INFORMATION

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

Full Registration includes:

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

4 EASY WAYS TO REGISTER

Complete the Attendee Registration Form and submit it to the International Association for Food Protection by:

Online: www.foodprotection.org

Fax: 515.276.8655

Mail: 6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA

Phone: 800.369.6337; 515.276.3344

The early registration deadline is July 13, 2005. After this date, late registration fees are in effect.

REFUND/CANCELLATION POLICY

Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by July 29, 2005. No refunds will be made after July 29, 2005; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 22, 2005. Event and tour tickets purchased are nonrefundable.

STUDENT FUNDRAISER

Help support the students with their annual fund raiser. See page 158 to order T-shirts or Polo Shirts.

International Association for Food Protection®

EXHIBIT HOURS

Sunday, August 14, 2005	8:00 p.m. - 10:00 p.m.
Monday, August 15, 2005	9:30 a.m. - 1:30 p.m.
	3:00 p.m. - 6:30 p.m.
Tuesday, August 16, 2005	9:30 a.m. - 1:30 p.m.

DAYTIME TOURS – Lunch included

Saturday, August 13, 2005	9:00 a.m. - 5:00 p.m.
Welcome to Washington	
Sunday, August 14, 2005	10:00 a.m. - 2:00 p.m.
Baltimore City Tour by Land and by Sea	
Monday, August 15, 2005	9:00 a.m. - 2:00 p.m.
Annapolis Past and Present	
Tuesday, August 16, 2005	9:00 a.m. - 1:00 p.m.
A Taste of Baltimore from the Inside	
Wednesday, August 17, 2005	10:00 a.m. - 1:00 p.m.
Chesapeake Bay Cooking Class	

EVENING EVENTS

Saturday, August 13, 2005	
Baseball Game	3:30 p.m. - 7:30 p.m.
Sunday, August 14, 2005	
Opening Session	7:00 p.m. - 8:00 p.m.
Cheese and Wine Reception *Sponsored by Kraft Foods North America*	8:00 p.m. - 10:00 p.m.
Monday, August 15, 2005	
Exhibit Hall Reception	5 :00 p.m. - 6:30 p.m.
Monday Night Social - Harbor Cruise	6:30 p.m. - 10:00 p.m.
Tuesday, August 16, 2005	
Little Italy Walking Tour and Dinner	6:30 p.m. - 10:30 p.m.
Wednesday, August 17, 2005	
Awards Banquet Reception	6:00 p.m. - 7:00 p.m.
Awards Banquet	7:00 p.m. - 9:30 p.m.

GOLF TOURNAMENT

Saturday, August 13, 2005	
Golf Tournament at Waverly Woods Golf Club	8:45 a.m. - 4:00 p.m.

HOTEL INFORMATION

For reservations, contact the hotel directly and identify yourself as an IAFP 2005 attendee to receive a special rate of $149 per night, single/double or make your reservations online. This special rate is available only until July 13, 2005 or until sold out.

Baltimore Marriott Waterfront Hotel
700 Aliceanna St.
Baltimore, Maryland 21202
Phone: 800.228.9290 • 410.385.3000 • Fax: 410.895.1910
Web site: www.stayatmarriott.com/IAFP2005
(Group Code iafiafa)

TRAVEL DISCOUNTS

Visit our Web site at www.foodprotection.org
for air travel, Amtrak and rental car information.

Attendee Registration Form

Member Number: _____

First name (as it will appear on your badge) _____ Last name _____

Employer _____ Title _____

Mailing Address (Please specify: ❒ Home ❒ Work) _____

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

Telephone _____ Fax _____ E-mail _____

❒ Regarding the ADA, please attach a brief description of special requirements you may have. Member since: _____

❒ IAFP occasionally provides Attendees' addresses (excluding phone and E-mail) to vendors and exhibitors supplying products and services for the food safety industry. If you prefer NOT to be included in these lists, please check the box.

PAYMENT MUST BE RECEIVED BY JULY 13, 2005 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES:	MEMBERS	NONMEMBERS	TOTAL
Registration	$ 385 ($ 435 late)	$ 583 ($633 late)	_____
Association Student Member	$ 78 ($ 88 late)	Not Availabie	_____
Retired Association Member	$ 78 ($ 88 late)	Not Available	_____
One Day Registration ❒ Mon. ❒ Tues. ❒ Wed.	$ 210 ($235 late)	$ 320 ($345 late)	_____
Spouse/Companion* (Name): _____	$ 55 ($ 55 late)	$ 55 ($ 55 late)	_____
Children 15 & Over* (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			

EVENING EVENTS:		# OF TICKETS	
Golf Tournament (Saturday, 8/13)	$ 135 ($145 late)	_____	_____
Baseball Game (Saturday, 8/13 – 3:30 p.m.–7:30 p.m.)	$ 26 ($ 36 late)	_____	_____
Student Luncheon (Sunday, 8/14)	$ 5 ($ 15 late)	_____	_____
Monday Night Social – Harbor Cruise (Monday, 8/15)	$ 45 ($ 55 late)	_____	_____
Children 14 and under	$ 40 ($ 50 late)	_____	_____
Tuesday Evening – Little Italy Walking Tour and Dinner (Tuesday, 8/16)	$ 92 ($102 late)	_____	_____
Additional Awards Banquet Ticket (Wednesday, 8/17)	$ 50 ($ 60 late)	_____	_____

DAYTIME TOURS: (Lunch included in daytime tours)			
Welcome to Washington (Saturday, 8/13)	$ 89 ($ 99 late)	_____	_____
Baltimore City Tour by Land and by Sea (Sunday, 8/14)	$ 74 ($ 84 late)	_____	_____
Annapolis Past and Present (Monday, 8/15)	$ 125 ($135 late)	_____	_____
A Taste of Baltimore from the Inside (Tuesday, 8/16)	$ 80 ($ 90 late)	_____	_____
Chesapeake Bay Cooking Class (Wednesday, 8/17)	$ 99 ($109 late)	_____	_____

PAYMENT OPTIONS: ❒ VISA ❒ MasterCard ❒

❒ Check Enclosed

Credit Card # _____

Name on Card _____

Signature _____

❒ Check box if you are a technical, poster, or symposium speaker.

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

Expiration Date _____

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

International Association for Food Protection®

6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337 • 515.276.3344
Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

EXHIBITORS DO NOT USE THIS FORM

STUDENT FUNDRAISER!

Purchase an IAFP 2005 long-sleeve T-shirt or Polo Shirt from the Student PDG to help raise money in support of our Students. Pre-ordered T-shirts are $18.00 and Polo shirts are $25.00. Shirts will be available for pick-up from the SPDG booth throughout IAFP 2005. All order forms are due by July 13th. If you have any questions, contact Renee Raiden at rraiden@vt.edu.

IAFP SPDG Shirt Order Form

If you choose to pay by credit card, make sure you include the amount to be charged. If you are paying by check make checks payable to IAFP and enclose the check with your order form. Please mail order forms for receipt by July 13, 2005 for pre-orders.

Please return order form to the following address: Renee Raiden, Virginia Tech, 22 Food Science Bldg., Blacksburg, VA 24061-0418; Fax: 540.231.9293.

Name _____ Title _____

Mailing Address _____

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

Telephone _____ Fax _____ E-mail _____

		Quantity	
T-shirts (long-sleeve)	S ❑ M ❑ L ❑ XL ❑	_____	$18.00 ea. _____
Polo Shirts	S ❑ M ❑ L ❑ XL ❑	_____	$25.00 ea. _____

METHOD OF PAYMENT: ❑ VISA ❑ MasterCard ❑ DISCOVER
(Payable to IAFP)

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

❑ Check or Money Order Enclosed

Credit Card # _____ Expiration Date _____

Name on Card _____

Signature _____

Contribute to the Eighth Annual Foundation Fund Silent Auction Today!

The Foundation of the International Association for Food Protection will hold its Annual Silent Auction during IAFP 2005, the Association's 92nd Annual Meeting in Baltimore, Maryland, August 14–17, 2005. The Foundation Fund supports:

- Ivan Parkin Lecture
- Travel support for exceptional speakers at the Annual Meeting
- Audiovisual Library
- Developing Scientist Competition
- Shipment of volumes of surplus *JFP* and *FPT* journals to developing countries through FAO in Rome

Support the Foundation by donating an item today. A sample of items donated last year included:

- Bausch & Lomb Student Microscope
- Brazil Cook's Tour
- Country Cured Ham
- Cultured Pearl Necklace
- The Food Safety Professional Guide Set
- Georgia Gift Basket
- International Food Safety Icons CD
- New York State Pure Maple Syrup
- Premium Export Brandy
- Wine

Complete the form and send it in today.

Description of Auction Items _____

Estimated Value _____

Name of Donor _____

Company (if relevant) _____

Mailing Address _____
(Please specify: ❒ Home ❒ Work)

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-mail _____

Return to:

Donna Gronstal
International Association for Food Protection
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA
800.369.6337; 515.276.3344
Fax: 515.276.8655
E-mail: dgronstal@foodprotection.org

International Association for Food Protection®

COMING EVENTS

MARCH

- **10–13, IAFIS 2005 Annual Conference,** San Francisco Fairmont, San Francisco, CA. For more information, call 703.761.2600 or go to www.iafis.org.
- **14–15, Microbiology IV: Sampling & Interpreting Results,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **16–18, Food Safety Summit,** Washington, D.C. Convention Center, Washington, D.C. For more information, call 800.746.9646 or go to www.foodsafetysummit.com.
- **31, Foodborne Illness & Food-Related Injury: Investigation & Resolution for Food Service & Retail,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **31, United Kingdom Association for Food Protection Annual Meeting,** University of Wales Institute, Cardiff, Wales. For more information, contact Gordon Hayburn at 44.(0)2920.416456; E-mail: ghayburn@uwic.ac.uk.

APRIL

- **6–8, Missouri Milk, Food and Environmental Health Association Educational Conference,** Ramada Inn, Columbia, MO. For more information, contact Marsha Perkins at 573.874.7346; E-mail: mlp@gocolumbiamo.com.
- **11–14, Marine and Freshwater Toxins Analysis: 1st Joint Symposium and AOAC Task Force Meeting,** Baiona, Spain. For more information, contact James Hungerford at 425.483.4894 or go to www.aoac.org/marine_toxins/task_force.htm.
- **13, HACCP: A Management Summary,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, call Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **13, Metropolitan Association for Food Protection Spring Meeting,** Cook College Student Center, Rutgers University, New Brunswick, NJ. For more information, contact Carol Schwar at 908.689.6693; E-mail: cschwar@entermail.net.
- **14, Microbiology V: *Listeria* Control,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **25–27, Microbiology I: Practical Food Micro and Troubleshooting,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, call Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.

MAY

- **12–14, Interbake China 2005,** Guangzhou International Conventional and Exhibition Center, Guangzhou, China. For more information, contact Ms. Athena Wu at 86.20.87746095; E-mail: sales@faircanton.com or go to www.faircanton.com.
- **12–17, The 30th National Conference on Interstate Milk Shipments,** Hyatt on Capitol Square, Columbus, OH. For more information, contact Leon Townsend at 502.695.0253; E-mail: ltownsend@ncims.org.
- **17–18, Pennsylvania Association of Milk, Food and Environmental Sanitarians Annual Spring Meeting,** Penn State University, State College, PA. For more information, contact Gene Frey at 717.397.0719; E-mail: erfrey@landolakes.com.
- **23–26, 3-A SSI Annual Meeting,** Four Points by Sheraton Milwaukee, Milwaukee, WI. For more information, contact Timothy Rugh at 703.790.0295; E-mail: trugh@3-a.org.
- **23–26, AOAC Midwest Section Meeting and Expo,** Kansas City, MO. For more information, contact Ron Jenkins at 816.891.0442; Web site: www.midwestaoac.org.
- **24, Associated Illinois Milk, Food and Environmental Sanitarians Annual Spring Meeting,** Bloomington, IL. For more information, contact Don Wilding at 217.785.2439; E-mail: dwilding@idph.state.il.us.
- **24–26, Penn State Food Microbiology Short Course Detection and Control of Foodborne Pathogens,** Penn State University, Berks-Lehigh Valley College, Reading, PA. For more information, contact Dr. Hassan Gourama at 610.396.6121; E-mail: hxg7@psu.edu; http://foodsafety.cas.psu.edu.
- **31, Microbiology VI: *Salmonella* Conrol,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.

JUNE

- **12–15, 4th IDF International Mastitis Conference,** Maastricht, The Netherlands. For more information, go to www.fil-idf.org/mastitis2005.
- **13–14, Brazil Association for Food Protection Annual Meeting,** Conselho Regional de Quimica do Estado de São Pãulo, São Pãulo, Brazil. For more information, contact Maria Teresa Destro at 55.113.091.2199; E-mail: mtdestro@usp.br.
- **16–24, XXV Quarter Century Gala International Workshop/Symposium on Rapid Methods and Automation in Microbiology,** Kansas State University, Manhattan, KS. For more information, contact Daniel Y. C. Fung at 785.532.5654; E-mail: dfung@oznet.ksu.edu.
- **29–30, 4th European Young Cereal Scientists and Technologists Workshop,** Vienna, Austria. For more information, call 32.16204035 or go to www.boku.ac.at/dlwt.

IAFP UPCOMING MEETINGS

AUGUST 14-17, 2005
Baltimore, Maryland

AUGUST 13-16, 2006
Calgary, Alberta, Canada

JULY 8-11, 2007
Lake Buena Vista, Florida

CAREER SERVICES SECTION

Food Safety Net Services, Ltd., a fast-growing, private company located in San Antonio has current job opportunities available in various locations throughout the United States. Our Company is a leader in the industry and provides comprehensive microbiological and chemical laboratory testing as well as quality assurance and regulatory services to the food industry.

We are seeking qualified professionals for the following position in various locations:

****LABORATORY MANAGER**
****ASSISTANT LABORATORY MANAGER**
**** LEAD TECHNOLOGIST**
**** MICROBIOLOGISTS**
****TECHNOLOGISTS AND TECHNICIANS**

This is a fantastic opportunity to join a winning management team and enjoy a successful career with a growth-orientated company. Food Safety Net Services offers competitive salaries and comprehensive benefit packages. Fax resumes to 210-525-1702 or pjyothi@food-safetynet.com.

Equal opportunity employer. Check our web site @ www.food-safetynet.com

Please specify which position you are interested in.

IAFP Members

Did you know that you are eligible to place an advertisement if you are unemployed and looking for a new position? As a Member benefit, you may assist your search by running an advertisement touting your qualifications.

ADVERTISING INDEX

Journal of Food Protection®

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Official Publication

International Association for Food Protection®

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Vol. 68 | January 2005 | No. 1

BOOKLET ORDER FORM

SHIP TO:

Member # _____

First Name _____ M.I. ____ Last Name _____

Company _____ Job Title _____

Mailing Address _____

Please specify: ☐ Home ☐ Work

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-Mail _____

BOOKLETS:

QUANTITY	DESCRIPTION	MEMBER OR GOV'T PRICE	NON-MEMBER PRICE	TOTAL
	Procedures to Investigate Waterborne Illness—2nd Edition	$12.00	$24.00	
	Procedures to Investigate Foodborne Illness—5th Edition	12.00	24.00	

SHIPPING AND HANDLING – $3.00 (US) $5.00 (Outside US) Each additional booklet $1.50 — Shipping/Handling

Multiple copies available at reduced prices. Booklets Total

Phone our office for pricing information on quantities of 25 or more.

OTHER PUBLICATIONS:

QUANTITY	DESCRIPTION	MEMBER OR GOV'T PRICE	NON-MEMBER PRICE	TOTAL
	*International Food Safety Icons CD	$ 25.00	$25.00	
	Pocket Guide to Dairy Sanitation (minimum order of 10)	$ .75	$1.50	
	Before Disaster Strikes…A Guide to Food Safety in the Home (minimum order of 10)	.75	1.50	
	Before Disaster Strikes… *Spanish language version* – (minimum order of 10)	.75	1.50	
	Food Safety at Temporary Events (minimum order of 10)	.75	1.50	
	*Developing HACCP Plans–A Five-Part Series (as published in *DFES*)	15.00	15.00	
	*Surveillance of Foodborne Disease – A Four-Part Series (as published in *JFP*)	18.75	18.75	
	*Annual Meeting Abstract Book Supplement (year requested _____)	25.00	25.00	
	*IAFP History 1911-2000	25.00	25.00	

SHIPPING AND HANDLING – per 10 – $2.50 (US) $3.50 (Outside US) — Shipping/Handling

*Includes shipping and handling — Other Publications Total

TOTAL ORDER AMOUNT

Prices effective through August 31, 2005

PAYMENT:

Payment must be enclosed for order to be processed • US FUNDS on US BANK

❑ **Check or Money Order Enclosed** ❑ VISA ❑ MasterCard ❑ DISCOVER

CREDIT CARD # _____

EXP. DATE _____

SIGNATURE _____

International Association for Food Protection®

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PHONE	FAX	MAIL	WEB SITE
800.369.6337; 515.276.3344	515.276.8655	6200 Aurora Ave., Suite 200W Des Moines, IA 50322-2864, USA	www.foodprotection.org

MEMBERSHIP APPLICATION

MEMBERSHIP DATA:

Prefix (❑ Prof. ❑ Dr. ❑ Mr. ❑ Ms.)

First Name _____ M.I. ____ Last Name _____

Company _____ Job Title _____

Mailing Address _____

Please specify: ❑ Home ❑ Work

City _____ State or Province _____

Postal Code/Zip + 4 _____ Country _____

Telephone # _____ Fax # _____

E-Mail _____

❑ IAFP occasionally provides Members' addresses (excluding phone and E-mail) to vendors supplying products and services for the food safety industry. If you prefer NOT to be included in these lists, please check the box.

MEMBERSHIP CATEGORIES:

MEMBERSHIPS	US	Canada/Mexico	International
❑ **Membership with *JFP* & *FPT* – *BEST VALUE!***	$185.00	$220.00	$265.00
12 issues of the *Journal of Food Protection* and *Food Protection Trends*			
❑ add *JFP* Online	$36.00	$36.00	$36.00
❑ **Membership with *FPT***	$100.00	$115.00	$130.00
12 issues of *Food Protection Trends*			
❑ add *JFP* Online	$36.00	$36.00	$36.00
❑ ***Student Membership with *JFP* Online** (no print copy)	$48.00	$48.00	$48.00
❑ ***Student Membership with *JFP* & *FPT***	$92.50	$127.50	$172.50
❑ ***Student Membership with *JFP***	$50.00	$70.00	$100.00
❑ ***Student Membership with *FPT***	$50.00	$65.00	$80.00
❑ add *JFP* Online	$36.00	$36.00	$36.00

*Must be a full-time student. Student verification must accompany this form.

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Recognition for your organization and many other benefits. *JFP* Online included.

❑ **GOLD**	$5,000.00
❑ **SILVER**	$2,500.00
❑ **SUSTAINING**	$750.00

PAYMENT:

Payment must be enclosed for order to be processed • US FUNDS on US BANK

❑ **Check Enclosed** ❑ VISA ❑ MasterCard ❑ Discover

TOTAL MEMBERSHIP PAYMENT $ _____

All prices include shipping and handling
Prices effective through August 31, 2005

CREDIT CARD # _____

EXP. DATE _____

SIGNATURE _____

International Association for Food Protection®

4 EASY WAYS TO JOIN

PHONE	FAX	MAIL	WEB SITE
800.369.6337; 515.276.3344	515.276.8655	6200 Aurora Ave., Suite 200W Des Moines, IA 50322-2864, USA	www.foodprotection.org

THE Black Pearl AWARD

RECOGNITION FOR CORPORATE EXCELLENCE IN FOOD SAFETY AND QUALITY

The Black Pearl Award is presented annually to a company for its efforts in advancing food safety and quality through consumer program, employee relations, educational activities, adherence to standards and support of the goals and objectives of the International Association for Food Protection. We invite you to nominate your company for this prestigious recognition. Contact the Association office for nomination information.

Presented by

The International Association for Food Protection

Proudly sponsored by

Wilbur S. Feagan and F&H Food Equipment Company

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2004 Jack in the Box Inc.
San Diego, California

2003 Wegmans Food Markets Inc.
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2001 Walt Disney World Company
Lake Buena Vista, Florida

2000 Zep Manufacturing Company
Atlanta, Georgia

1999 Caravelle Foods
Brampton, Ontario, Canada

1998 Kraft Foods, Inc.
Northfield, Illinois

1997 Papetti's of Iowa Food Products, Inc.
Lenox, Iowa

1996 Silliker, Inc.
Homewood, Illinois

1995 Albertson's Inc.
Boise, Idaho

1994 H-E-B Grocery Company
San Antonio, Texas

August 14-17, 2005

Baltimore Marriott Waterfront Hotel

Baltimore, Maryland

International Association for Food Protection®

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