

FOOD PROTECTION TRENDS

SCIENCE AND NEWS

FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

VOL. 27, NO. 8

ISSN: 1541-9576

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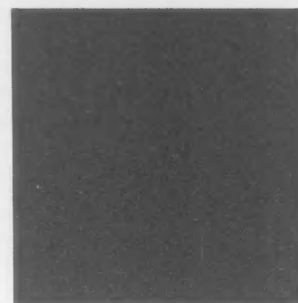
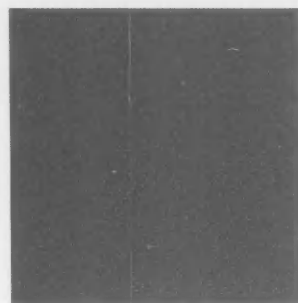
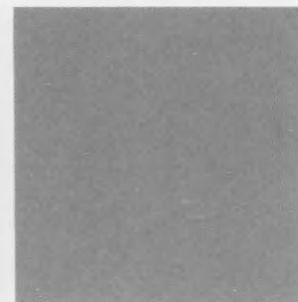
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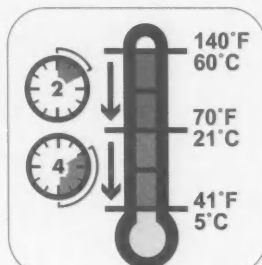
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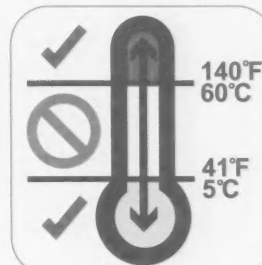
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FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

Food Protection Trends (ISSN-1541-9576) is published monthly beginning with the January number by the International Association for Food Protection, 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2864, USA. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, Iowa 50010, USA. Periodical Postage paid at Des Moines, Iowa 50318 and additional entry offices.

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

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

"Instructions for Authors" may be obtained from our Web site at www.foodprotection.org or from Donna A. Bahun, Production Editor, International Association for Food Protection.

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Subscription Rates: *Food Protection Trends* is available by subscription for \$241.00 US, \$256.00 Canada/Mexico, and \$271.00 International. Single issues are available for \$26.00 US and \$35.00 all other countries. All rates include shipping and handling. No cancellations accepted. For more information contact Julie A. Cattanaach, Membership Services, International Association for Food Protection.

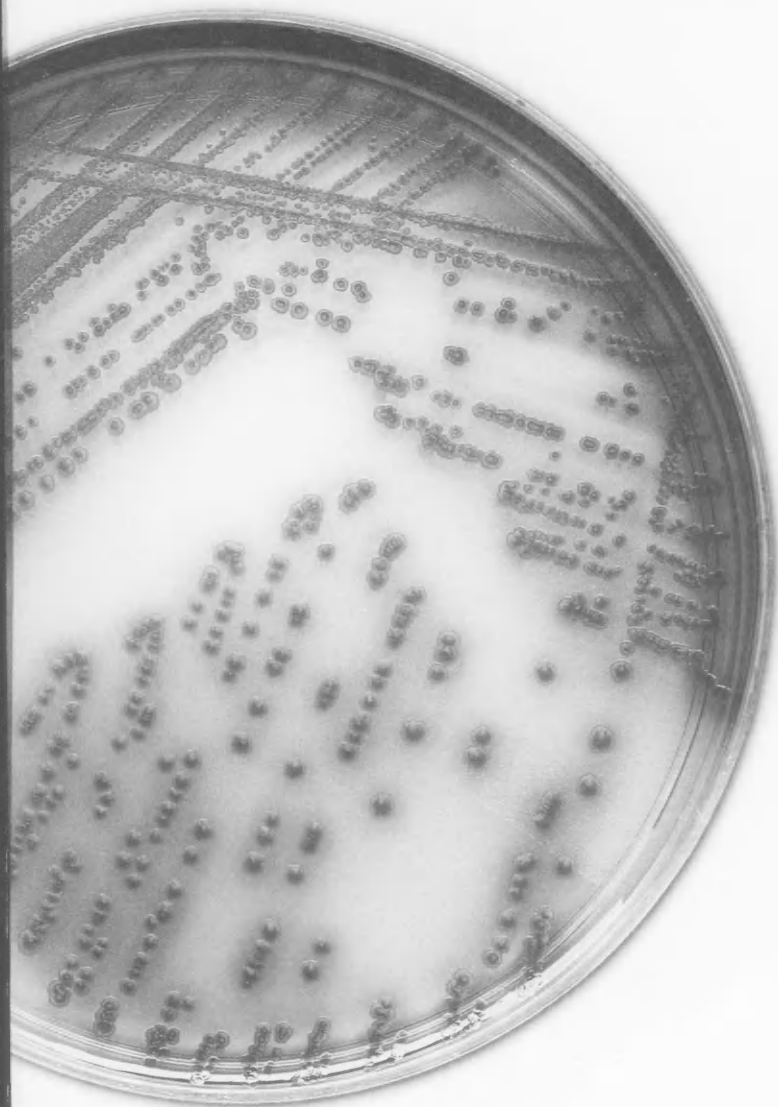
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¹ IAFP 2006, Calgary, Alberta, Canada, Technical Symposium: Detection of *Salmonella* in Chicken Carcass Rinses Using a Chromogenic Agar Plating Medium, Julian Cox, The University of New South Wales, Sydney, Australia & Stan Bailey, ARS-USDA, Athens, GA.

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"LONE STAR PERSPECTIVE" FROM YOUR PRESIDENT

As I begin my first column, let me start off with a few random thoughts. First, I am very honored to be your president. The International Association for Food Protection is definitely the place to be in food safety, and the reason we are the premiere food safety association is primarily due to the quality, dedication and involvement of our members. You represent the top food-safety thinkers, the people in the industry responsible for producing, processing and delivering a safe, high-quality product, the government agencies that help assure a consistent and reliable food supply — and you actively contribute your time, intellect and money to this organization. I can't tell you how humbling it is to be in the position of President of this Association.

Second, I view the office of President as a service. I am here to help you. You are the force that drives this Association to excellence, so I need to hear from you to know what IAFP can do to address your needs as members and provide opportunities for professional growth. That's not to say your Executive Board does not have ideas for taking the Association to the next level—we do. But if we are not listening and serving the membership first, all of our plans for advancement and expansion will be irrelevant.

Third, I am committed to maintaining momentum. Hopefully, you have noticed that the Association has demonstrated significant activity in some very important areas. Our Foundation has been the focus of numerous important fundraising efforts lately, and with great success. Our international



By **GARY R. ACUFF**
PRESIDENT

***"I need to hear
from you to know
what IAFP can
do to address
your needs
as members"***

presence has increased greatly, with multiple meetings scheduled annually outside North America. Our Association dues have been completely restructured in an effort to provide a membership defined by your individual needs and at the best value for your money. IAFP is moving forward in many areas, and the Executive Board is committed to continue serving the membership with new and innovative initiatives.

By the time this column is published, we will have completed a very successful 94th Annual Meeting in Orlando, Florida. I have always been impressed with the work of our Program Committee and IAFP staff in putting together an Annual Meeting, but I have to tell you that I have been especially impressed this year. This year's Program Committee, a hard-working and talented group under the leadership of Lee-Ann Jaykus, did an incredible job designing a program containing something useful and interesting for all our members. And providing additional value, holding the meeting on Disney property offered a unique opportunity for family involvement that we don't often have. A huge thanks goes out to the Florida Affiliate and to Frank Yiannas for hosting us. Frank really went the extra mile in working with Disney to make sure everything was perfect and that this meeting was "Magical!"

Speaking of Frank, I can't let my first column go by without expressing gratitude for the outstanding job he has done as President. I feel very fortunate to have been able to watch him work, and I have to say that I am also a little intimidated. It is hard to follow a perfect act! Frank has worked very hard this year to continue our efforts to promote the presence of IAFP in the world and to specifically serve our members located outside North America. During his term as President and following the momentum begun in Jeff Farber's term, we now have initiated multiple international meetings occurring on an annual basis. We are seeing even more international members at our Annual Meetings; our journals are sent out all over the world and our inter-

national affiliate associations continue to grow. Our goal has always been to be an Association with international focus, but Frank's leadership this last year has provided a major boost in that area. Thanks, Frank; you renewed our focus on our roots and our mission: "to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

Of course, none of our recent success would have been possible without the behind-the-scenes work of the remainder of the Executive Board. Our past president, Jeff Farber, has continued to provide wisdom and leadership to the group, and our president-elect and secretary, Stan Bailey and Vickie

Lewandowski, respectively, have been invaluable in their efforts to advance the IAFP Foundation. I am looking forward to adding Lee-Ann Jaykus to the Executive Board and working with her for the next couple of years. We should have a strong Board this year, and you can be confident that we will work to keep IAFP at the forefront of the science and issues in food safety important to you.

And while I am thanking people, the entire Executive Board would be the first to tell you that the real reason for the success of IAFP is the outstanding staff. David Tharp and Lisa Hovey lead a dedicated and talented group of people who make sure everything works. On behalf of the Executive Board and the entire

IAFP membership, I want to thank the staff for everything you do—for making sure we look professional even when we aren't, for being patient with us when deadlines loom, and for keeping the premiere food safety association in the world humming so we can do what we do best—advance food safety worldwide.

So we are off and running on my term as President of IAFP. I look forward to serving you and believe we are in for an exciting year of challenges and opportunities. As I mentioned before, communication is essential to success for IAFP, so please feel free to contact me at any time. I would love to hear your opinions and dreams for the Association.

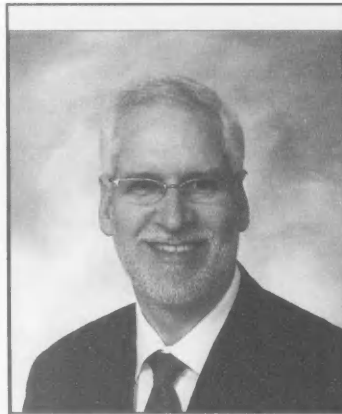
“COMMENTARY” FROM THE EXECUTIVE DIRECTOR

When you read this column in August, IAFP 2007 will have been completed for just about one month. Since I am writing about one week prior to the start of our 94th Annual Meeting, we cannot report on final attendance or how successful the meeting actually was (I'm certain it will be a great success!). What I can tell you now is that we received more pre-registrations for IAFP 2007 than we had in total attendees ever before, so we will break previous attendance records for sure! We may even break 2,000 attendees this year; wouldn't that be outstanding?

With the successful growth of IAFP's Annual Meeting and the addition of a European Symposium scheduled each year, word is spreading about IAFP far and wide! Speaking of the European Symposium, it is now just more than two months away! See the ad on the inside back cover and visit the IAFP Web site for program and sponsorship information.

Can you believe that just 10-years ago, we first broke the one-thousand threshold for attendees at an Annual Meeting? Now, we are knocking on the door for two-thousand attendees! I can tell you this growth has come with some pains, but they are good ones to have to endure.

First off, our staff size is the same number as we employed 10-years ago. There are many additional events that take place at our Annual Meeting when compared to 1997. We now work smarter, along with enduring more overtime than we



By **DAVID W. THARP, CAE**
EXECUTIVE DIRECTOR

“As an IAFP Member, we ask that you help to publicize the new dues structure to your colleagues”

experienced back then. In addition to stretching the staff, it is difficult to find facilities providing adequate space for our current meeting needs along with having space that allows us to grow our meeting should the need arise. When searching for a facility, we must plan for growth; all the time not knowing how much growth will occur or even if it will occur. There are risks taken but certainly we minimize such risks to every extent possible.

During the time we have seen steady increases in the Annual Meeting attendance, there has been some fluctuation in our Membership. IAFP's actual Membership number is somewhat hard to track as our Memberships renew on an annual basis depending on what month you join. Many organizations run their Membership from January to December, building their number all year long. For IAFP's Membership, it is easiest to compare a 12 month average which tracks our total Membership each month.

With our new Membership dues structure, we have already seen a large surge in Membership AND our renewal rate increased dramatically. There seems to be great interest in our new dues structure as we have received a number of new Members. Evidence of this growth is provided when you review the pages of new Members beginning on page 630.

As an IAFP Member, we ask that you help to publicize the new dues structure to your colleagues. Maybe there is someone in your office, lab or facility that can benefit from an IAFP Membership? Think about this for a minute...even if half of our Members encouraged one person to join, we could easily be more than 5,000 strong in our Membership!!!

Membership dues start at only \$50 and that rate is good any place in the world! For only \$50, your colleague can be a part of this international network of food safety professionals who work to “Advance Food Safety Worldwide.” Students receive an even better value and only need to pay one half

the regular Member rates! Surely you know someone who can benefit from an IAFP Membership. Take a minute right now to pick up the phone, walk across the hall or the facility, send an E-mail; do whatever it takes to give that little encouragement to someone who can join IAFP and receive a lifetime of benefits. Do it now, you will be glad you did!

I also want to share good news about the IAFP Sustaining Membership Program. You may have noticed the rapid growth in our Sustaining Members. Over the past four years, we have seen a 35% growth overall. We now boast 94 Sustaining Members and see that

100 are now within our sights! Each Sustaining Member helps to support the mission and goals of IAFP by providing that extra boost in revenue. A portion of all Sustaining Members' dues goes directly to support the IAFP Foundation. In the case of our Gold and Silver Sustaining Members, substantial amounts of these dues support the Foundation and in addition, fund a separate pool of monies to support speaker travel for Annual Meetings.

We are fortunate to have 15 Sustaining Members now in the Gold level and eight Silver level Sustaining Members. We also have 79 regular Sustaining Members. Each of these companies sees the value of supporting IAFP in this way and

we thank them for this kind support. If your company or organization is not a Sustaining Member, we invite you to find out more about the Sustaining Member Program either on our Web site or by calling to the IAFP office. I would be happy to talk with you to explain the program as would any of our staff!

So we have covered a few topics this month: growth in Annual Meeting, staff size, and growth in Membership and Sustaining Membership. Next month, we will know the total number of attendees at IAFP 2007 and will be able to report that number. As for Membership, we hope you will do your part by encouraging someone you know to become an IAFP Member.

New Dues Structure

Renew today

Base membership plus the flexibility of choosing what YOU want as part of your membership package.

Watch for this on your next renewal or call the Association office for details.

Detection of Nonpathogenic and Pathogenic *Listeria* Species by Use of a Chromogenic Agar

LAWRENCE RESTAINO,* ELON W. FRAMPTON, WILLIAM C. LIONBERG, and ANTHONY L. RESTAINO
R & F Laboratories, 2725 Curtiss St., Downers Grove, IL 60515, USA

SUMMARY

A selective and differential chromogenic plating medium (R & F *Listeria* spp./*Listeria monocytogenes* Plating Medium [LSPM]) has been developed that simultaneously differentiates presumptive colonies of both the nonpathogenic *Listeria* species (*L. innocua*, *L. seeligeri*, *L. welshimeri*, and *L. grayi*) and the pathogenic species (*L. monocytogenes* and *L. ivanovii*) on a single plate in 42–48 h at 35°C. Unlike chromogenic media that produce only a single color in detecting the presence of all *Listeria* species on the basis of β -glucosidase activity, or those that specifically detect the two pathogenic species by phosphatidylinositol-specific-phospholipase C activities (PI-PLC), LSPM contains a combination of indoxyl-derivative chromogenic substrates with which colonies of nonpathogenic *Listeria* species are pink because of their β -glucosidase activity, and pathogenic species are blue-green to blue-violet, depending on the strain-specific balance of β -glucosidase and PI-PLC activities on an agar with an opaque white background. On LSPM, 39 pure culture strains of *L. monocytogenes* yielded blue-green to blue-violet colonies 1–2 mm in diameter with or without surrounding precipitates in 42–48 h, and 4 strains of *L. ivanovii* yielded dark blue-green colonies with dark precipitates, whereas all of the nonpathogenic *Listeria* strains yielded pink colonies 1–2 mm diameter without precipitates. The ability to differentiate *Listeria* spp. from *L. monocytogenes* over a broad range on the same plate of LSPM was demonstrated at ratios of 1:1 to 100:1 of *L. innocua* to *L. monocytogenes*. Additionally, a high level of selectivity by this plating medium was evidenced by the lack of growth by common species of five gram-positive genera (*Bacillus*, *Staphylococcus*, *Lactobacillus*, *Pediococcus*, and *Enterococcus*), and eight gram-negative genera (*Escherichia*, *Enterobacter*, *Citrobacter*, *Shigella*, *Morganella*, *Providencia*, *Pantoea*, and *Klebsiella*). Two yeast genera, *Zygosaccharomyces* and *Candida*, also failed to grow at 35°C.

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TABLE 1. The colony morphologies of *Listeria* and other bacteria growing on LSPM for 42 to 48 h at 35°C

Bacterial Species	Number of Strains	Colonial Morphology
<i>Listeria monocytogenes</i>	39	Convex, 1–2 mm, blue-green to blue-violet, ± precipitate
<i>Listeria ivanovii</i>	4	Convex, 1–1.5 mm, dark blue-green, large ppt.
<i>Listeria innocua</i>	6	Convex, 1–2 mm, pink, no ppt.
<i>Listeria welshimeri</i>	2	Convex, 1–2 mm, pink, no ppt.
<i>Listeria seeligeri</i>	1	Convex, 1–2 mm, pink, no ppt.
<i>Listeria grayi</i>	1	Convex, 1–2 mm, pink, no ppt.
<i>Bacillus cereus/thuringiensis</i>	3	No growth
<i>Enterococcus</i> spp. ^a		No growth
Gram positive spp. ^b		No growth
Gram negative spp. ^c		No growth
Yeasts spp. ^d	3	No growth

^a*Enterococcus faecalis*, *E. faecium*, and *E. avium*

^bIncludes: *Bacillus circulans* and *B. subtilis*; *Staphylococcus aureus*, *S. epidermidis*, and *S. saprophyticus*; *Lactobacillus acidophilus* and *L. plantarum*; and *Pediococcus cerevisiae*

^cIncludes: *E. coli* (2 strains) and *E. coli* O157:H7 (1 strain); *Enterobacter aerogenes*; *Citrobacter freundii*; *Shigella sonnei*; *Morganella morganii*; *Providencia alcalifaciens*; *Pantoea agglomerans*; *Enterobacter sakazakii*; *Klebsiella pneumoniae* and *K. ozaenae*

^d*Zygosaccharomyces bailii* and *Z. rouxii*; *Candida albicans*

INTRODUCTION

The presence of any *Listeria* spp. in a food sample is interpreted as an indicator of the general hygiene used in its production and also suggests that such organisms might be masking the presence of the pathogen *L. monocytogenes*. In 2003, the US Food and Drug Administration (FDA) modified *Listeria* methodology by encouraging the use of one of the newer chromogenic differential selective agars (i.e., BCM [presently R & F], ALOA, CHROMagar *Listeria*, or Rapid^L. mono) that differentiate the two pathogenic spp., *L. monocytogenes* and *L. ivanovii*, from the nonpathogenic spp. (*L. innocua*, *L. seeligeri*, *L. welshimeri*, and *L. grayi*), as long as it is run in parallel with one of the prescribed selective agars (i.e., Oxford, PALCAM, LPM plus esculin and ferric iron, and MOX) (3). The FDA-prescribed selective media identify all the *Listeria* spp. without differentiation on the basis of β -D-glucosidase (esculinase) activity. Of the suggested newer chromogenic differential selective agars listed above, R & F and Rapid^L. mono both contain the chromogenic substrate 5-bromo-4-chloro-3-indoxyl-myo-inositol-1-

phosphate (X-IP), which differentiates *L. monocytogenes* and *L. ivanovii* from the nonpathogenic spp. by detecting phosphatidylinositol-specific phospholipase-C (PI-PLC) activity, but do not differentiate the other *Listeria* spp. ALOA and CHROMagar *Listeria*, however, detect both β -glucosidase activity by the hydrolysis of 5-bromo-4-chloro-3-indolyl- β -D-glucopyranoside [X- β -D-glucoside]), and PI-PLC activity by incorporation of L- α -phosphatidylinositol, a non-chromogenic substrate that produces a white precipitate with a halo around blue colonies of the two pathogens, and thus differentiate *L. monocytogenes* and *Listeria* spp. on the same plate (6).

The differentiation of *L. monocytogenes* and *Listeria* spp. by two positive chromogenic reactions on a single plate in 42–48 h at 35°C (5), using a selective and differential chromogenic plating medium (R & F *Listeria* spp./*Listeria monocytogenes* Plating Medium [LSPM]), is described here. The three chromogenic substrates responsible for these reactions have indoxyl moieties halogenated in different positions: 5-bromo-6-chloro-3-indoxyl- β -glucopyranoside (Magenta- β -glucoside; 0.033 g/l) and 6-chloro-3-indoxyl- β -glucopyranoside (Salmon- β -glucoside; 0.030

g/l) for β -glucosidase, and X-IP (0.29 g/l) for PI-PLC, producing two different colors upon specific hydrolysis. By a critical balancing of the levels of these three substrates, this mechanism permits presumptive colonies of nonpathogenic *Listeria* spp. to appear as pink colonies, and the pathogenic *Listeria* species as blue-green to blue-violet colonies on a single plate, with the latter dependent upon the strain-specific balance of β -glucosidase and PI-PLC activities. Additionally, to better discern the light pastel pink colonies of the nonpathogenic *Listeria* spp. and the blue-green to blue-violet colonies for the pathogenic *Listeria* spp. on the plates, they are viewed against an opaque white background in the agar produced by addition of titanium dioxide (TiO₂) to the medium. Colonies of *L. monocytogenes* are detectable on a plate in a 100-fold excess of *L. innocua*.

MATERIALS AND METHODS

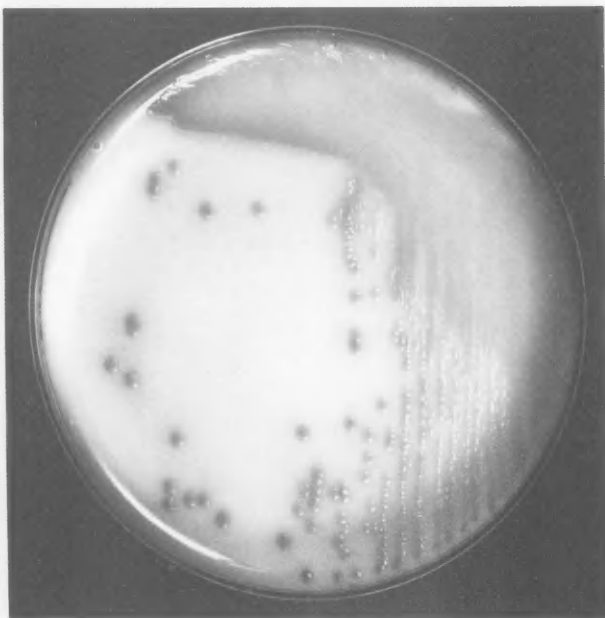
Growth of organisms and media

All bacterial strains (see Table 1) were maintained on brain heart infusion agar (BHIA; Acumedia, Lansing, MI) slants

FIGURE 1. Pure culture of *Listeria monocytogenes* growing on LSPM for 42–48 h at 35°C



FIGURE 2. Pure culture of *Listeria innocua* growing on LSPM for 42–48 h at 35°C



at 4 to 6°C and transferred monthly. For the 39 *L. monocytogenes* strains tested, the origin of isolation included pork, environmental (meat and dairy processing plants), clinical, rabbit, poultry, sheep, bovine brain tissue, beef, milk, and cheese; the serotypes represented included 1/2a, 1/2b, 1/2c, 3a, 3b, 4a, 4b, 4c, 4d, and 4e. For inoculation studies, cells were grown in either brain heart infusion broth (BHIB) or APT (All Purpose Tween; Difco Laboratories, Detroit, MI) broths at 35°C for 24 h to insure that they were in the stationary phase. Loopfuls of cells were streaked on the plates and incubated at 35°C for 48 h.

Media preparation

The LSPM was prepared according to manufacturer's directions. Briefly, 3.0 g of TiO₂ is added to 1 liter of deionized water and swirled. To this suspension 62.0 g of LSPM powder (R & F Products, Downers Grove, IL) is added with swirling, and the mixture is autoclaved for 10 min. Upon removal from the autoclave, the suspension is swirled to re-suspend the TiO₂ and cooled to 50°C before adding the supplements. After another swirl, plates are poured that are stable in the dark for up to 30 days at 4°C.

Colony morphology and species characteristics

After 42–48 h of incubation at 35°C, colonies growing on the plates were examined for morphology, growth, and color against the opaque white background of the agar.

RESULTS AND DISCUSSION

On LSPM, 39 pure culture strains of *L. monocytogenes* yielded blue-green to blue-violet colonies 1–2 mm diameter with or without surrounding precipitates in 42–48 h, and 4 strains of *L. ivanovii* yielded dark blue-green colonies with dark precipitates, whereas all of the nonpathogenic *Listeria* strains yielded pink colonies 1–2 mm diameter without precipitates (Table 1). The percent recovery for three *L. monocytogenes* strains (ATCC 19114, 19116 and 19117) on LSPM compared with recovery on Tryptic soy agar (Acumedia) ranged from 63.3 to 70.0% (data not presented). The suppression of growth

FIGURE 3. Mixed culture of *Listeria innocua* (pink) and *Listeria monocytogenes* (blue-green) at a 1:1 ratio growing on LSPM for 42–48 h at 35°C

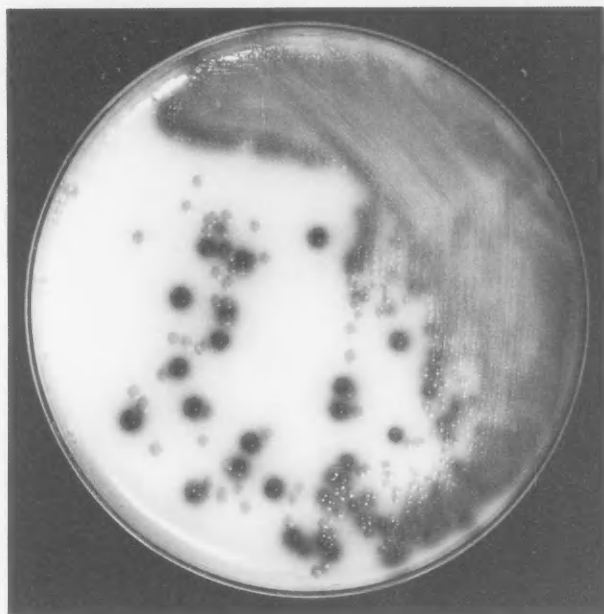
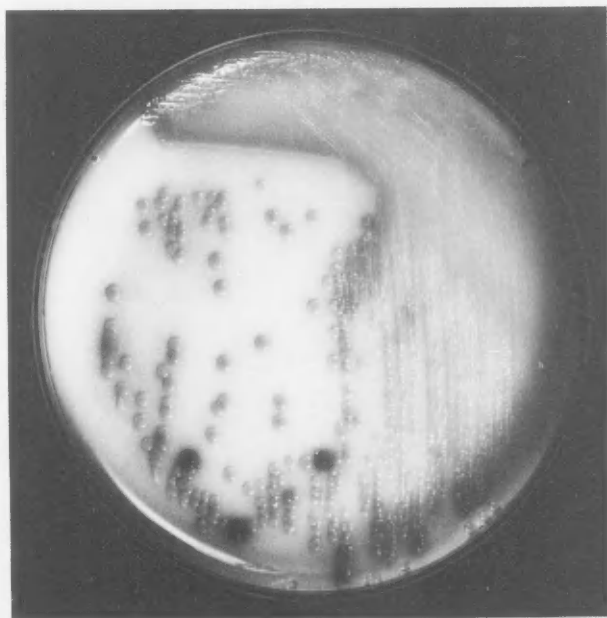


FIGURE 4. Mixed culture of *Listeria innocua* (pink) and *Listeria monocytogenes* (blue-green) at a 100:1 ratio growing on LSPM for 42–48 h at 35°C



observed for five common gram-positive genera (*Bacillus*, *Staphylococcus*, *Lactobacillus*, *Pediococcus*, and *Enterococcus*), as well as eight gram-negative genera (*Escherichia*, *Enterobacter*, *Citrobacter*, *Shigella*, *Morganella*, *Providencia*, *Pantoea*, and *Klebsiella*), demonstrates the high selectivity of LSPM. Two yeast genera, *Zygosaccharomyces* and *Candida*, also failed to grow in LSPM at 35°C. The highly selective properties of LSPM prevent the growth of potentially false positive organisms such as *Enterococcus* and *Bacillus* species that are positive for β -glucosidase or PI-PLC activity.

Plating on LSPM of pure cultures of *L. innocua* and *L. monocytogenes* showed that the three chromogenic substrates in the medium are capable of generating water-insoluble positive color reactions for both β -glucosidase (pink) and PI-PLC activities (blue-green to blue-violet) that permit *Listeria* spp. and *L. monocytogenes* to be readily differentiated (Figs. 1 and 2). Using mixed cultures, *L. innocua* and *L. monocytogenes* are differentiated by positive color reactions on a single plate over a wide range on LSPM incubated for 42–48 h at 35°C, with respective ratios of 1:1 and 100:1 (Figs. 3 and 4). Previously, media capable of detecting both β -glucosidase and PI-PLC activities have been reported to be superior for *L. monocytogenes* detection in a variety of foods when compared with standard methods and protocols currently in use (1, 2, 4, 6, 7). In these media, however, PI-PLC activity is detected by a non-chromogenic substrate (L- α -phosphatidylinositol) and not X-IP in order to avoid a color conflict with the X-glucoside used to detect β -glucosidase. This non-chromogenic substrate produces a white precipitate and halo around blue colonies of *L. monocytogenes* and *L. ivanovii*.

Although use of the LSPM medium has not been fully evaluated against a standard protocol for the differentiation of nonpathogenic and pathogenic *Listeria* species, the formation of two discrete positive color changes, plus the use of X-IP instead of a non-chromogenic substrate (L- α -phosphatidylinositol) for PI-PLC detection, should result in a clearer and more accurate differentiation of *Listeria* species than is possible in media without these properties. Studies are now being conducted to determine the effectiveness

of LSPM in comparison with USDA and FDA recommended plating media on various food products.

ACKNOWLEDGMENTS

The authors thank Barbara Ball and Steve Jorstad for the graphics, Larry Rohr for his assistance in the laboratory, and Drs. Steve Gendel and Catherine Donnelly for supplying some of the *Listeria* isolates.

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See page 613 of this issue for additional information.

Removal of Bacteria from Fingertips and the Residual Amount Remaining on the Hand Washing Nailbrush

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SUMMARY

The purpose of this study, which utilized 3 volunteer participants, was to measure the effectiveness of the double hand-washing procedure for removing non-pathogenic surrogate *Escherichia coli* organisms from fingertips and to measure the residual *E. coli* remaining on the nailbrush. Data from the experiment show that use of the nailbrush during hand and fingertip washing (Wash #1) reduced an inoculum of *E. coli* on fingertips by 2.98 log₁₀ CFU/ml, an almost 1,000-fold reduction. When Wash #1 was followed by a 10-s wash without the nailbrush (Wash #2), there was an additional reduction of 1.72 log₁₀ CFU/ml, an approximately 50-fold reduction. Added together, there was a total average reduction of 4.70 log₁₀ CFU/ml. Thus, the double hand-wash method was shown to reduce bacteria on fingers and to offer a validated solution for the foodservice operation that wishes to use the FDA Food Code provision of §3-301.11(D)(6) as an alternative to gloving. The average *E. coli* population remaining on the nailbrush after use during Wash #1 was measured, and it was found that retention was less than 1 in 10⁷ of the initial bacterial inoculum.

INTRODUCTION

The purpose of this study was to measure the effectiveness of the nailbrush (Kleen-Brush™) (San Jamar, Elkhorn, WI) for removing non-pathogenic surrogate *Escherichia coli* organisms from fingertips during hand washing and to measure the residual amount of *E. coli* remaining on the nailbrush.

The 2005 FDA Food Code (8) requirements are that "food employees shall clean their hands and exposed portions of their arms for at least 20 s, in a hand-washing sink, by rinsing under clean, running warm water, applying an amount of cleaning compound recommended by the cleaning compound manufacturer; rubbing together vigorously for at least 10 to 15 s while paying particular attention to removing soil from underneath the fingernails and creating friction on the surfaces of the hands and arms. The hands and arms must then be rinsed thoroughly under clean, running warm water and then thoroughly dried using disposable paper towels, or a continuous towel system that supplies the user with a clean towel,

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or with a heated air hand drying device.” According to the FDA Code Annex 3 (8), this procedure produces a 2-log reduction in transient microorganisms. However, there is no validation that this is adequate to reduce fecal pathogens on fingertips to an appropriate level of protection after the employee has used the toilet and toilet paper. The FDA code does not differentiate between removing high levels of possible pathogenic microorganism contamination on fingers after using the toilet (when layers of toilet paper can slip and tear, so as to allow feces with potentially millions of fecal pathogens to contaminate fingertips), vs. removing relatively low levels of pathogens from touching objects such as raw chicken contaminated with *Campylobacter* spp. and/or *Salmonella* spp. (22, 23).

Lack of, or inadequate, hand washing can result in transmission of pathogenic microorganisms and is a significant factor / cause of foodborne illness (3). Foodservice personnel must be educated about the importance of hand washing and trained to use the best method to use for hand sanitation at appropriate times (10, 20). Bacteria, viruses and parasites can be transmitted from person to person, from person to surface and vice-versa, and from person to food (1, 4, 12). Pathogens that have caused foodborne illness, transmitted to food by people, include *Escherichia coli* spp., *Salmonella* spp., *Shigella* spp., *Staphylococcus aureus*, *Streptococcus pyogenes*, *Campylobacter jejuni*, *Yersinia enterocolitica*, noroviruses, hepatitis A virus, *Cryptosporidium parvum*, *Entamoeba histolytica*, *Giardia lamblia*, and *Taenia solium* (2, 3, 6, 7, 12).

Lin et al. (13) reported the efficacy of different hand-washing methods for removing microbes from natural and artificial fingernails. Strains of non-pathogenic *Escherichia coli* JM109 and feline calicivirus (FCV) strain F9 were used as bacterial and viral indicators, respectively. Participants with artificial or natural nails were artificially contaminated with ground beef containing *E. coli* JM109 or artificial feces containing FCV. Participants washed their hands with tap water, regular liquid soap, antibacterial liquid soap, alcohol-based hand sanitizer gel, regular liquid soap followed by alcohol gel, or regular liquid soap plus a nailbrush. The greatest reduction of inoculated microbial populations was obtained by washing with liquid soap plus a nailbrush,

and the least reduction was obtained by rubbing hands with alcohol gel.

Michaels et al. (17) studied the effect of water temperature (4.4, 12.8, 21.1, 35 or 48.9°C) on the reduction of resident microflora and *Serratia marcescens*-inoculated menstruum when hands were washed with bland soap for 15 s and rinsed for 10 s. Results indicated that water temperature has no effect on transient or resident bacterial reduction during normal hand washing.

The FDA Food Code (8) permits drying hands with hot air dryers, clean cloth towels and paper towels. Paper towels have been shown to give the greatest reduction in bacteria (9). It was noted that the number of bacteria on paper towels was low before use but markedly increased after hands were dried, indicating physical removal of microbes from the hands. The friction applied when drying with paper towels further reduces bacterial counts. Under experimental conditions, an average of 95% reduction in contamination with *S. aureus* was obtained after rinsing with tap water alone and drying hands with paper towels. This frictional removal of transient bacteria from hands is very important when establishing the best procedure to obtain a Food Safety Objective (FSO).

To prevent transfer of fecal microorganisms from inadequately washed or unwashed bare hands after the toilet is used, the FDA Food Code (8) recommends that tongs, spatulas, serving utensils, deli tissue, dispensing equipment, or single-use gloves be used to serve and prepare ready-to-eat food. If gloves are used, hands must be washed before putting gloves on and after they are removed.

Requiring foodservice and food production personnel to wear gloves does not in itself provide effective control of cross contamination. Paulson (19) reported the transfer of 4 to 5 logs of Norwalk virus on contaminated surfaces to gloved hands. Michaels (15, 16) discussed the value and limitations of glove use. Interiors of gloves on hands can become incubators for microorganisms if hands are not washed prior to putting on gloves. Gloves develop holes or break and allow sweat and other contaminants to leak onto contact surfaces. Workers wearing gloves do not always change gloves as necessary to prevent pathogenic microorganism transmission. Lynch et al. (14) reported an observational study in a fast-food op-

eration that showed that food handlers tended to wear the same pair of gloves for extended periods of time; hence, there was an apparent failure of gloves to reduce or prevent bacterial contamination. Green et al. (11) reported an observational study of foodservice personnel that indicated a significant decrease in attempted and appropriate hand washing when gloves were worn than when gloves were not worn. These findings suggest that hand-washing practices of food workers need to be improved and that glove use may actually reduce hand washing.

The FDA Food Code (8) does permit bare-hand contact with ready-to-eat food under §3-301.11 when described conditions are met. Conditions include proper hand-washing facilities (location, installation, and maintenance); written employee health policy; employee training in proper hand-washing methods and good hygienic practices; documentation that hands are being washed to prevent cross contamination; and documentation that food employees contacting ready-to-eat food with bare hands use two or more of the following control measures to provide additional safeguards against hazards associated with bare-hand contact:

- (a) Double hand washing,
- (b) Nailbrushes,
- (c) A hand antiseptic after hand washing, as specified under §2-301.16,
- (d) Incentive programs such as paid sick leave that assist or encourage food employees not to work when they are ill, or
- (e) Other control measures approved by the regulatory authority, as well as documentation that corrective action is taken when conditions of this section are not met.

This study evaluated the first two of these measures, the double hand wash and use of a nailbrush.

METHOD

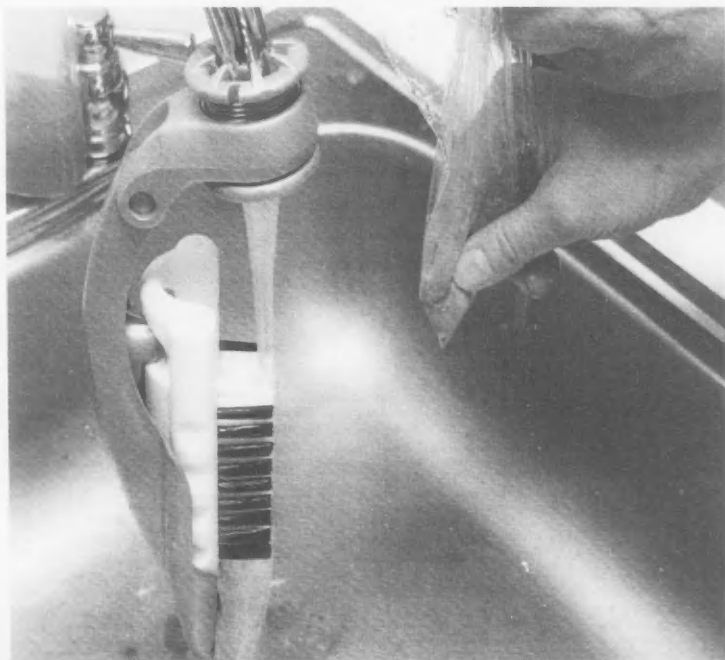
A sink faucet was modified to hold a Kleen-Brush™ unit (Fig. 1). Three people volunteered as subjects for this study. Two of them performed the double hand wash procedure 4 times and the third performed the procedure 3 times.

An inoculum of non-pathogenic *Escherichia coli* ATCC 25922 was pre-

FIGURE 1. Kleen-Brush™ unit installed



FIGURE 2. Fingertip rinse into zip-lock bag



pared in Tryptic Soy Broth (International Bio Products, Redmond, WA) to obtain a cell population of about $11 \log_{10}$ CFU/ml. To simulate unintentional contamination of fingertips, a 0.01 ml sample of the inoculum was spread equally on the surfaces of the tips of the second and middle fingers of the unwashed hands of the participants. The inoculum was then allowed to dry on the fingertips for 5 min.

The participants then applied approximately 3 ml of liquid soap [GOJO® Deluxe Lotion Soap with Moisturizers (Akron, OH)] to the second and middle fingers, dispensing the soap from a pump hand soap dispenser. The water was turned on at a flow rate of about 1 gallon (3.785 l) per minute at a temperature of 75°F (23.9°C), and the hands were rubbed and lathered with the nailbrush in the flowing water for 10 s to reduce the *E. coli* on the fingertips (Wash #1). The water continued to flow over the nailbrush for another 10 s before the faucet was turned off and the brush was removed and sampled for a count of residual *E. coli* remaining on the brush.

To determine reduction of *E. coli* due to the use of the nailbrush, the fingertips were rinsed in 10 ml of letheen broth (bioMérieux; Lombard, IL) contained in a 1-pint (0.473 l) zip-lock plastic bag; rinsing was accomplished by rubbing the thumb against the second and middle fingers for 20 s (Fig. 2). The letheen broth in the plastic bag was then sampled for *E. coli*, and the CFU/ml were determined by pour plating on VRB+MUG [Violet Red Bile agar with MUG (fluorogen)] (International Bio Products, Redmond, WA).

To determine the effectiveness of a plain wash without the nailbrush (Wash #2), the participants washed their hands and fingertips a second time for 10 s by applying 3 ml of soap to the palm of the hand, lathering and rinsing, using flowing water at 75°F (23.9°C) but no nailbrush. (No additional inoculum was placed on the fingertips prior to Wash #2.) The fingers were rinsed again in 10 ml of letheen broth contained in a 1-pint (0.473 l) zip-lock plastic bag, and a count of *E. coli* was performed using VRB+MUG.

The residual amount of *E. coli* remaining on the nailbrush was measured by removing the brush from the holder and placing it in a zip-lock plastic bag with

TABLE 1. Reduction of non-pathogenic *Escherichia coli* ATCC 25922 on fingertips as affected by hand washing with nailbrush (Wash #1), followed by washing without nailbrush (Wash #2), and residual amount remaining on nailbrush

Repli- cation	Description	Remaining CFU/ml	Remaining Log ₁₀ CFU/ml	Reduction Log ₁₀ CFU/ml	Total Reduction Log ₁₀ CFU/ml
1	Wash #1 with brush	9,900,000	7.00	2.89	4.57
	Wash #2 without brush	210,000	5.32	1.68	
	Residual <i>E. coli</i> on brush	300	2.48		
2	Wash #1 with brush	5,700,000	6.76	3.13	4.81
	Wash #2 without brush	120,000	5.08	1.68	
	Residual <i>E. coli</i> on brush	420	2.62		
3	Wash #1 with brush	7,000,000	6.85	3.04	4.77
	Wash #2 without brush	130,000	5.11	1.73	
	Residual <i>E. coli</i> on brush	2,800	3.45		
4	Wash #1 with brush	2,200,000	6.34	3.55	5.09
	Wash #2 without brush	64,000	4.81	1.54	
	Residual <i>E. coli</i> on brush	1,500	3.18		
5	Wash #1 with brush	3,400,000	6.53	3.36	5.13
	Wash #2 without brush	58,000	4.76	1.77	
	Residual <i>E. coli</i> on brush	760	2.88		
6	Wash #1 with brush	43,000,000	7.63	2.18	3.77
	Wash #2 without brush	1,100,000	6.04	1.59	
	Residual <i>E. coli</i> on brush	250	2.40		
7	Wash #1 with brush	11,000,000	7.04	2.77	4.27
	Wash #2 without brush	350,000	5.54	1.50	
	Residual <i>E. coli</i> on brush	300	2.48		
8	Wash #1 with brush	14,000,000	7.15	2.66	4.30
	Wash #2 without brush	320,000	5.51	1.64	
	Residual <i>E. coli</i> on brush	1,200	3.08		
9	Wash #1 with brush	2,500,000	6.40	3.41	5.17
	Wash #2 without brush	320,000	4.64	1.76	
	Residual <i>E. coli</i> on brush	100	2.00		
10	Wash #1 with brush	18,000,000	7.26	2.55	4.63
	Wash #2 without brush	150,000	5.18	2.08	
	Residual <i>E. coli</i> on brush	9,300	3.97		
11	Wash #1 with brush	4,000,000	6.60	3.21	5.20
	Wash #2 without brush	41,000	4.61	1.99	
	Residual <i>E. coli</i> on brush	630	2.80		

FIGURE 3. Reduction of *Escherichia coli* ATCC 25922 from hand surfaces as affected by hand washing with a nailbrush (Wash #1) and without a nailbrush (Wash #2)

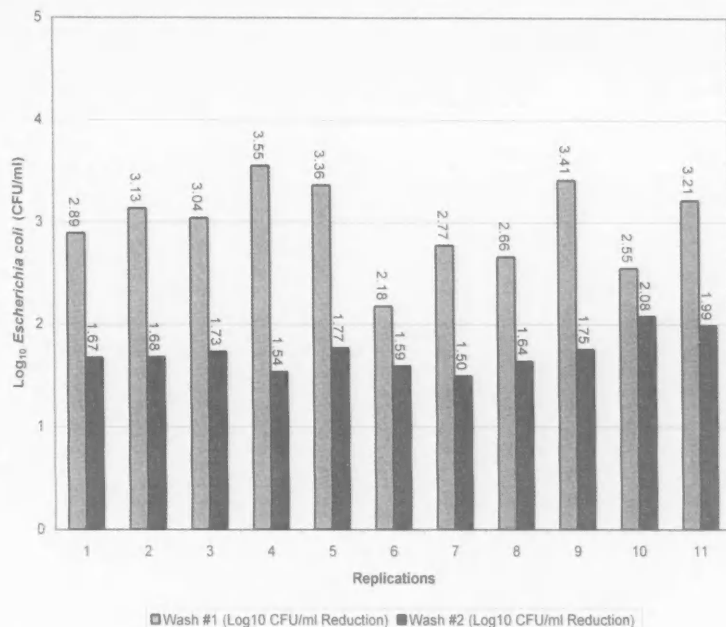
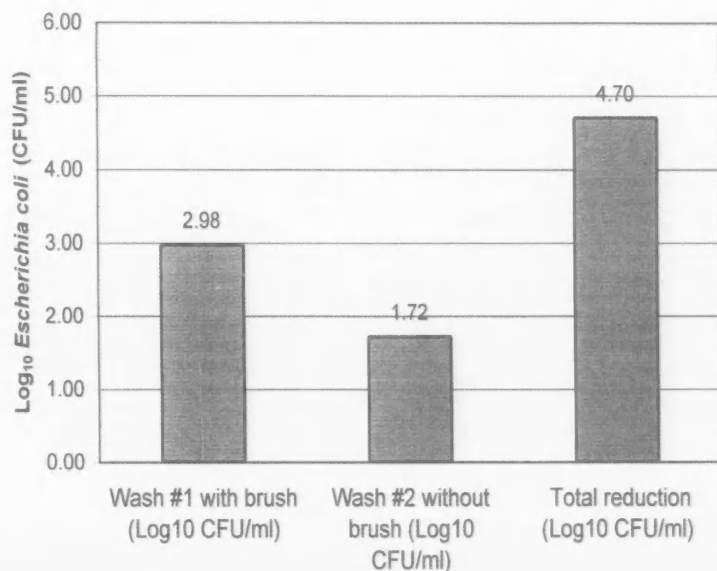


FIGURE 4. Average reduction of *Escherichia coli* ATCC 25922 from fingertip surfaces as affected by hand washing with a nailbrush (Wash #1) and without a nailbrush (Wash #2)



10 ml of letheen broth, which was then shaken for 30 s. The broth was sampled for *E. coli*, and the number remaining on the nailbrush was determined in VRB+MUG. A new brush was used for each of the 11 Wash #1 replications.

RESULTS

The initial inoculum on fingertips was 9.89 log₁₀ CFU/ml for replications 1 through 5, and 9.81 log₁₀ CFU/ml for replications 6 through 11. Data in Table 1 show the number of *E. coli*, reported as log₁₀ CFU/ml, remaining on fingertips after Wash #1 (with nailbrush) and Wash #2 (without nailbrush) for each replication. The reduction was calculated, based on the initial inoculum.

The average number and standard deviation for *E. coli* remaining on fingertips and on the nailbrush are as follows: Wash #1, 6.87 log₁₀ CFU/ml, (standard deviation = 0.39 log₁₀ CFU/ml); Wash #2, 5.15 log₁₀ CFU/ml (standard deviation = 0.44 log₁₀ CFU/ml); Nailbrush 2.85 log₁₀ CFU/ml (standard deviation = 0.55 log₁₀ CFU/ml).

The average reductions for *E. coli* are as follows: Wash #1, with the nailbrush, 2.98 log₁₀ CFU/ml (standard deviation = 0.41 log₁₀ CFU/ml), or almost 1,000-to-1 reduction. Wash #2, without the nailbrush, increased the total reduction to an average of 4.70 log₁₀ CFU/ml (standard deviation = 0.45 log₁₀ CFU/ml), or a difference of 1.72 log₁₀ CFU/ml, which is about a 50-to-1 additional reduction.

Figure 3 provides a graphical representation of the 11 replications of the reduction of *E. coli* on hand surfaces (fingertips) as affected by hand washing with a brush (Wash #1) followed by hand washing without a brush (Wash #2). The average reduction data are shown in Fig. 4.

DISCUSSION

Snyder (21) reported experiments that measured the effectiveness of using a nailbrush for reduction of bacteria (*Serratia marcescens*) on fingertips. Data from these experiments indicated that a 3-log₁₀ CFU/ml reduction in the bacterial population occurred with use of the double hand wash method using the nailbrush. It was also speculated that potential for

transfer of residual bacteria remaining on the nailbrush was slight.

Results of this study, which indicate an average reduction of 2.98 log₁₀ CFU/ml *E. coli* when a nailbrush was used for hand washing, are similar to the results of earlier research by Snyder. Conventional hand washing has been reported to give about a 0.5-to-1.5-log₁₀ CFU/ml reduction of bacteria (5, 13, 18). In this study, the second wash, without a brush, gave an average reduction of 1.72 log₁₀ CFU/ml.

SUMMARY

The results of this experiment have shown that use of a nailbrush during Wash #1 reduced an inoculum of *E. coli* on fingertips by 2.98 log₁₀ CFU/ml, a reduction of almost 1,000 to 1. An additional 10-s wash without the nailbrush gave an additional average reduction of 1.72 log₁₀ CFU/ml, or a reduction of 50 to 1. Added together, there was a total average reduction of 4.70 log₁₀ CFU/ml. Thus, the results of this study indicate that the double hand wash method reduces bacteria on fingers and offers a validated solution for the foodservice operation that would prefer to use the FDA Food Code provision of §3-301.11(D) (6) as an alternative to gloving.

This study also indicates that the average population of *E. coli* remaining on the nailbrush after being used during Wash #1 corresponded to less than a 1 in 10,000,000 retention of the initial bacterial inoculum.

ACKNOWLEDGMENT

This study was funded by San Jamar, Elkhorn, WI.

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Survey of Consumer Attitudes and the Effectiveness of Hand Cleansers in the Home

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SUMMARY

Although frequent hand washing reduces microbial load, the best hand-cleansing agents and hand washing methodologies to employ to reduce microbial load on hands are not obvious. The objectives of this study were to determine public attitudes about available hand cleansers and to determine the effectiveness of three hand cleansers in reducing bacteria on hands. A survey was distributed to ascertain the rationale used to select specific hand cleansers for use in the home. Most respondents believed that regular hand soaps (no active ingredient) were not as effective as antibacterial soaps in reducing bacteria on hands. Liquid hand soap, antibacterial liquid hand soap, and an alcohol gel sanitizer were evaluated to determine their effectiveness in reducing bacteria on hands. Comparisons made between pre-wash agar touch plates and post-wash agar touch plates showed that all three hand cleansers reduced bacteria on hands when a 20 s hand wash procedure was used. No significant differences ($P > 0.05$) were detected between relative colony numbers (RCN), defined as a visible range of bacterial or fungal colonies, obtained with liquid hand soap with antibacterial ingredients and liquid hand soap without such ingredients. However, alcohol gel significantly reduced ($P \leq 0.05$) RCN on hands, compared to results with liquid hand soap and antibacterial hand soap.

INTRODUCTION

Hand washing is recommended to prevent disease. However, which hand cleansers to use and what methods to employ when washing hands have not been sufficiently established. Public misinformation, misconceptions and confusion as to the proper methods and frequency of hand washing continues to confuse consumers and health care professionals. Triclosan is the most common antibacterial agent in antibacterial hand soaps and detergents. Over 75% of the hand soaps for home hygiene use are antibacterial soaps containing triclosan or triclocarbon (chemically, 5-chloro-2-(2,4-dichlorophenoxy)phenol) (32). Establishing the best methods of washing hands and the effectiveness of specific hand cleansers is crucial in finding the best defense against pathogenic microorganisms.

Triclosans and triclocarbons work by attacking the peptidoglycan layer of Gram positive bacteria and the lipopolysaccharide layer of Gram negative bacteria (23). Proteins that function in the building of the cell wall or in the cell's ability to reproduce are affected. Researchers have

A peer-reviewed article

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shown that triclosan inhibits bacterial fatty acid synthesis at the enoylacyl carrier protein reductase (ENR) (encoded FabI) step. Triclosan disrupts the enzyme so that the bacteria cannot make the cell wall and, therefore, cannot replicate (23).

Larson et al. (30) found in a long-term study that antibacterial soaps and cleaning products were no more or less effective than regular soaps and hand cleansers without an antibacterial ingredient in reducing the risk for symptoms of viral infectious diseases in households; however, they did not test the potential contribution of these products in reducing symptoms of bacterial diseases in the home. Larson and colleagues concluded, on the basis of the outcome of their study, that the knowledge base of both health professionals and the general public in choosing hand cleansing agents is lacking.

Several factors should be considered regarding the use and efficacy of antimicrobial soaps and cleaning products. Triclosan is a potent wide spectrum antibacterial and antifungal agent that the United States Environmental Protection Agency (USEPA) has registered as a pesticide. A dioxin known as dibenzodichlorodioxin (2,7/21,8-dibenzodichloro-p-dioxin), suspected to be a photodegradation by-product of triclosan, has been found in various environmental matrices and under different conditions (42). Researchers have also indicated that the use of antibacterial agents, such as triclosans and triclocarbons, may promote the development of antimicrobial-resistant microorganisms (1, 11, 43, 53). A mutation in a particular gene may lead to the development of bacteria that are resistant to triclosan or other antimicrobial agents. By inactivating normal bacteria, triclosan then would create an environment in which the resistant, mutated bacteria are more likely to survive. Although a link between antibacterial agents and antibiotic resistance in bacteria has long been suspected, no cause-effect relationship has been established. This theory has been challenged; in a recent study of over 200 randomized households, Aiello et al. (2, 14) determined that the use of 0.2 percent triclosan in hand soap did not significantly increase antimicrobial drug resistance or alter bacterial susceptibility to triclosan. This study concluded, however, that

more extensive and longer term use of triclosan might provide a suitable environment for emergence of resistant species. Researchers have also found that certain microorganisms are intrinsically resistant to antibiotics because of the expression of efflux pumps (13, 40). In response to possible public policy changes regarding antimicrobial use, a panel of experts funded by The Institute of Food Technologists (16) was assembled to address the impact of interactions between bacteria and antibiotics. The panel discussions revealed the complexity and unique interactions between specific bacterium and antimicrobial agents and the ways in which possible mitigation interventions must be considered. There are no simple solutions to this issue, and risk analysis must be used at all levels to identify, characterize and measure hazards, assess exposure, and characterize risks.

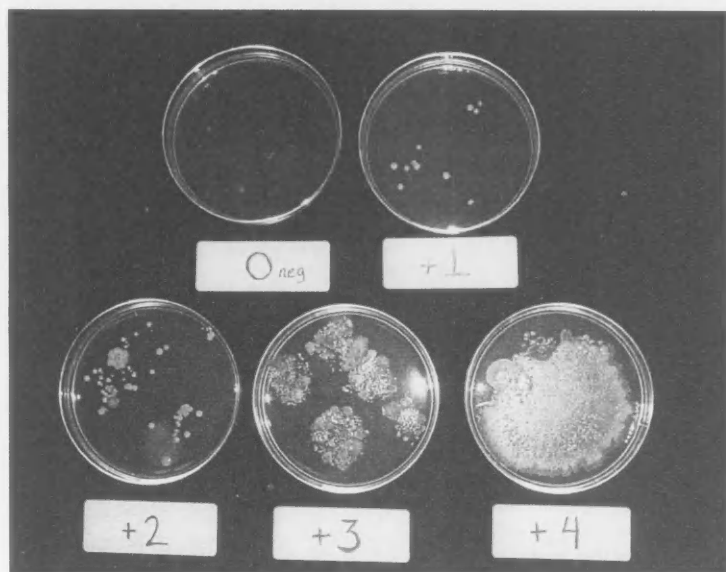
Alcohol gels have been introduced as alternatives or supplements to antibacterial hand cleansers such as triclosan and triclocarbon in hospital settings. In 2002, the CDC revised the "Guidelines for Hand Hygiene in Health-Care Settings" and included the use of alcohol-based hand rubs (54). Alcohol's mode of action is to denature membranes, which results in cellular leakage. Alcohol solutions containing 60% to 95% alcohol are most effective (15, 22, 56). Alcohols have excellent in vitro germicidal activity against gram-positive and gram-negative vegetative bacteria, including multidrug-resistant pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant Enterococci (VRE), *Mycobacterium tuberculosis*, and various fungi (12, 54, 55). Certain enveloped (lipophilic) viruses (e.g., herpes simplex virus, human immunodeficiency virus [HIV], influenza virus, respiratory syncytial virus, and vaccinia virus) are susceptible to alcohols when tested in vitro (12). Because alcohol dissipates after use, it is not considered an environmental hazard. There is no known long-term effect from using an alcohol gel sanitizer on microorganisms, and it is considered to have no influence on selection of organisms for antibiotic resistance (23). The effectiveness of alcohol gel sanitizers for reducing bacterial loads on hands has some limitations, however. Despite their effectiveness against many organisms, alcohols have

poor activity against bacterial spores, protozoan oocysts, and certain nonenveloped (nonlipophilic) viruses (48, 54). In addition, because organic matter reduces the effectiveness of alcohol gel sanitizers, hands need to be free of debris prior to use (54). In recent years, researchers (10, 20, 24, 52, 56) have demonstrated the value of multidisciplinary hand-hygiene promotion programs and the potential role of alcohol-based hand rubs in improving hand-hygiene practices. They have advocated the use of alcohol gels in health-care facilities as well as in the home.

Sandora et al. (45) reported a 59% reduction in the spread of gastrointestinal illnesses in homes where alcohol gels were used compared with those homes where they were not used. In a multi-state study completed by Hilburn et al. (20), individual schools in separate districts were divided into alcohol gel product groups and control groups. There was an overall 19.8% reduction of absenteeism due to illness in the product group schools and more than a 10% decrease in teacher absenteeism due to illness, compared to the control group. The information, instruction materials on proper use of the product, and free product provided to participants using alcohol gels may have biased the outcome of both of the studies cited above. These studies did, however, provide further evidence that when hand cleansing with alcohol gel is consistently employed, a decrease in illness results.

Some researchers have suggested that hand washing itself may increase the number of microorganisms on hands (27, 33, 47). The microbial flora of the skin, consisting of both transient and resident microorganisms, have been found to be easily modified by frequent hand washing and application of substances such as soaps and lotions (28, 31, 35). Hand washing removes skin lipids and decreases moisture and acidity. The extent of lipid removal depends on the chemical composition and concentration of the hand-washing agent, temperature of the water, washing time (30 s or more releases more microorganisms), mechanical action, and rinsing and drying after washing. These researchers suggest that when the skin becomes too dry as a result of the environment, frequent hand washing or chemical use, the drying of the stratum corneum to below 10% water content causes fissures,

FIGURE 1. Template for visual analysis of Relative Colony Number



destroying the integrity of the surface and thereby increasing the skin's susceptibility to infectious bacteria.

Public knowledge of the importance of hand hygiene and the proper methods for hand washing is critical to helping to prevent disease; however, a large survey sponsored by the American Society for Microbiology found that almost one-third of people using airport restrooms in New York, Miami, and Chicago did not stop to wash their hands. In contrast, restroom users in Toronto stopped to wash their hands 90% of the time (8). The observations were made during the midst of the SARS epidemic, which affected Canada more than the United States. Efforts by the Canadian government and media to educate people on the importance of washing hands during the SARS epidemic may have been the largest factor in this significant difference between Americans and Canadians. Other surveys (3, 7, 21, 25, 34, 44, 50) have reported similar findings, that people are not washing their hands, which highlights the magnitude of the problem. Researchers estimate that proper hand washing could eliminate nearly half of all cases of foodborne illness (26). The best methods and soaps are of no value if people do not wash their hands.

The purpose of this investigation was to determine what factors consumers consider when choosing hand cleansers for the home and to determine the efficacy of three hand cleansers used under similar circumstances.

METHODS AND MATERIALS

Consumer attitudinal and behavioral survey

A six-question survey was developed, following suggested formats for survey questions in the Survey Research Writer's Guide (9) accessed from Colorado State University's Web site. The questions were developed to evaluate the attitude and behavioral base of consumers regarding hand cleansers. Large-scale surveys that use closed-ended questions take less time from the interviewer, the participant and the researcher, and have a higher response rate than surveys that use open-ended questions. Participants were allowed to use a comments section for further explanation of choices. More than one answer per question was allowed and considered in the results.

The survey was conducted using both telephone and paper formats. Participants for the telephone survey were selected by choosing phone numbers at random from a local Colorado telephone book. The paper survey was distributed to students in a college-level food preparation class, who were also used in the hand wash experiment.

Hand wash experiment

Six laboratories with 15 students each participated in the hand-washing experiment, for a total of 90 participants. None of the students had washed their hands prior to the experiment and none exhibited cuts or abrasions on their hands.

Each participant had his/her hands sampled by touching an agar plate containing a standard method plate count agar (41) containing tryptone, yeast extract, and dextrose. The fingertips of all fingers on one hand were placed gently on the agar medium with a finger rolling action, and the agar plate was closed immediately and incubated at 35°C for 48 hours. Each participant was asked to choose either the right hand or left hand for testing purposes and to use the same hand for testing after washing. Different testing procedures were needed for the liquid hand soap categories and the alcohol gel hand cleanser to account for the different instructional uses for each product. Specific ingredient information for products used in this test were accessed from the National Institutes of Health, Specialized Information Services (5), and the product label. The following products were used:

1. Liquid hand soap (Ivory® brand, Procter and Gamble Co., Cincinnati, OH): Ingredients (in descending order by weight): water, sodium laureth sulfate, sodium lauryl sulfate, cocamidopropyl betaine, citric acid, sodium chloride, fragrance, DMDM hydantoin, tetrasodium.
2. Antibacterial soap (Softsoap® brand, Colgate Palmolive Co., New York, NY): Active ingredient: Triclosan (~2%). Other ingredients (in descending order by weight): Water, sodium laureth sulfate, cocamidopropyl betaine,

sodium chloride, decyl glucoside, fragrance, DMDM hydantoin, PEG-120 methyl glucose dioleate, tetrasodium EDTA, citric acid, sodium sulfate, polyquaternium-7, poloxamer 124, PEG-7 glyceryl cocoate, D&C red no. 33, FD&C blue no. 1, aloe barbadensis/vera extract/gel, silk protein, hydrolyzed.

- Alcohol gel (Purell® brand, GoJo Industries, Inc., Akron, OH): Active ingredient: Ethyl alcohol (62%). Inactive ingredients (in descending order by weight): Water, glycerin, isopropyl myristate, propylene glycol, tocopheryl acetate, aminomethyl propanol, aloe barbadensis/vera extract/gel.

Each hand-cleansing station was equipped with the hand cleanser (two bottles), agar plates, a timer which was pre-programmed for 20 s and an instruction sheet describing, in detail, how to wash the hands.

The procedure for liquid hand cleansers tests was as follows: After using the touch plate method to roll their fingertips across the agar plate, participants wetted their hands with warm (35 to 37°C) tap water. The person next in line was instructed to turn off the tap and to open the agar plates containing the sterile agar to avoid surface contamination of the participant's hands during the study. Approximately three (3) milliliters (± 0.2 ml) of product (approximately 2 squirts from the applicator) was applied to the hands. The applicators were tested previously to ensure consistent application amounts. A timer was set for 20 s as hands were rubbed together as instructed by study researchers and as indicated on the hand-washing instruction sheet (6) displayed at each hand-cleansing station. This was followed by a rinse of approximately 10 s under warm (35 to 37°C) tap water. Participants were instructed to pat hands dry with a clean paper towel. The same hand as initially tested for the pre-wash agar plate was tested after hand washing by touching each fingertip region to the surface of the post-wash agar plates, using the same procedure as for the pre-wash test. All plates were incubated at 35°C for 48 h before being observed.

The same procedure for touching the pre-wash agar plate was used for the

alcohol gel sanitizer as in the liquid hand-cleanser procedures. A dime-sized amount (approximately 1.5 ml) or one (1) squirt of product was dispensed onto the hands and participants were asked to rub the hands for 20 s (a preset timer was started for each participant). Using the same hand as initially tested for the "before" plate, hands were tested after application of the alcohol gel and air drying, by touching each fingertip region to the surface of the "after" plates using the same procedure that was used on the "before" agar plates. The student next in line opened the agar plates and held the plate for the student completing the test. The plates were incubated at 35°C for 48 h.

Each agar plate was assigned a relative colony number (RCN) on a 5-point scale between 0 (negative) to +4 (highest number of colonies) based on visual comparison with the RCN template shown in Fig. 1. A range of microbial colonies was used to determine differences between groups. The ranges that were used for quantification were zero colonies for negative plates, 1 to 15 for + 1; 16 to 40 for + 2; 41 to 60 for + 3; and greater than 60 for + 4.

Each set (pre and post treatment) of incubated agar plates was placed on a counter top and compared with each other and with other plates in each group and between groups, to ensure consistency of quantification. One person quantified all plates to avoid personal discrepancies of judgment; a coding system, which was masked, was used to identify treatments and decoded after quantification was completed.

Statistical analysis

Means and percent responses to each question of the attitudinal/behavioral survey were determined with the use of Microsoft Excel. Statistical Analysis Software (SAS) Version 9.0 (46) was employed to determine possible differences in responses between the student group used for the lab testing component of the study and the consumers participating in the random telephone survey.

The results of the hand-wash experiment were analyzed with the SAS (Statistical Analysis Software - 9.0 version), using the Proc Mix procedure. The differences of least squares means was used to indicate differences between hand cleansers used in this study. To analyze for any differences

among the three groups using the identified hand cleansers, a proc mixed procedure was used, comparing initial microbial loads observed on the touch plates prior to washing for each group.

RESULTS

The behavioral/attitudinal survey was conducted by telephone ($n = 40$) and on paper ($n = 60$) to identify which hand cleansers consumers prefer and to determine the reasons for their choice. Approximately 320 telephone calls were made to local consumers to complete the verbal survey, resulting in a response rate of 12.5%. Mean age of participants in the paper survey (class) group was 22.5 ± 6 years, while the mean age for the random telephone survey was 44.5 ± 30 years, a much wider variation in age. The educational level of participants was not investigated. However, students were at a sophomore or higher college level. Previous demographic studies of the general population of this city have shown a higher than normal level of education with 48.4% of those 25 and older having bachelor's degrees or higher compared to the national average of 24.4% (7). Results of the survey are summarized in Table 1.

The majority of consumers surveyed for this study (72%) said that they used a liquid hand cleanser in the home. Sixty-four percent said that they used hand cleansers containing an antibacterial ingredient, while 26% did not know what type of ingredient their home hand cleanser contained. Consumers in both groups also thought that price and fighting bacteria were equally important. Responses also indicated that when thinking about removing bacteria from hands, consumers were unaware that alcohol gels may be an effective way to remove bacteria from hands. Results of consumers' attitudes regarding which hand cleanser is best in removing bacteria from hands indicated that 61% thought that antibacterial soaps were better than other hand cleansers. Only 12% of consumers surveyed preferred using regular hand cleansers to remove bacteria from hands, and only 6% preferred using an alcohol gel rub.

No differences were detected at a significance level of $P \leq 0.05$ between the class group versus the telephone survey group for which type of hand cleanser

TABLE 1. Consumer attitudinal and behavioral survey of hand cleanser choices for home use

Question	Response Choices	Telephone survey n = 40 n (%)	Student written survey n = 60 n (%)	Total response N	Significance P-value Between Groups
1. Which type of hand cleanser do you currently use in your home?	Liquid	32 (78%)	44 (73%)	76 (72%)	0.1236
	Bar	8 (20%)	12 (20%)	20 (19%)	
	Alcohol gel rub	1 (2%)	9 (15%)	10 (9%)	
	Don't know	0 (0%)	0 (0%)	0 (0%)	
	Other	0 (0%)	0 (0%)	0 (0%)	
2. Of the type of hand cleansers you use in the home, do any of them contain the following ingredients? (check all that apply)	Citric acid	0 (0%)	3 (4.7%)	3 (3%)	0.4847
	Alcohol gel	2 (5%)	5 (7.8%)	7 (7%)	
	Antibacterial agent	25 (62.5%)	42 (67%)	67 (64%)	
	Don't know	13 (32.5%)	14 (21.9%)	27 (26%)	
	Other	0 (0%)	0 (0%)	0 (0%)	
3. When choosing a hand cleanser for the home, which of the following is most important to you?	Organic or natural	0 (0%)	2 (2.9%)	2 (2%)	0.0325
	Fragrance	2 (5%)	9 (13%)	11 (10%)	
	Contains a moisturizer	3 (7.5%)	15 (22%)	18 (16%)	
	Contains a germ fighter	19 (47.5%)	20 (29%)	39 (35%)	
	Price	18 (45%)	22 (32%)	40 (36%)	
4. When thinking about removing bacteria from your hands, which of the following best describes how you feel?	Alcohol gels are better than regular hand cleansers.	5 (13%)	9 (15%)	14 (14%)	0.3112
	Alcohol gels are neither better nor worse than regular hand cleansers.	10 (26%)	7 (11.5%)	17 (17%)	
	Alcohol gels are worse than regular hand cleansers.	7 (18%)	11 (18%)	18 (18%)	
	Never thought about it.	17 (44%)	34 (55.5%)	51 (51%)	
5. When thinking about removing bacteria from your hands, which of the following best describes how you feel?	Antibacterial hand cleansers are better than regular hand cleansers.	27 (67.5%)	34 (57%)	61 (61%)	0.0416
	Antibacterial hand cleansers are neither better nor worse than regular hand cleansers.	4 (10%)	12 (20%)	16 (16%)	
	Antibacterial hand cleansers are worse than regular hand cleansers.	1 (2.5%)	9 (15%)	10 (10%)	
	Never thought about it.	8 (20%)	5 (8%)	13 (13%)	
	Antibacterial hand cleansers	27 (67.5%)	35 (58%)	62 (62%)	
6. When thinking about removing bacteria from hands, which of the following would you prefer to use?	Alcohol gel rubs	2 (5%)	4 (7%)	6 (6%)	0.0352
	Regular hand cleansers	0 (0%)	12 (20%)	12 (12%)	
	None of the above	1 (2.5%)	1 (2%)	2 (2%)	
	Any of the above	10 (25%)	8 (13%)	18 (18%)	

was used in the home. The majority in both groups used a liquid hand cleanser containing an antibacterial agent. Neither group used alcohol gel rubs as their hand cleanser of choice. The two groups did differ ($P < 0.05$) in their responses to factors they considered important when choosing hand cleansers for the home, but both groups placed highest values on antibacterial ingredient and price. There were no significant differences detected between the answers given by the paper survey group and the telephone survey group when they were asked whether they thought alcohol gels were better or worse than regular hand soaps. A majority of both groups never thought about whether or not hand sanitizers were better than regular hand sanitizers; however, when asked the same question regarding antibacterial hand cleansers, a majority

of both groups thought that antibacterial hand cleansers were better than regular hand cleansers. There was a significant difference between groups in that a greater percentage of the student group considered antibacterial hand cleansers worse than regular hand cleansers (15 vs. 2.5%, respectively). Gender was not a question of the survey and could be ascertained only by name and voice indications; for this reason, this information was analyzed but is not included in this report.

The null hypothesis for the hand-washing experiment was that there are no differences among non-antibacterial and antibacterial hand cleansers and alcohol gel hand sanitizers with regard to the efficacy of bacteria reduction on hands.

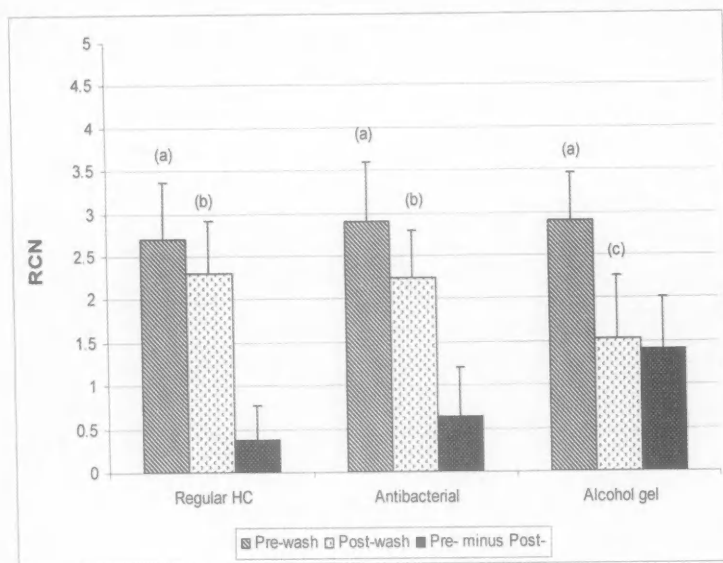
No significant differences were detected ($P > 0.05$) among pre-wash RCN values of the three treatment groups; therefore, all three groups had equally

contaminated hands before treatment was applied (Fig. 2).

Regular liquid hand cleanser, used as the control in this experiment, reduced bacterial contamination on hands, with typical results showing an RCN decrease from 2.7 to 2.3 RCN on agar plates, with mean reduction of 0.4 RCN. Antibacterial soaps also showed a decrease in RCN values from 2.9 to 2.2 RCN with a mean reduction of 0.7, and alcohol gel reduced RCN values from 2.9 to 1.5, with a mean reduction of 1.4 RCN.

Regular and antibacterial hand cleansers reduced RCN values from pre-wash values ($P < 0.05$); however, alcohol gel reduced RCN values significantly more than did either regular or antibacterial hand cleanser ($P < 0.05$). No significant differences were seen in post-hand wash RCN values for regular and liquid antibacterial hand cleanser ($P > 0.05$).

FIGURE 2. Results of hand-washing experiment



Note: RCN = Relative Colony Numbers
Pre-wash = RCN value prior to hand washing
Post-wash = RCN value after 20 s hand washing
Pre- minus Post-wash = RCN value before hand washing minus RCN value after hand washing
a, b, c: significant differences at $P < 0.05$

DISCUSSION

The behavioral/attitudinal study indicated that people use antibacterial hand soaps because they believe that these products are the best at removing microorganisms from hands. However, consumers may not be aware that they may be able to reduce hand bacteria with plain soap and water as effectively as using products containing triclosan or triclocarbon. This study also showed a lack of awareness by those surveyed of the effectiveness of alcohol gel hand sanitizers.

Three commonly used methods for determining the microbial flora of hands were considered: 1) contact or impression plate; 2) the swab method; and, 3) the gloved hand and sterile bag method. The contact or impression plate method was used in this study because of its ease of use and cost effectiveness. Researchers have shown that this method is highly effective and repeatable (27, 29, 36). Touch plate methodologies have been employed in classrooms to demonstrate the microbial load of washed versus unwashed hands.

The swab method was considered; however, because of the variability in swabbing methods between researchers, this method was ruled out. Even though the gloved hand and sterile bag method is considered to be more accurate when a quantitative method is desired, this method also has deficiencies; cost and ease of use were determined to be the prohibitive factors. No current method has been proven exclusively accurate; however, some higher technology methods are currently under study. The use of bioluminescence ATP monitoring has been evaluated and found to be no more reliable than other methods, including the gloved hand and sterile bag method (29).

By its very name, an antibacterial soap infers effectiveness against bacteria; and thus, the name is a good marketing tool. Triclosan is showing up in water and groundwater (17, 18, 19, 38, 49, 51, 57), and may be a component in the emergence of antibiotic-resistant microorganisms (1, 11, 43, 53). With over 75% of all liquid and bar soaps containing triclosan and triclocarbon, the environmental impact

of these antibacterial agents should be investigated further. As previously indicated, antibacterial agents have been added to an array of products, with consumers and product makers believing that use of these agents will protect consumers from disease and therefore serve as an effective marketing tool for product makers. As evidenced by the results of the consumer survey conducted in this study, the efficacy and proper use and application of hand soaps and alcohol gel instant hand sanitizers needs to be communicated to consumers.

Instructions for product usage should be included on packaging for hand cleansers. It has been shown that the contact time of the antibacterial hand cleansers is an important factor in reducing bacteria on hands, while alcohol gel rubs work more directly, so that contact time does not seem to be a factor in their efficacy (10, 20, 37, 39). Therefore, a generic approach should no longer be used in deciding on the best methods for reducing bacteria on hands. Increasing public awareness of the benefits of frequent hand washing is beneficial. Programs such as FightBAC! with Hand Washing (8), Massachusetts Medical Society's "Good Health is in Your Hands" (4), and many other programs are beginning to make inroads into educating school-aged children and consumers about simple hand-washing methods. However, more effort should be made to educate consumers regarding their choice of hand cleansers, including limitations of such cleansers.

This study was limited by the low response rate to the community-based telephone survey. A higher number of participants, both in the survey portion of the study and the hand-wash experiment, could have increased statistical verification of results. Another limitation was use of the contact plate method and relative colony numbers to evaluate the results of the hand wash experiment. Although contact or impression plate methods have been proven to be reliable and repeatable, the enumeration and quantification of such colony numbers are less efficient, and variations in smaller numbers of plates decrease reliability and limit the ability to detect smaller variations. However, the consistency of results may counter the lack of available quantification and enumeration variability.

CONCLUSIONS

The results of the behavioral/attitudinal survey indicate that consumers have little awareness of alcohol gel hand sanitizers. They believe that a soap that contains an antibacterial agent is better than one that does not contain this agent. Consumers do not believe that an alcohol gel hand sanitizer or regular hand soap is as effective as an antibacterial soap in removing microorganisms, and most consumers surveyed (90%) do not have an alcohol gel in their home.

Approaches to hand hygiene practices are needed that do not trigger evolutionary countermeasures by pathogens. Such strategies may arise from a better understanding of the ways that pathogens invade host cells and evade the immune system. The results of this and other studies suggest that employing a strong antibacterial agent such as triclosan for everyday use may be of questionable value. The full impact of the use of these persistent chemicals in our environment must be more clearly understood.

The results of this study indicate that alcohol gel hand sanitizers are a quick and easy way to reduce microbial load on hands. However, when hands are soiled with debris, a simple 20-s hand wash with regular (non-antibacterial) hand soap, followed by application of an alcohol gel, may be unparalleled in preventing bacterial and viral infections transmitted by hands.

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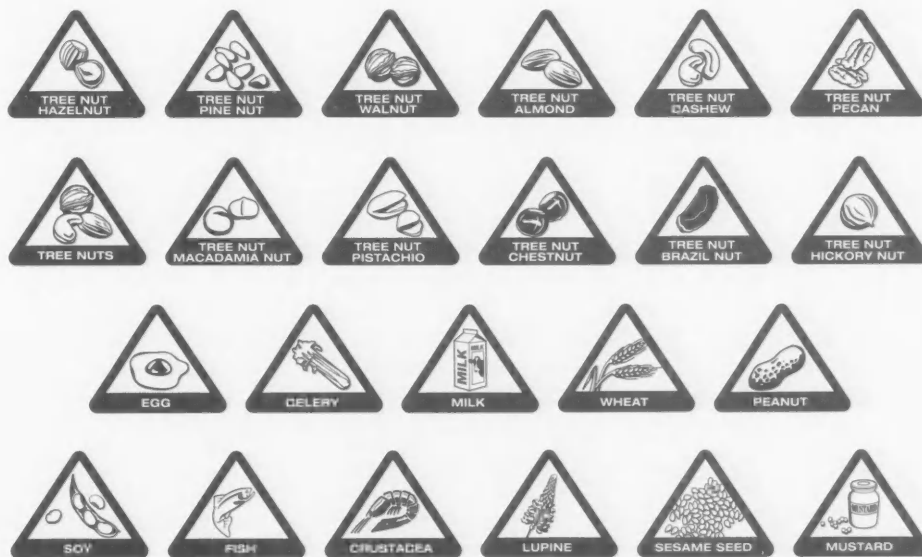
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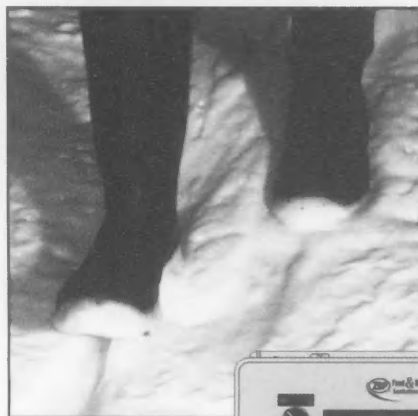
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The Secretary-Elect is determined by a majority of votes cast through a vote taken in March of 2008. Official Secretary duties begin at the conclusion of IAFP 2008. The elected Secretary serves as a Member of the Executive Board for a total of five years, succeeding to President, then serving as Past President.

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

Nominations Close November 1, 2007

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 629 of this issue) and fax or mail it to the IAFP office. Members may also find a Library listing and an order form online at the IAFP Web site at www.foodprotection.org.
- (2) Material from the Audiovisual Library is checked out for a maximum of two weeks (three weeks outside of North America) so that all Members can benefit from its use.
- (3) Requests are limited to five videos at a time.

How to Contribute to the Audiovisual Library ...

- (1) As the IAFP Membership continues to grow, so does the need for additional committee members and materials for the Library. The Audiovisual Committee meets at the IAFP Annual Meeting to discuss the status of the Audiovisual Library and ways to improve the service. New Members are sought to add fresh insight and ideas.
- (2) Donations of audiovisual materials are always needed and appreciated. Tapes in foreign languages (including, but not limited to Spanish, French, Chinese [Mandarin/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 Lani McDonald, Association Services at 800.369.6337 or 515.276.3344 if you wish to make a donation.

A Member Benefit of IAFP

DAIRY

- D1010 The Bulk Milk Hauler: Protocol & Procedures** – (8 minutes). Teaches bulk milk haulers how they contribute to quality milk production. Special emphasis is given to the hauler's role in proper milk sampling, sample care procedures, and understanding test results. (Iowa State University Extension–1990) (Reviewed 1998)
- D1030 Cold Hard Facts** – This video is recommended for training personnel associated with processing, transporting, warehousing, wholesaling, and retailing frozen foods. It contains pertinent information related to good management practices necessary to ensure high quality frozen foods. (National Frozen Food Association–1993) (Reviewed 1998)
- D1031 Dairy Plant** – (28 minutes). Join in on this video as it follows a tour of the University of Wisconsin Dairy Plant. Observe the gleaming machinery and learn the ins and outs of milk processing, packaging, and storage. Watch as workers manufacture butter, cheese, yogurt, sour cream and ice cream, and learn about secondary dairy products. (Chipsbooks Company–2003)
- D1040 Ether Extraction Method for Determination of Raw Milk** – (26 minutes). Describes the ether extraction procedure to measure milk fat in dairy products. Included is an explanation of the chemical reagents used in each step of the process. (CA–1988) (Reviewed 1998)
- D1050 Food Safety: Dairy Details** – (18 minutes). Dairy products are prime targets of contamination because of their high protein and water content, but this presentation shows how to maintain dairy foods. It explores techniques such as selection, handling, preparation and storage for milk, yogurt, cheese and other dairy products. (Chipsbooks Company–2003)
- D1060 Frozen Dairy Products** – (27 minutes). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients, emphasis is on what to look for in a plant inspection. Everything from receiving, through processing, cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA–1987) (Reviewed 1997)
- D1070 The Gerber Butterfat Test** – (7 minutes). Describes the Gerber milk fat test procedure for dairy products and compares it to the Babcock test procedure. (CA–1990) (Reviewed 1998)
- D1080 High-Temperature, Short-Time Pasteurizer** – (59 minutes). Developed to train pasteurizer operators and is well done. There are seven sections with the first covering the twelve components of a pasteurizer and the purpose and operation of each. The tape provides the opportunity for discussion after each section or continuous running of the videotape. Flow diagrams, processing and cleaning are covered. (Borden, Inc.–1986) (Reviewed 1997)
- D1090 Managing Milking Quality** – (33 minutes). This training video is designed to help dairy farmers develop a quality management process and is consistent with ISO 9000 certification and HACCP processes. The first step is to evaluate the strengths and weaknesses of a dairy operation. The video will help you find ways to improve the weaknesses that are identified on your farm.
- D1100 Mastitis Prevention and Control** – (Two–45 minute tapes). This video is ideal for one-on-one or small group presentations. Section titles include: Mastitis Pathogens, Host Defense, Monitoring Mastitis, Mastitis Therapy, Recommended Milking Procedures, Post milking Teat Dip Protocols, Milk Quality, and Milking Systems. (Nasco–1993)
- D1105 Milk Hauling Training** – (35 minutes). This video covers the procedures and duties of the milk hauler from the time of arrival at the dairy farm, to the delivery of the milk at the processing plant. It also provides the viewer with a general understanding of the quality control issues involved in milk production and distribution. Topics include milk composition breakdown, milk fat content measurement, testing for added water, antibiotic and pesticide residues, somatic cell and bacteria counts, sediment, and aflatoxins. (Avalon Mediaworks LLC–2003)
- D1110 Milk Plant Sanitation: Chemical Solution** – (13 minutes). This explains the proper procedure required of laboratory or plant personnel when performing chemical titration in a dairy plant. Five major titrations are reviewed...alkaline wash, presence of chlorine and iodophor, caustic wash and an acid wash in a HTST system. Emphasis is also placed on record keeping and employee safety. (1989)
- D1120 Milk Processing Plant Inspection Procedures** – (15 minutes). Developed by the California Department of Food and Agriculture. It covers pre- and post-inspection meetings with management, but emphasis is on inspection of all manual and cleaned in place equipment in the receiving, processing and filling rooms. CIP systems are checked along with recording charts and employee lockers and restrooms. Recommended for showing to plant workers and supervisors. (CA–1986)

- D1125 Ohio Bulk Milk Hauling Video** – (15 minutes). Milk haulers, weighers, and samplers are the most constant link between the producer, the producer cooperative, and the milk processor. This video shows their complete understanding of all aspects of farm milk collection and handling, milk quality and quality tests, and sanitation and sanitary requirements that contribute to the trust between the producer and the dairy plant. The video educates prospective haulers, weighers, and samplers throughout Ohio. (Ohio State University–2001)
- D1130 Pasteurizer: Design and Regulation** – (16 minutes). This tape provides a summary of the public health reasons for pasteurization and a nonlegal definition of pasteurization. The components of an HTST pasteurizer, elements of design, flow-through diagram and legal controls are discussed. (Kraft General Foods–1990) (Reviewed 1998)
- D1140 Pasteurizer: Operation** – (11 minutes). This tape provides a summary of the operation of an HTST pasteurizer from start-up with hot water sanitization to product pasteurization and shut-down. There is an emphasis on the legal documentation required. (Kraft General Foods–1990) (Reviewed 1998)
- D1150 Processing Fluid Milk** – (30 minutes). This slide set was developed to train processing plant personnel on preventing food poisoning and spoilage bacteria in fluid dairy products. Emphasis is on processing procedures to meet federal regulations and standards. Processing procedures, pasteurization times and temperatures, purposes of equipment, composition standards, and cleaning and sanitizing are covered. Primary emphasis is on facilities such as drains and floors, and filling equipment to prevent post-pasteurization contamination with spoilage or food poisoning bacteria. It was reviewed by many industry plant operators and regulatory agents and is directed to plant workers and management. (Penn State–1987) (Reviewed 1998)
- D1180 10 Points to Dairy Quality** – (10 minutes). Provides in-depth explanation of a critical control point in the residue prevention protocol. Illustrated with on-farm, packing plant, and milk-receiving plant scenes as well as interviews of producers, practicing veterinarians, regulatory officials and others. (Dairy Quality Assurance–1992) (Reviewed 1998)
- E3020 Acceptable Risks?** – (16 minutes). Accidents, deliberate misinformation, and the rapid proliferation of nuclear power plants have created increased fears of improper nuclear waste disposal, accidents during the transportation of waste, and the release of radioactive effluents from plants. The program shows the occurrence of statistically anomalous leukemia clusters; governmental testing of marine organisms and how they absorb radiation; charts the kinds and amounts of natural and man-made radiation to which man is subject; and suggests there is no easy solution to balancing our fears to nuclear power and our need for it. (Films for the Humanities & Sciences, Inc.–1993) (Reviewed 1998)
- E3030 Air Pollution: Indoor** – (26 minutes). 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 minutes). Designed to educate food and beverage company employees about their role in preventing an accidental allergic reaction caused by a product their company produces. Recommended for product development, production, labeling, scheduling and cleaning. Everyone has an important role to prevent cross contamination and mislabeling issues. (Food and Consumer Products Manufacturers of Canada–2003)
- E3040 Asbestos Awareness** – (20 minutes). This videotape discusses the major types of asbestos and their current and past uses. Emphasis is given to the health risks associated with asbestos exposure and approved asbestos removal abatement techniques. (Industrial Training, Inc.–1988) (Reviewed 1998)
- E3055 Effective Handwashing – Preventing Cross-Contamination in the Food Service Industry** – (3.5 minutes). It is critical that all food service workers wash their hands often and correctly. This video discusses the double wash method and the single wash method, and when to use each method. (Zep Manufacturing Company–1993)

ENVIRONMENTAL

- E2012 Better TEDs for Better Fisheries** – (42 minutes). Introduces the usefulness of turtle excluder devices (TEDs) and demonstrates the working nature of the devices. It covers the major sea turtles and the specific TEDs needed for each. It precedes two segments on installation of appropriate TEDs in shrimp trawl nets. (MS Dept. of Marine Resources–2003)
- E3010 The ABC's of Clean – A Handwashing and Cleanliness Program for Early Childhood Programs** – For early childhood program employees. This tape illustrates how proper hand washing and clean hands can contribute to the infection control program in daycare centers and other early childhood programs. (The Soap & Detergent Association–1991)
- E3070 EPA Test Methods for Freshwater Toxicity Tests (Using Fathead Minnow Larva)** – (15 minutes). A training tape that teaches environmental professionals about the Fathead Minnow Larva Survival and Growth Toxicity Test. The method described is found in an EPA document entitled, "Short Term Methods for Estimating the Chronic Toxicity of Effluents & Receiving Waters to Freshwater Organisms." The tape demonstrates

how fathead minnow toxicity tests can be used to monitor and evaluate effluents for their toxicity to biota and their impact on receiving waters and the establishment of NPDES permit limitations for toxicity. (1989) (Reviewed 1998)

- E3075 EPA: This is Super Fund** – (12 minutes). Produced by the United States Environmental Protection Agency (EPA) in Washington, D.C., this videotape focuses on reporting and handling hazardous waste sites in our environment. The agency emphasizes community involvement in identifying chemical waste sites and reporting contaminated areas to the authorities. The primary goal of the "Super Fund Site Process" is to protect human health and to prevent and eliminate hazardous chemicals in communities. The film outlines how communities can participate in the process of cleaning up hazardous sites. The program also explains how federal, state and local governments, industry and residents can work together to develop and implement local emergency preparedness/response plans in case chemical waste is discovered in a community.
- E3080 Fit to Drink** – (20 minutes). This program traces the water cycle, beginning with the collection of rain—water in rivers and lakes, in great detail through a water treatment plant, to some of the places where water is used, and finally back into the atmosphere. Treatment of the water begins with the use of chlorine to destroy organisms; the water is then filtered through various sedimentation tanks to remove solid matter. Other treatments employ ozone, which oxidizes contaminants and makes them easier to remove; hydrated lime, which reduces the acidity of the water; sulfur dioxide, which removes any excess chlorine; and flocculation, a process in which aluminum sulfate causes small particles to clump together and precipitate out. Throughout various stages of purification, the water is continuously tested for smell, taste, titration, and by fish. The treatment plant also monitors less common contaminants with the use of up-to-date techniques like flame spectrometers and gas liquefaction. (Films for the Humanities & Sciences, Inc.—1987)
- E3110 Garbage: The Movie** – (25 minutes). A fascinating look at the solid waste problem and its impact on the environment. Viewers are introduced to landfills, incinerators, recycling plants, and composting operations as solid waste management solutions. Problems associated with modern landfills are identified and low-impact alternatives such as recycling, reuse, and source reduction are examined. (Churchill Films) (Reviewed 1998)
- E3120 Global Warming: Hot Times Ahead** – (23 minutes). An informative videotape program that explores the global warming phenomenon and some of the devastating changes it may cause. This program identifies greenhouse gases and how they are produced by human activities. Considered are: energy use in transportation, industry and home; and effects of deforestation, planting of trees and recycling as means of slowing the build-up of greenhouse gases. (Churchill Films—1995)
- E3125 Good Pest Exclusion Practices** – (28 minutes). Most pests you find inside come from outside your food plant. This video covers numerous tactics of keeping pests out of food processing and distribution operations. Tactics include grounds, landscaping and building design; inbound trailer and bulk transportation materials inspection; and key employee actions. Learn how to defend your perimeter with one of the best weapons in the battle against pests – exclusion. (CTI Publications—2004)
- E3128 Integrated Pest Management (IPM)** – (28 minutes). This video develops the IPM concept into a comprehensive 12-point program. To emphasize this concept, computer-animated, digital graphics are used to piece together the IPM puzzle. This dramatic effect assists participants in visualizing and retaining key points of the video. To paint the complete picture, each of the 12 points is discussed providing an IPM overview. (CTI Publications—2004)
- E3130 Kentucky Public Swimming Pool and Bathing Facilities** – (38 minutes). Developed by the Lincoln Trail District Health Department in Kentucky and includes all of their state regulations which may be different from other states, provinces, and countries. This tape can be used to train those responsible for operating pools and waterfront bath facilities. All aspects are included of which we are aware, including checking water conditions and filtration methods. (1987) (Reviewed 1998)
- E3131 Key Pests of the Food Industry** – (28 minutes). Many types of pests can cause waste and loss of profits. Keeping food processing operations free of pest problems is a challenge. This video will assist food plant employees in the review of basic identification, biology, habits and control options of three key groups of pests frequently associated with food processing operations: birds, insects, and rodents. (CTI Publications—2004)
- E3133 Physical Pest Management Practices** – (28 minutes). Do you feel that you cannot do your job without pesticides? There are solutions. Many of them are what we call physical controls. This video will provide you with some of the things which can help you manipulate the physical environment in a manner that will prevent the growth of the pest population, causing them to leave or die. (CTI Publications—2004)
- E3135 Plastics Recycling Today: A Growing Resource** – (26 minutes). Recycling is a growing segment of our nation's solid waste management program. It shows how plastics are handled from curbside pickup through the recycling process to end-use by consumers. This video provides a basic understanding of recycling programs and how communities, companies and others can benefit from recycling. (The Society of the Plastics Industry, Inc.—1988)
- E3140 Putting Aside Pesticides** – (26 minutes). This program probes the long-term effects of pesticides and explores alternative pest-control efforts, biological pesticides, genetically engineered microbes that kill objectionable insects, the use of natural insect predators, and the cross-breeding and genetic engineering of new plant strains that produce their own anti-pest toxins. (Films for the Humanities & Sciences, Inc.) (Reviewed 1999)

- E3150 Radon** – (26 minutes). This videotape explains the danger associated with hazardous chemical handling and discusses the major hazardous waste handling requirements presented in the Resource Conservation and Recovery Act.
- E3160 RCRA–Hazardous Waste** – (19 minutes). This videotape explains the dangers associated with hazardous chemical handling and discusses the major hazardous waste handling requirements presented in the Resource Conservation and Recovery Act. (Industrial Training, Inc.)
- E3161 The Kitchen Uncovered: Orkin Sanitized EMP** – (13 minutes). This video teaches restaurant workers what they can do to prevent pest infestation, and what health inspectors look for. An excellent training tool for food service workers that can be used in conjunction with HACCP instruction. (Orkin–1997)
- The New Superfund: What It Is and How It Works** – A six-hour national video conference sponsored by the EPA. Target audiences include the general public, private industry, emergency responders and public interest groups. The series features six videotapes that review and highlight the following issues:
- E3170 Tape 1 – Changes in the Remedial Process: Clean-up Standards and State Involvement Requirements** – (62 minutes). A general overview of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and the challenge of its implementation. The remedy process – long-term and permanent clean-up – is illustrated step-by-step, with emphasis on the new mandatory clean-up schedules, preliminary site assessment petition procedures and the hazard ranking system/National Priority List revisions. The major role of state and local government involvement and responsibility is stressed.
- E3180 Tape 2 – Changes in the Removal Process: Removal and Additional Program Requirements** – (48 minutes). The removal process is a short-term action and usually an immediate response to accidents, fires, and illegal dumped hazardous substances. This program explains the changes that expand removal authority and require procedures consistent with the goals of remedial action.
- E3190 Tape 3 – Enforcement & Federal Facilities** – (52 minutes). Who is responsible for SARA clean-up costs? Principles of responsible party liability; the difference between strict, joint, and several liability; and the issue of the innocent land owner are discussed. Superfund enforcement tools-mixed funding, De Minimis settlements and the new nonbinding preliminary allocations of responsibility (NBARs) are explained.
- E3210 Tape 4 – Emergency Preparedness & Community Right-to-Know** – (48 minutes). A major part of SARA is a free-standing act known as Title III: the Emergency Planning and community Right-to-Know Act of 1986, requiring federal, state, and local governments and industry to work together in developing local emergency preparedness/response plans. This program discusses local emergency planning committee requirements, emergency notification procedures, and specifications on community right-to-know reporting requirements such as using OSHA Material Safety Data Sheets, the emergency and hazardous chemical inventory and the toxic chemical release inventory.
- E3220 Tape 5 – Underground Storage Tank Trust Fund & Response Program** – (48 minutes). Another 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 minutes). An important new mandate of the new Superfund are the technical provisions for research and development to create more permanent methods in the handling and disposing of hazardous wastes and managing hazardous substances. This segment discusses the SITE (Superfund Innovative Technology Evaluation) program, the University Hazardous Substance Research Centers, hazardous substance health research and the DOD research, development and demonstration management of DOD wastes.
- E3235 Regulatory and Good Manufacturing Practices** – (42 minutes). This video comes in two parts. Part one is a professional, 20-minute drama using real actors emphasizing the importance of food safety and GMPs. This dramatization will focus your emotions on the importance of cleanliness. Part two is a comprehensive 22-minute video introducing your employees to basic GMP elements. This training video uses numerous split screens of “good” and “bad” practices, and will help viewers understand GMPs and basic food safety. (CTI Publications–2004)
- E3236 Rodent Control Strategies** – (22 minutes). Pest control is a vital part of food safety, and leading pest-control specialist Dr. Bobby Corrigan shows you how to design and maintain a rodent-control program at food processing establishments. (J.J. Keller–2004)
- E3240 Sink a Germ** – (10 minutes). A presentation on the rationale and techniques for effective hand washing in health care institutions. Uses strong imagery to educate

hospital personnel that hand washing is the single most important means of preventing the spread of infection. (The Brevis Corp.—1986) (Reviewed 1998)

- E3245** **Wash Your Hands**—(5 minutes). Hand washing is the single most important means of preventing the spread of infection. This video presents why hand washing is important and the correct way to wash your hands. (LWB company—1995)
- E3250** **Waste Not: Reducing Hazardous Waste**—(35 minutes). This tape looks at the progress and promise of efforts to reduce the generation of hazardous waste at the source. In a series of company profiles, it shows activities and programs within industry to minimize hazardous waste in the production process. "Waste Not" also looks at the obstacles to waste reduction, both within and outside of industry, and considers how society might further encourage the adoption of pollution prevention, rather than pollution control, as the primary approach to the problems posed by hazardous waste. (Umbrella Films)
- E3251** **Would Your Restaurant Kitchen Pass Inspection?**—(29 minutes). Help ensure a perfect score on any health inspection with this video by addressing safe food-handling techniques in the food service industry. Learn how foodborne illness is spread and how it can be prevented. Dramatizations display specific techniques students and employees can use to help any restaurant kitchen meet the highest standards. (Chipsbooks Company—2003)
- E3260** **Swabbing Techniques for Sampling the Environment and Equipment**—(DVD) (60 minutes). This training program is designed to assist in providing effective training to technicians that collect environmental samples for APC and *Listeria*. It will help assure that technicians understand the basic principles and best practices, and can demonstrate good sample collection techniques. (Silliker Labs—2005)

FOOD

- F2007** **The Amazing World of Microorganisms**—(12 minutes). This training video provides your employees with an overview of how microorganisms affect their everyday lives and the foods they produce. The video explores how microscopic creatures are crucial in producing foods, fighting disease, and protecting the environment. In addition, certain microorganisms
- when given the proper time and conditions to grow — are responsible for food spoilage, illness, and even death. Equipped with this knowledge, your employees will be better able to protect your brand. (Silliker Laboratories Group, Inc.—2001)
- F2008** **A Recipe for Food Safety Success**—(30 minutes). This video helps food-industry employees understand their obligations in the areas of safety and cleanliness... what the requirements are, why they exist, and the consequences for all involved if they're not adhered to consistently. Critical information covered includes the role of the FDA and USDA; HACCP systems; sanitation and pest control; time and temperature controls that fight bacteria growth; and the causes and effects of pathogens. (J. J. Keller—2002)
- F2009** **Basic Personnel Practices**—(18 minutes). This training video covers the practical GMPs from the growing field to the grocery store with a common sense approach. Employees learn the necessary training to help them understand the basic principles of food safety. (AIB International—2003)
- F2010** **Close Encounters of the Bird Kind**—(18 minutes). A humorous but in-depth look at *Salmonella* bacteria, their sources, and their role in foodborne disease. A modern poultry processing plant is visited, and the primary processing steps and equipment are examined. Potential sources of *Salmonella* contamination are identified at the different stages of production along with the control techniques that are employed to insure safe poultry products. (Topek Products, Inc.) (Reviewed 1998)
- F2011** **Available Post Harvest Processing Technologies for Oysters**—(8 minutes). This video explains three currently available post-harvest processing (PHP) technologies for oysters that continue to be developed to provide safer oysters to consumers. The Gulf oyster industry increasingly adopts solutions offered by modern technology in its efforts to continue to promote quality, food safety and extended shelf life of oysters. (MS Dept. of Marine Resources—2003)
- F2013** **Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments**—(26 minutes). (English and Spanish)—This video addresses a variety of issues facing meat processors who must meet revised regulations concerning *Listeria monocytogenes* in ready-to-eat meats. Topics covered include personal hygiene, sanitation, biofilms, cross contaminations, in plant sampling, and microbiological testing. (Penn State college of Ag Sciences—2003)
- F2014** **Controlling Food Allergens in the Plant**—(16 minutes). This training video covers key practices to ensure effective control in food plants and delivers current industry knowledge to help companies enhance in-plant allergen training. Visually communicates allergen-specific Good Manufacturing Practices, from checking raw material to sanitation, to prevent serious, costly problems. (Silliker Laboratories, Inc.—2004)
- F2015** **Controlling *Listeria*: A Team Approach**—(16 minutes). In this video, a small food company voluntarily shuts down following the implication of one of its products in a devastating outbreak of *Listeria monocytogenes*. This recall dramatization is followed

by actual in-plant footage highlighting key practices in controlling *Listeria*. This video provides workers with an overview of the organism, as well as practical steps that can be taken to control its growth in plant environments. Finally, the video leaves plant personnel with a powerful, resounding message: Teamwork and commitment are crucial in the production of safe, quality foods. (Silliker Laboratories—2000)

- F2016 Bloodborne Pathogens: What Employees Must Know** – (20 minutes). This program provides an overview of the hazards and controls for worker exposure to bloodborne pathogens. Specifically, the program covers the basic requirements of the standard; definitions of key terms (including AIDS, contaminated sharps, and occupational exposure); engineering controls and work practices; housekeeping techniques; Hepatitis B and more. (J.J. Keller—2005)
- F2020 Egg Handling and Safety** – (11 minutes). Provides basic guidelines for handling fresh eggs which could be useful in training regulatory and industry personnel. (American Egg Board—1997)
- F2021 Egg Production** – (46 minutes). Live action footage of a completely automated operation follows the egg from the chicken to the carton. Watch the eggs as they roll down onto the main line, are washed, “candled,” sorted by weight, placed into their packing containers, and prepared for shipment. Sanitation and health concerns are addressed. (Chipsbooks Company—2003)
- F2030 “Eggs Games” Foodservice Egg Handling & Safety** – (18 minutes). Develop an effective egg handling and safety program that is right for your operation. Ideal for manager training and foodservice educational programs, this video provides step-by-step information in an entertaining, visually exciting format. (American Egg Board—1999)
- F2035 Fabrication and Curing of Meat and Poultry Products** – (2 tapes – 165 minutes). (See Part 2 Tape F2036 and Part 3 F2037) This is session one of three-part meat and poultry teleconference cosponsored by AFDO and the USDA Food Safety Inspection Service. Upon viewing, the sanitarian will be able to (1) identify typical equipment used for meat and poultry fabrication at retail and understand their uses; (2) define specific terms used in fabrication of meat and poultry products in retail establishments, and (3) identify specific food safety hazards associated with fabrication and their controls. (AFDO/USDA—1997)
- F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef** – (2 tapes – 165 minutes). (See Part 1 Tape F2035 and Part 2 Tape F2037) This is session two of a three-part meat and poultry teleconference co-sponsored by AFDO and the USDA Food Safety Inspection Service. These videotapes present an action plan for federal, state, and local authorities, industry, and trade associations in a foodborne outbreak. (AFDO/USDA—1998)
- F2037 Cooking and Cooling of Meat and Poultry Products** – (2 tapes – 176 minutes). (See Part 1 Tape F2035 and Part 2 Tape F2036) This is session three of a three-part meat and poultry teleconference cosponsored by AFDO and the USDA Food Safety Inspection Service. Upon completion of viewing these videotapes, the viewer will be able to (1) recognize inadequate processes associated with the cooking and cooling of meat and poultry at the retail level; (2) discuss the hazards associated with foods and the cooking and cooling processes with management at the retail level; (3) determine the adequacy of control methods to prevent microbiological hazards in cooking and cooling at the retail level; and (4) understand the principle for determining temperature with various temperature measuring devices. (AFDO/USDA—1999)
- F2039 Food for Thought – The GMP Quiz Show** – (16 minutes). In the grand tradition of television quiz shows, three food industry workers test their knowledge of GMP principles. As the contestants jockey to answer questions, the video provides a thorough and timely review of GMP principles. This video is a cost-effective tool to train new hires or sharpen the knowledge of veteran employees. Topics covered include employee practices – proper attire, contamination, stock rotation, pest control, conditions for microbial growth, and employee traffic patterns. Food safety terms such as HACCP, microbial growth niche, temperature danger zone, FIFO, and cross contamination, are also defined. (Silliker Laboratories—2000)
- F2040 Food Irradiation** – (30 minutes). Introduces viewers to food irradiation as a new preservation technique. Illustrates how food irradiation can be used to prevent spoilage by microorganisms, destruction by insects, over-ripening, and to reduce the need for chemical food additives. The food irradiation process is explained and benefits of the process are highlighted. (Turnelle Productions, Inc.) (Reviewed 1998)
- F2045 Food Microbiological Control** – (6 tapes – 12 hours). Designed to provide information and demonstrate the application of basic microbiology, the Good Manufacturing Practices (GMPs), retail Food Code, and sanitation practices when conducting food inspections at the processing and retail levels. Viewers will enhance their ability to identify potential food hazards and evaluate the adequacy of proper control methods for these hazards. (FDA—1998)
- F2050 Food Safe—Food Smart – HACCP and Its Application to the Food Industry (Parts 1 & 2)** – (2 tapes – 16 minutes each). (1) Introduces the seven principles of HACCP and their application to the food industry. Viewers will learn about the HACCP system and how it is used in the food industry to provide a safe food supply. (2) Provides guidance on how to design and implement a HACCP system. It is intended for individuals with the responsibility of setting up a HACCP system. (Alberta Agriculture, Food and Rural Development) (Reviewed 1998)
- F2060 Food Safe Series I** (4 videos) – (4 tapes – 10 minutes each). (1) “Receiving and Storing Food Safely” details for food service workers the procedures for performing sight inspections for the general conditions of food, including a discussion of food labeling and government approval stamps. (2) “Food service Facility and Equipment” outlines the requirements for the proper cleaning and sanitizing of equipment used in food preparation areas. Describes the type of materials, design, and proper maintenance of this equipment.

- (3) "Microbiology for Foodservice Workers" provides a basic understanding of the microorganisms which cause food spoilage and foodborne illness. This program describes bacteria, viruses, protozoa, and parasites and the conditions which support their growth. (4) "Foodservice Housekeeping and Pest Control" emphasizes cleanliness as the basis for all pest control. Viewers learn the habits and life cycles of flies, cockroaches, rats, and mice. (Perennial Education-1991) (Reviewed 1998)
- F2070 Food Safe Series II** (4 videos) – (4 tapes – 10 minutes each). Presents case histories of foodborne disease involving (1) *Staphylococcus aureus*, (sauces) (2) *Salmonella*, (eggs) (3) *Campylobacter*, and (4) *Clostridium botulinum*. Each tape demonstrates errors in preparation, holding or serving food; describes the consequences of those actions; reviews the procedures to reveal the cause of the illness; and illustrates the correct practices in a step-by-step demonstration. These are excellent tapes to use in conjunction with hazard analysis critical control point training programs. (Perennial Education-1991) (Reviewed 1998)
- F2080 Food Safe Series III** (4 videos) – (4 tapes – 10 minutes each). More case histories of foodborne disease. This set includes (1) Hepatitis "A"; (2) *Staphylococcus aureus* (meats); (3) *Bacillus cereus*; and (4) *Salmonella* (meat). Viewers will learn typical errors in the preparation, holding and serving of food. Also included are examples of correct procedures which will reduce the risk of food contamination. (Perennial Education-1991) (Reviewed 1998)
- F2081 Food Safety Begins on the Farm** (DVD) – (15 minutes). From planting to consumption, there are many opportunities to contaminate produce. This is an excellent resource for training fruit and vegetable growers Good Agricultural Practices (GAPs). It includes seven PowerPoint presentations that deal with all aspects of food safety relative to growing, harvesting, and packing fresh fruits and vegetables. (Cornell Good Agricultural Practices Program-2000)
- F2090 Food Safety: An Educational Video for Institutional Food Service Workers** – (10 minutes). Provides a general discussion on food safety principles with special emphasis on pathogen reductions in an institutional setting from child care centers to nursing homes. (US Dept of Health & Human Services-1997)
- F2095 Now You're Cooking** – (DVD and video) (15 minutes). Using a food thermometer can improve the quality and safety of meat. This 15-minute video describes the why and how of using a food thermometer when cooking small cuts of meat like meat patties, chicken breasts, and pork chops. Topics include: why color is not a good indicator of doneness; how to choose an appropriate food thermometer for small cuts of meat; quick and easy steps for using an instant-read thermometer; how to calibrate an instant-read thermometer; and the most effective cooking methods for reducing *E. coli* O157:H7 in hamburger patties. (University of Idaho-2005) (Reviewed-2005)
- Food Safety for Food Service Series I** – An employee video series containing quick, 10-minute videos that teach food service employees how to prevent foodborne illness. This four video series examines sources of foodborne illness, plus explores prevention through awareness and recommendations for best practices for food safety. It also looks at how food safety affects the food service employee's job. (J.J. Keller & Associates-2000)
- F2100 Tape 1 – Food Safety for Food Service: Cross Contamination** – (10 minutes). Provides the basic information needed to ensure integrity and safety in foodservice operations. Explains proper practices and procedures to prevent, detect and eliminate cross contamination.
- F2101 Tape 2 – Food Safety for Food Service: HACCP** – (10 minutes). 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 minutes). This video establishes clear, understandable ground rules for good personal hygiene in the foodservice workplace and explains why personal hygiene is so important. Topics include: personal cleanliness; proper protective equipment; correct hand washing procedures; when to wash hands; hygiene with respect to cross contamination; and prohibited practices and habits.
- F2103 Tape 4 – Food Safety for Food Service: Time and Temperature Controls** – (10 minutes). 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-2002)
- F2104 Tape 1 – Basic Microbiology and Foodborne Illness** – (10 minutes). Covers four common microorganisms in food, how they get into food, and simple ways to prevent contamination. Stresses the importance of keeping food at the right temperature, having proper personal hygiene, and cleaning and sanitizing work surfaces.
- F2105 Tape 2 – Handling Knives, Cuts, and Burns** – (10 minutes). Explains why sharp

knives are safer than dull ones, provides tips for selecting a good knife, and gives techniques for cutting food safely. Also explains first aid for cuts and burns and the most common causes of burns.

- F2106** Tape 3 – Working Safely to Prevent Injury – (10 minutes). Discusses common lifting hazards and how back injuries can happen. Gives proper lifting and carrying techniques to prevent soreness and injury. Also covers how to prevent slips, trips, and falls.
- F2107** Tape 4 – Sanitation – (10 minutes). Provides tips for good personal hygiene habits, including the proper way to wash your hands, dress, and prepare for work. Also covers cleaning and sanitizing equipment; storing chemicals and cleaning supplies; and controlling pests that can contaminate work areas and food.
- F2110** **Food Safety is No Mystery** – (34 minutes). This is an excellent training visual for foodservice workers. It shows the proper ways to prepare, handle, serve and store food in actual restaurant, school and hospital situations. A policeman sick from food poisoning, a health department sanitarian, and a foodservice worker with all the bad habits are featured. The latest recommendations on personal hygiene, temperatures, cross contamination, and storage of foods are included. (USDA–1987) (Reviewed 1998)
- F2111** **Controlling Salmonella: Strategies That Work** – (16 minutes). This training video provides practical guidelines to prevent the growth of *Salmonella* in dry environments and avoid costly product recalls. Using this video as a discussion tool, supervisors can help employees learn about water and how it fosters conditions for the growth of *Salmonella* in dry processing plants with potentially devastating consequences. (Silliker Laboratories–2002)
- F2120** **Food Safety: For Goodness Sake Keep Food Safe** – (15 minutes). Teaches food handlers the fundamentals of safe food handling. The tape features the key elements of cleanliness and sanitation, including: good personal hygiene, maintaining proper food product temperature, preventing time abuse, and potential sources of food contamination. (Iowa State University Extension–1990) (Reviewed 1998)
- F2121** **Food Safety the HACCP Way** – (11.5 minutes). Introduces managers and line-level staff to HACCP, or the Hazard Analysis Critical Control Point food safety system. The HACCP system is a seven-step process to control food safety, and can be applied to any size and type of food establishment.
- Food Safety Zone Video Series** – A one-of-a-kind series that helps get your employees to take food safety issues seriously. These short, to-the-point videos can help make your employees aware of various food hazards, and how they can help promote food safety. The four topics are: Basic Microbiology, Cross Contamination, Personal Hygiene, and Sanitation. (J.J. Keller & Associates–1999)
- F2125** **Tape 1 – Basic Microbiology and Foodborne Illness** – (10 minutes). Covers four common microorganisms in food, how they get into food, and simple ways to prevent contamination. Stresses the importance of keeping food at the right temperature, having proper personal hygiene, and cleaning and sanitizing work surfaces.
- F2126** **Tape 2 – Food Safety Zone: Cross Contamination** – (10 minutes). Quickly teach your employees how they can help prevent cross contamination. Employees are educated on why contaminants can be extremely dangerous, cause serious injury and even death, to consumers of their food products. This fast-paced video will give your employees a deeper understanding of the different types of cross contamination, how to prevent it, and how to detect it through visual inspections and equipment. The emphasis is that prevention is the key to eliminating cross contamination.
- F2127** **Tape 3 – Food Safety Zone: Personal Hygiene** (English and Spanish) – (10 minutes). After watching this video, your employees will understand why their personal hygiene is critical to the success of your business. This video teaches employees about four basic good personal hygiene practices: keeping themselves clean, wearing clean clothes, following specific hand washing procedures, and complying with all related work practices. Personnel are also taught that personal hygiene practices are designed to prevent them from accidentally introducing bacteria to food products, and are so important that there are federal laws that all food handlers must obey.
- F2128** **Tape 4 – Food Safety Zone: Sanitation** – (10 minutes). Don't just tell your employees why sanitation is important, show them! This training video teaches employees about the sanitation procedures that cover all practices to keep workplaces clean, and the food produced free of contaminants and harmful bacteria. Four areas covered include personal hygiene, equipment and work areas, use and storage of cleaning chemicals and equipment, and pest control.
- F2129** **Food Technology: Irradiation** – (29 minutes). Video covers the following issues: history and details of the irradiation process; effects of irradiation on treated products; and consumer concerns and acceptance trends. Other important concerns addressed include how food irradiation affects food cost, the nutritional food industry, food science and research, and irradiation regulatory industries (such as the Nuclear Regulatory Commission) add insight into the process of irradiation. (Chipsbooks–2001)
- F2130** **Food Safety: You Make the Difference** – (28 minutes). Through five food workers from differing backgrounds, this engaging and inspirational documentary style video illustrates the four basic food safety concepts: hand washing, preventing cross contamination, moving foods quickly through the danger zone, and hot/cold holding. (Seattle–King County Health Dept.–1995)

- F2131** Fruits, Vegetables, and Food Safety: Health and Hygiene on the Farm (DVD and video) – (15 minutes). This presentation shows ways to prevent contamination of fruits and vegetables while you work. It was filmed in real production fields and packinghouses in the United States. Organisms of concern in fruits and vegetables are discussed, along with proper hygiene practices when handling and harvesting fruits and vegetables. (Cornell University–2004)
- F2133** **Food Safety First** (English and Spanish) (DVD and Video) – (50 minutes). Presents causes of foodborne illness in foodservice and ways to prevent foodborne illness. Individual segments include personal hygiene and hand washing, cleaning, and sanitizing, preventing cross contamination, and avoiding time and temperature abuse. Food handling principles are presented through scenarios in a restaurant kitchen. (GloGerm–1998)
- F2134** **Food Safety: Fish and Shellfish Safety** – (21 minutes). Seafood tops the list for foods that can become contaminated with bacteria—causing foodborne illness. This video shows how to protect yourself from fish and shellfish contamination by learning proper selection, storage, preparation and safe consumption. (Chipsbooks Company–2003)
- F2135** **Get with a Safe Food Attitude** – (40 minutes). Consisting of nine short segments which can be viewed individually or as a group, this video presents safe food handling for moms-to-be. Any illness a pregnant 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 Dept. of Agriculture–1999)
- F2136** **GLP Basics: Safety in the Food Micro Lab** – (16 minutes). This video is designed to teach laboratory technicians basic safety fundamentals and how to protect themselves from inherent workplace dangers. Special sections on general laboratory rules, personal protective equipment, microbiological, chemical, and physical hazards, autoclave safety, and spill containment are featured. (Silliker Laboratories–2001)
- F2137** **GMP Basics: Avoiding Microbial Cross-Contamination** – (15 minutes). This video takes a closer look at how harmful microorganisms, such as *Listeria*, can be transferred to finished products. Employees see numerous examples of how microbial cross contamination can occur from improper traffic patterns, poor personal hygiene, soiled clothing, 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 minutes). Through real-life examples and dramatization, this video demonstrates good manufacturing practices that relate to employee hygiene, particularly hand washing. This video includes a unique test section to help assess participants' understanding of common GMP violations. (Silliker Laboratories–1997)
- F2143** **GMP Basics: Guidelines for Maintenance Personnel** – (21 minutes). Developed specifically for maintenance personnel working in a food processing environment, this video depicts a plant-wide training initiative following a product recall announcement. Maintenance personnel will learn how GMPs relate to their daily activities and how important their roles are in the production of safe food products. (Silliker Laboratories–1999)
- F2147** **GMP Basics: Process Control Practices** – (16 minutes). In actual food processing environments, an on-camera host takes employees through a typical food plant as they learn the importance of monitoring and controlling key points in the manufacturing process. Beginning with receiving and storing, through production and ending with packaging and distribution, control measures are introduced, demonstrated and reviewed. Employees will see how their everyday activities in the plant have an impact on product safety. (Silliker laboratories–1999)
- F2148** **GMP – GSP Employee** – (38 minutes). This video was developed to teach food plant employees the importance of "Good Manufacturing Practices" and "Good Sanitation Practices." Law dictates that food must be clean and safe to eat. This video emphasizes the significance of each employee's role in protecting food against contamination. Tips on personal cleanliness and hygiene are also presented. (L.J. Bianco & Associates)
- F2150** **GMP: Personal Hygiene and Practices in Food Manufacturing** (English, Spanish, and Vietnamese) – (14 minutes). This video focuses on the personal hygiene of food-manufacturing workers, and explores how poor hygiene habits can be responsible for the contamination of food in the manufacturing process. This is an instructional tool for new food-manufacturing line employees and supervisors. It was produced with "real" people in actual plant situations, with only one line of text included in the videotape. (Penn State–1993)
- A GMP Food Safety Video Series** – This five-part video series begins with an introduction to GMPs and definitions, then goes on to review specific sections of the GMPs: personnel, plant and grounds, sanitary operations, equipment and utensils, process and controls, warehousing, and distribution. Developed to assist food processors in training employees on personnel policies and Good Manufacturing Practices (CMPs), the series includes different types of facilities, including dairy plants, canning factories, pasta plants, bakeries, and frozen food manufacturing facilities. (J.J. Keller–2003)
- F2151** **Tape 1 – Definitions** – (12 minutes). Provides the definitions necessary to understand the meaning of the CMPs.
- F2152** **Tape 2 – Personnel and Personnel Facilities** – (11 minutes). Covers selection of personnel, delegation of responsibilities, development of plant policies for employees, and operational practices.
- F2153** **Tape 3 – Building and Facilities** – (16 minutes). Discusses guidelines for the construction and maintenance of the manufacturing plant and grounds around the plant.
- F2154** **Tape 4 – Equipment and Utensils** – (12.5 minutes). Provides guidelines for the construction, installation, and maintenance of processing equipment.

- F2155 Tape 5 – Production and Process Controls** – (20 minutes). Covers establishing a food safety committee, in-house inspections, analysis of raw materials and ingredients, cleaning schedules and procedures, and more.
- F2160 GMP: Sources and Control of Contamination during Processing** – (20 minutes). This program, designed as an instructional tool for new employees and for refresher training for current or reassigned workers, focuses on the sources and control of contamination in the food-manufacturing process. It was produced in actual food plant situations. A concise description of microbial contamination and growth and cross contamination, a demonstration of food storage, and a review of aerosol contaminants are also included. (Penn State –1995)
- GMPs for Food Plant Employees: Five-Volume Video Series Based on European Standards and Regulations** – Developed to assist food processors in training employees in the Good Manufacturing Practices. Examples are drawn from a variety of processing facilities including dairy plants, canning facilities, pasta plants, bakeries, frozen food facilities, etc. (AIB International–2003)
- F2161 Tape 1 – Definitions** – (13 minutes). Begins with an introduction to the GMPs and traces a basic history of food laws in Europe, ending with the EC Directive 93/43/EEC of June 1993 on the hygiene of foodstuffs.
- F2162 Tape 2 – Personnel and Personnel Practices** – (13 minutes). Selecting personnel, delegating responsibilities, developing plant policies for employees and visitors, and establishing operational practices.
- F2163 Tape 3 – Building and Facilities** – (17 minutes). Guidelines for the construction and maintenance of the manufacturing facility and grounds around the factory.
- F2164 Tape 4 – Equipment and Utensils** – (13 minutes). Guidelines for construction, installation, and maintenance of processing equipment.
- F2165 Tape 5 – Production/Process Controls** – (22 minutes). Covers production and process controls, establishing a food safety committee, conducting in-house inspections, analyzing raw materials and ingredients, developing operational methods, establishing cleaning schedules and procedures, creating pest control programs and record keeping.
- F2168 HACCP Advantage – Good Manufacturing Practices** – (English and Spanish) – (DVD) (40 minutes). The HACCP Advantage is based on HACCP principles and was developed by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMARFA). HACCP Advantage was designed to be a practical, cost-effective and preventative food safety system for all nonfederally registered food processing facilities, regardless of size, commodity or volume processed. OMARFA has developed a 3-step approach to food safety management that makes it easier for small and medium-sized food processors to adopt a HACCP food safety program that meets their requirements. These three components – GMP Advantage, HACCP Advantage and HACCP Advantage Plus+ – collectively encompass all the elements of the original HACCP Advantage program as well as new elements to meet the evolving needs of modern food safety systems. (OMARFA–2006)
- F2169 HACCP: Training for Employees – USDA Awareness** – (15 minutes). This video is a detailed training outline provided for the employee program. Included in the video is a synopsis of general federal regulations; HACCP plan development; incorporation of HACCP's seven principals; HACCP plan checklist; and an HACCP employee training program. (J.J. Keller & Associates–1999)
- F2170 The Heart of HACCP** – (22 minutes). A training video designed to give plant personnel a clear understanding of the seven HACCP principles and practical guidance on how to apply these principles to their own work environment. This video emphasizes the principles of primary concern to plant personnel such as critical limits, monitoring systems, and corrective actions that are vital to the success of a HACCP plan. (Silliker Laboratories–1994)
- F2172 HACCP: Training for Managers** – (17 minutes). Through industry-specific examples and case studies, this video addresses the seven HACCP steps, identifying critical control points, record keeping and documentation, auditing, and monitoring. It also explains how HACCP relates to other programs such as Good Manufacturing Practices and plant sanitation. (J.J. Keller & Associates–2000)
- F2173 Inside HACCP: Principles, Practices and Results** (English and Spanish) – (15 minutes). This video is designed to help you build a more knowledgeable work-force and meet safety standards through a comprehensive overview of HACCP principles. Employees are provided with details of prerequisite programs and a clear overview of the seven HACCP principles. "Inside HACCP" provides short, succinct explanations of how HACCP works and places special emphasis on the four principles – monitoring, verification, corrective action, and recordkeeping – in which employees actively participate. (Silliker Laboratories–2001)
- F2175 Inspecting for Food Safety – Kentucky's Food Code** – (100 minutes). Kentucky's Food Code is patterned after the Federal Food Code. The concepts, definitions, procedures, and regulatory standards included in the code are based on the most current information about how to prevent foodborne diseases. This video is designed to prepare food safety inspectors to effectively use the new food code in the performance of their duties. (Dept. of Public Health Commonwealth of Kentucky–1997) (Reviewed 1999)
- F2180 HACCP: Safe Food Handling Techniques** – (22 minutes). The video highlights the primary causes of food poisoning and emphasizes the importance of self inspection. An explanation of potentially hazardous foods, cross contamination, and temperature control is provided. The main focus is a detailed description of how to implement a Hazard Analysis Critical Control Point (HACCP) program in a food service operation.

- A leader's guide is provided as an adjunct to the tape. (The Canadian Restaurant & Foodservices Assoc.—1990) (Reviewed 1998)
- F2190** **Is What You Order What You Get? Seafood Integrity**—(18 minutes). Teaches seafood department employees about seafood safety and how they can help insure the integrity of seafood sold by retail food markets. Key points of interest are cross-contamination control, methods and criteria for receiving seafood and determining product quality, and knowing how to identify fish and seafood when unapproved substitutions have been made. (The Food Marketing Institute) (Reviewed 1998)
- F2191** **Microbial Food Safety: Awareness to Action** (DVD PowerPoint presentation) — (90 minutes). An overview of GAPs and resources by the United Fresh Fruits and Vegetables Association, a hazard identification self-audit, a sample farm investigative questionnaire, copies of relevant California state information, and US federal regulations. Contains numerous commodity flow charts and photos for more than 30 fruits and vegetables, one dozen PowerPoint presentations containing more than 400 slides, including may in Spanish and two dozen supplemental documents on a variety of food safety topics. (UC Davis—2002)
- F2210** **Northern Delight—From Canada to the World** — (13 minutes). A promotional video that explores the wide variety of foods and beverages produced by the Canadian food industry. General in nature, this tape presents an overview of Canada's food industry and its contribution to the world's food supply. (Ternelle Production, Ltd.) (Reviewed 1998)
- F2220** **Proper Handling of Peracetic Acid**—(15 minutes). Introduces peracetic acid as a chemical sanitizer and features the various precautions needed to use the product safely in the food industry.
- F2230** **Purely Coincidental** — (20 minutes). A parody that shows how foodborne illness can adversely affect the lives of families that are involved. The movie compares improper handling of dog food in a manufacturing plant that causes the death of a family pet with improper handling of human food in a manufacturing plant that causes a child to become ill. Both cases illustrate how handling errors in food production can produce devastating outcomes. (The Quaker Oats company—1993) (Reviewed 1998)
- F2240** **On the Front Line** — (18 minutes). A training video pertaining to sanitation fundamentals for vending service personnel. Standard cleaning and serving procedures for cold food, hot beverage and cup drink vending machines are presented. The video emphasizes specific cleaning and serving practices which are important to food and beverage vending operations. (National Automatic Merchandising Association—1993) (Reviewed 1998)
- F2250** **On the Line** (English and Spanish) — (30 minutes). This was developed by the Food Processors Institute for Training food processing plant employees. It creates an awareness of quality control and regulations. Emphasis is on personal hygiene, equipment cleanliness and good housekeeping in a food plant. It is recommended for showing to both new and experienced workers. (The Food Processors Institute—1993) (Reviewed 1998)
- F2260** **100 Degrees of Doom...The Time and Temperature Caper**—(14 minutes). Video portraying a private eye tracking down the cause of a *Salmonella* poisoning. Temperature control is emphasized as a key factor in preventing foodborne illness. (Educational Communications, Inc.—1987) (Reviewed 1998)
- F2265** **A Day in the Deli: Service, Selection, and Good Safety** — (22 minutes). This training video provides basic orientation for new deli department employees and highlights skills and sales techniques that will build department traffic and increased sales. The focus will be on the priorities of the deli department freshness, strong customer service, professionalism, and food safety. By understanding the most important issues for their position(s), employees can comprehend their contribution to the financial interests of the store. (Food Marketing Institute—2003)
- F2266** **HACCP: A Basic Understanding** — (32 minutes). Explore applications for Hazard Analysis Critical Control Points (HACCP), a system of process controls required by federal and state governments for most areas of the food service industry. Learn to minimize the risk of chemical, microbiological and physical food contamination while focusing on the seven principles of HACCP and the chain of responsibility. (Chipsbook company—2003)
- F2270** **Pest Control in Seafood Processing Plants** — (26 minutes). Covers procedures to control flies, roaches, mice, rats, and other common pests associated with food processing operations. The tape will familiarize plant personnel with the basic characteristics of these pests and the potential hazards associated with their presence in food operations.
- F2271** **Preventing Foodborne Illness** — (10 minutes). This narrated video is for food service workers, with emphasis on insuring food safety by washing one's hands before handling food, after using the bathroom, sneezing, touching raw meats and poultry, and before and after handling foods such as salads and sandwiches. Safe food temperatures and cross contamination are also explained. (Colorado Dept. of Public Health and Environment—1999)
- F2280** **Principles of Warehouse Sanitation**—(33 minutes). This videotape gives a clear, concise and complete illustration of the principles set down in the Food, Drug and Cosmetic Act and in the Good Manufacturing Practices, as well as supporting legislation by individual states. (American Institute of Baking—1993)
- F2290** **Product Safety and Shelf Life** — (40 minutes). This videotape was done in three sections with opportunity for review. Emphasis is on providing consumers with good products. One section covers off-flavors, another product problem caused by plant conditions, and a third the need to keep products cold and fresh. Procedures to assure this are outlined, as shown in a plant. Well done and directed to plant workers and supervisors. (Borden, Inc.—1987) (Reviewed 1997)
- F2310** **Safe Food: You Can Make a Difference** — (25 minutes). A training video for food service workers which covers the fundamentals of food safety. An explanation of proper food temperature, food storage, cross-contamination control, cleaning and sanitizing, and hand washing as methods of foodborne

illness control is provided. The video provides an orientation to food safety for professional food handlers. (Tacoma-Pierce County Health Dept.-1990) (Reviewed 1998)

- F2320 Safe Handwashing** – (15 minutes). Twenty-five percent of all foodborne illnesses are traced to improper hand washing. The problem is not just that hand washing is not done, the problem is that it's not done properly. This training video demonstrates the "double wash" technique developed by Dr. O. Peter Snyder of the Hospitality Institute for Technology and Management. Dr. Snyder demonstrates the procedure while reinforcing the microbiological reasons for keeping hands clean. (Hospitality Institute for Technology & Management-1991) (Reviewed 1998)
- F2321 All Hands On Deck** – (12 minutes) Germ Tells All. A Benedict Arnold of the germ world comes clean by teaching the audience to "think like a germ" when it comes to hand washing. The reasons for hand washing are outlined and proper technique is demonstrated along with suggestions for avoiding immediate recontamination before even leaving the rest room. Interesting, informative, humorous and appropriate for virtually any age group. (Brevis Corporation – 2005)
- F2322 The Why, The When and The How Video** – (5 minutes) An excellent tool for motivating good hand hygiene behavior with existing and new employees. Fast paced. Three modules train the why, when, and how of hand washing. (Brevis Corporation-2005)
- F2325 Safe Practices for Sausage Production** – (180 minutes). This videotape is based on a series of educational broadcasts on meat and poultry inspections at retail food establishments produced by the Association of Food and Drug Officials (AFDO) and USDA's Food Safety and Inspection Service (FSIS), along with FDA's Center for Food Safety and Applied Nutrition. The purpose of the broadcast was to provide training to state, local, and tribal sanitarians on processes and procedures that are being utilized by retail stores and restaurants, especially those that were usually seen in USDA-inspected facilities. The program will cover the main production steps of sausage products, such as the processes of grinding, stuffing, and smoking, and typical equipment used will be depicted. Characteristics of different types of sausage (fresh, cooked, and smoked, and dry/semi-dry) will be explained. Pathogens of concern and outbreaks associated with sausage will be discussed. The written manual for the program is available at www.fsis.usda.gov/fofo/hrds/STATE/RETAIL/manual.htm (1999)
- F2330 Sanitation for Seafood Processing Personnel** – (20 minutes). A training video suited for professional food handlers working in any type of food manufacturing plant. The film highlights Good Manufacturing Practices and their role in assuring food safety. The professional food handler is introduced to a variety of sanitation topics including: (1) food handlers as a source of food contamination, (2) personal hygiene as a means of preventing food contamination, (3) approved food storage techniques including safe storage temperatures, (4) sources of cross contamination, (5) contamination of food by insects and rodents, (6) garbage handling and pest control, and (7) design and location of equipment and physical facilities to facilitate cleaning. (Reviewed 1998)

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

F2341 Science and Our Food Supply – (45 minutes). Becoming food safety savvy is as easy as A-B-C! This video includes a step-by-step journey as food travels from the farm to the table; the FightBAC® 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 day Alliance training courses. There are 12 training modules in the course that cover all of the information on HACCP principles, their application to seafood products, and the FDA regulation. Experience has shown that HACCP implementation can be more effective when a number of key people in the operation have a good understanding of the system and its requirements. (Cornell University-2004)

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

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

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

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

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

Tape 5 Step Five: Cleaning and Sanitizing – (11 minutes). Describes the difference between cleaning and sanitizing; manual and machine warewashing; how sanitizers work; how to store clean items and cleaning supplies; and how to set up a cleaning program.

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

- F2370** Supermarket Sanitation Program – Cleaning and Sanitizing – (13 minutes). Contains a full range of cleaning and sanitizing information with minimal emphasis on product. Designed as a basic training program for supermarket managers and employees (1989) (Reviewed 1998)
- F2380** **Supermarket Sanitation Program: Food Safety** – (11 minutes). Contains a full range of basic sanitation information with minimal emphasis on product. Filmed in a supermarket, the video is designated as a basic program for manager training and a program to be used by managers to train employees. (1998) (Reviewed 1998)
- F2390** **Take Aim at Sanitation** (English and Spanish) – (8 minutes). Produced by the Foodservice & Packaging Institute in cooperation with the US Food and Drug Administration, this video demonstrates how to properly store and handle foodservice disposables so customers are using safe, clean products. This video demonstrates: the problem of foodborne illness; how foodservice disposables are manufactured for cleanliness; tips for storing foodservice disposables; tips to help your customers in self-serve areas; guidelines for serving meals and maintaining proper sanitation; and tips for cleaning up after meals. Throughout the program a roving microscope “takes aim” at common mistakes made by workers to help audiences identify unsanitary handling and storage practices. (Foodservice & Packaging Institute, Inc.)
- F2391** **Understanding Foodborne Pathogens** – (40 minutes). Explore the major causes of foodborne illness and review the practices used to minimize the risk of contracting or spreading a foodborne disease. Learn about microorganisms associated with foodborne illness such as parasites, viruses, fungi and bacteria. Study ways to reduce harmful pathogens through proper handling, storage, and cooking. (Chipsbooks Company–2003)
- F2410** **Wide World of Food Service Brushes** – (18 minutes). Discusses the importance of cleaning and sanitizing as a means to prevent and control foodborne illness. Special emphasis is given to proper cleaning and sanitizing procedures and the importance of having properly designed and constructed equipment (brushes) for food preparation and equipment cleaning operations. (1989)
- F2420** **Your Health in Our Hands, Our Health in Yours** – (8 minutes). For professional food handlers, the tape covers the do’s and don’ts of food handling as they relate to personal hygiene, temperature control, safe storage, and proper sanitation. (Jupiter Video Production–1993) (Reviewed 1998)
- F2430** **Smart Sanitation: Principles and Practices for Effectively Cleaning Your Food Plant** – (20 minutes). A practical training tool for new sanitation employees or as a refresher for veterans. Employees will understand the food safety impact of their day-to-day cleaning and sanitation activities and recognize the importance of their role in your company’s food safety program. (Silliker Laboratories–1996)
- F2440** **Cleaning and Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!** (English and Spanish) – (16 minutes). This training video shows how to safely and effectively clean and sanitize in a vegetable processing plant. It teaches how it is the same for a processing plant as it is for washing dishes at home. (University of Wisconsin Extension–1996)
- F2450** **A Guide to Making Safe Smoked Fish** – (21 minutes). Smoked fish can be a profitable product for aquaculturalists, but it can be lethal if not done correctly. This video guides you through the steps necessary to make safe smoked fish. It provides directions for brining, smoking, cooling, packaging, and labeling, and cold storage to ensure safety. The video features footage of fish smoking being done using both traditional and modern equipment. (University of Wisconsin–Madison–1999)
- F2451** **A HACCP–based Plan Ensuring Food Safety in Retail Establishments (DVD)** – (11 minutes). This is an educational DVD that provides a brief summary of HACCP. It explains the purpose and execution of each of the seven principles. Can be used as part of a wide range of HACCP training programs beyond retail establishments. The major emphasis is on proper documentation and validation. (Ohio State University–2004)
- F2460** **Safer Processing of Sprouts** – (82 minutes). Sprouts are enjoyed by many consumers for their taste and nutritional value. However, recent outbreaks of illnesses associated with sprouts have demonstrated a potentially serious human health risk posed by this food. FDA and other public health officials are working with industry to identify and implement production practices that will assure that seed and sprouted seed are produced under safe conditions. This training video covers safe processing practices of sprouts including growing, harvesting, milling, transportation, storage, seed treatment, cleaning and sanitizing, sampling and microbiological testing. (CA Dept. of Health Service, Food & Drug Branch–2000)
- Fast Track Restaurant Video Kit** – These five short, direct videos can help make your employees more aware of various food hazards and how they can promote food safety. (Diversey Lever–1994)
- F2500** **Tape 1 – Food Safety Essentials** – (23 minutes). This video provides an overview of food safety. All food service employees learn six crucial guidelines for combating foodborne illness. Prepares employees for further position-specific training to apply the six food safety principles to specific jobs.
- F2501** **Tape 2 – Receiving and Storage** – (22 minutes). Make sure only safe food enters your doors! Receiving and storage staff learn what to look for and how to prevent spoilage with proper storage with this video.
- F2502** **Tape 3 – Service** – (22 minutes). Servers are your last safety checkpoint before guests receive food. This video helps you make sure they know the danger signs.

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

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

Worker Health and Hygiene Program for the Produce Industry

F2505 **Manager Guide to Worker Health and Hygiene: Your Company's Success May Depend on It!** (English) — (18 minutes). Covers the importance of foodborne illness as related to the produce industry and provides practical hands-on information of managers/operators on teaching health and hygiene to the workers in their operations (University of Florida/IFAS—2006)

F2506 **Worker Health and Hygiene: Your Job Depends On It!** (English and Spanish) — (11 minutes). Covers the importance of personal health and hygiene and simple hands-on information on foodborne illness and how produce handlers could spread disease if proper personal hygiene is not practiced. Also provides stepwise handwashing procedures for produce handlers in any situation (University of Florida/IFAS—2006)

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

OTHER

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

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

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

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

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

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

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

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DAIRY

- D1010 The Bulk Milk Hauler Protocol & Procedures
- D1030 Gold Hand Facts
- D1051 Dairy Plant Effluent Extraction Method for Determination of Raw Milk
- D1090 Food Safety: Dairy Details
- D1060 Frozen Dairy Products
- D1070 The Gerber Butterfat Test
- D1080 High-Temperature, Short-Time Pasteurizer
- D1090 Managing Milk Quality
- D1100 Moisture Prevention and Control
- D1105 Milk Hauling Training
- D1110 Milk Plant Sanitation: Chemical Solution
- D1120 Milk Processing Plant Inspection Procedures
- D1125 Ohio Bulk Milk Hauling Video
- D1130 Pasteurizer: Design and Regulation
- D1140 Pasteurizer: Operation
- D1150 Processing Fluid Milk
- D1180 10 Points to Dairy Quality

- F2013 Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments
- F2014 Controlling Food Allergens in the Plant
- F2015 Controlling *Listeria*: A Team Approach
- F2016 Bloodborne Pathogens: What Employees Must Know
- F2020 Egg Handling and Safety
- F2021 Egg Production
- F2030 'Egg Games' Foodservice Egg Handling & Safety
- F2035 Fabrication and Curing of Meat and Poultry
- F2036 Emerging Pathogens and Grinding and Cooking Comminated Beef
- F2037 Cooking and Cooling of Meat and Poultry Products
- F2039 Food for Thought - The GMP Quiz Show
- F2040 Food Irradiation
- F2045 Food Microbiological Control
- F2050 Food Safe-Food Smart - HACCP and Its Application to the Food Industry (Part 1 & 2)
- F2070 Food Safe Series II (4 videos)
- F2080 Food Safe Series III (4 videos)
- F2081 Food Safety Begins on the Farm
- F2090 Food Safety: An Educational Video for Institutional Food Service Workers

- F2109 HACCP: Training for Employees - USDA Awareness
- F2170 The Heart of HACCP
- F2172 HACCP: Training for Managers
- F2175 Inside HACCP: Principles, Practices and Results
- F2178 Inspecting for Food Safety - Kentucky's Food Code
- F2180 HACCP: Safe Food Handling Techniques
- F2190 Is What You Order What You Get? Seafood Integrity
- F2191 Microbial Food Safety: Awareness to Action
- F2210 Northern Delight - From Canada to the World
- F2220 Proper Handling of Petaside: Acid
- F2230 Purely Coincidental
- F2240 On the Front Line
- F2250 The Line
- F2260 100 Degrees of Doom... The Time and Temperature Caper
- F2265 A Day in the Life: Service, Selection, and Food Safety
- F2266 HACCP: A Basic Understanding
- F2270 Pest Control in Seafood Processing Plants
- F2271 Preventing Foodborne Illness
- F2280 Principles of Warehouse Sanitation
- F2290 Product Safety and Shelf Life
- F2310 Safe Food: You Can Make a Difference
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- F2325 Safe Practices for Sausage Production
- F2330 Sanitation for Seafood Processing Personnel
- F2340 Sanitizing for Safety
- F2341 Science and Our Food Supply
- F2342 Seafood HACCP Alliance Internet Training Course
- F2350 Step One: Starting Out with Food Safety
- F2350-1 Step Two: Ensuring Proper Personal Hygiene
- F2350-2 Step Three: Purchasing, Receiving and Storage
- F2350-3 Step Four: Preparing, Cooking and Serving
- F2350-4 Step Five: Cleaning and Sanitizing
- F2350-5 Step Six: Take the Food Safety Challenge: Good Practices, Bad Practices - You Make the Call
- F2370 Supermarket Sanitation Program - Cleaning and 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
- F2430 Smart Sanitation: Principles and Practices for Effectively Cleaning Your Food Plant
- F2440 Cleaning and Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely
- F2450 A Guide to Making Safe Smoked Fish
- F2451 A HACCP-based Plan Ensuring Food Safety in Retail Establishments
- F2460 Safer Processing of Sprouts
- F2500 Fast Track Restaurant Video Kit
- F2501 Type 1 - Food Safety Essentials
- F2502 Type 2 - Receiving and Storage
- F2503 Type 3 - Service
- F2504 Type 4 - Food Production
- F2505 Type 5 - Warewashing
- F2506 Worker Health and Hygiene Program for the Produce Industry
- F2507 Manager Guide to Worker Health and Hygiene
- F2508 Your Company's Success May Depend on It
- F2509 Worker Health and Hygiene: Your Job Depends on It
- F2600 Food Industry Security Awareness: The First Line of Defense

ENVIRONMENTAL

- E2012 Better TEDs for Better Fisheries
- E3010 The ABCs of Clean - A Handwashing and Cleanliness Program for Early Childhood Programs
- E3020 Available Risks
- E3030 Air Pollution: Indoor
- E3031 Allergy Beware
- E3040 Asbestos Awareness
- E3055 Effective Handwashing - Preventing Cross-Contamination in the Food Service Industry
- E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- E3070 EPA Test Methods for Freshwater Toxicity Tests (Using Fathead Minnow Larva)
- E3075 EPA: This is Super Fund
- E3080 Fit to Drink
- E3110 Garbage: The Movie
- E3120 Global Warming: Hot Times Ahead
- E3125 Good Pest Exclusion Practices
- E3128 Integrated Pest Management (IPM)
- E3130 Kentucky Public Swimming Pool and Bathing Facilities
- E3131 Key Pests of the Food Industry
- E3133 Physical Pest Management Practices
- E3135 Pesticide Recycling Today: A Growing Resource
- E3140 Putting Ascle Pesticides
- E3150 Radon
- E3160 RCRA Hazardous Waste
- E3161 The Kitchen Uncovered: Orkin Sanitized EMP
- E3170 The New Superfund: What It Is and How It Works
- E3171 Type 1 - Changes in the Remedial Process
- E3172 Clean-up Standards and Site Involvement Requirements
- E3180 Type 2 - Changes in the Remedial Process
- E3181 Removal and Additional Program Requirements
- E3190 Type 3 - Enforcement & Federal Facilities
- E3210 Type 4 - Emergency Preparedness
- E3211 & Community Right-to-Know
- E3220 Type 5 - Underground Storage Tank Trust Fund & Response Program
- E3230 Type 6 - Research & Development Closing Remedies
- 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?
- E3260 Swabbing Techniques for Sampling the Environment and Equipment

- F2095 New York Cooking
- F2100 Type 1 - Food Safety for Food Service: Cross Contamination
- F2101 Type 2 - Food Safety for Food Service: HACCP
- F2102 Type 3 - Food Safety for Food Service: Personal Hygiene
- F2103 Type 4 - Food Safety for Food Service: Time and Temperature Controls
- F2104 Food Safety for Food Service Series II
- F2105 Type 1 - Basic Microbiology and Foodborne Illness
- F2106 Type 2 - Handling Knives, Cuts, and Burns
- F2107 Type 3 - Working Safely to Prevent Injury
- F2110 Food Safety is No Mystery
- F2111 Controlling *Salmonella*: Strategies That Work
- F2120 Food Safety: For Goodness Sake Keep Food Safe
- F2121 Food Safety the HACCP Way
- F2122 Food Safety Zone Video Series
- F2123 Type 1 - Food Safety Zone: Basic Microbiology
- F2124 Type 2 - Food Safety Zone: Cross Contamination
- F2125 Type 3 - Food Safety Zone: Personal Hygiene
- F2126 Type 4 - Food Safety Zone: Sanitation
- F2127 Food Technology: Irradiation
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- F2137 GMP Basics: Avoiding Microbial Cross-Contamination
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- F2148 GMP - GSP: Process Control
- F2150 GMP: Personal Hygiene and Practices in Food Manufacturing
- F2151 GMP Food Safety Video Series
- F2152 Type 1 - Definitions
- F2153 Type 2 - Personnel and Personnel Practices
- F2154 Type 3 - Building and Facilities
- F2155 Type 4 - Equipment and Utensils
- F2156 Type 5 - Production Process Controls
- F2160 GMP: Sources and Control of Contamination during Processing
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- F2162 Type 1 - Definitions
- F2163 Type 2 - Personnel and Personnel Practices
- F2164 Type 3 - Building and Facilities
- F2165 Type 4 - Equipment and Utensils
- F2166 Type 5 - Production Process Controls
- F2168 HACCP Advantage - Good Manufacturing Practices

OTHER

- M4010 Diet, Nutrition and Cancer
- M4020 Eating Defensively: Food Safety Advice for Persons with AIDS
- M4030 Ice: The Frozen Food
- M4040 Personal Hygiene and Sanitation for Food Processing Employees
- M4050 Psychiatric Aspects of Product Tampering
- M4060 Tampering: The Issue Examined
- M4070 Understanding Nutritional Labeling Processing Employees

FOOD

- F2005 A Lot on the Line
- F2007 The Amazing World of Microorganisms
- F2008 A Recipe for Food Safety Success
- F2009 Basic Personnel Practices
- F2010 Close Encounters of the Bird Kind
- F2011 Available Post Harvest Processing Technologies for Oysters



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UPDATES

Silliker Announces Personnel Updates

Jim Ondyak was named president of Silliker North America. He most recently served as vice president of sales and marketing for the Homewood, IL, food testing and consulting organization.

David J. Evanson was appointed corporate vice president of quality for Silliker Group Corp. He has served in a series of senior operations and quality management roles at Silliker over the past 20 years.

Jean-Baptiste Gay was appointed vice president of industrial performance for Silliker Group Corp.

NFI Welcomes Lisa Weddig to Advocacy Team

The National Fisheries Institute (NFI) has announced the addition of Lisa Weddig as director of regulatory and technical affairs. Ms. Weddig will continue NFI's regulatory and technical work to help provide a safe seafood supply for American consumers.

Ms. Weddig comes to NFI following a nearly 20-year career with the Grocery Manufacturers/Food Products Association (GMA/FPA) where she served as the director of processing technologies. She held various positions in thermal processing, HACCP, food safety and educational support for the association's members. Currently, Ms. Weddig oversees the technical assistance function in the discipline of traditional canning and aseptic processing. She has been a member of the Seafood HACCP Alliance Steering Committee and an industry advisor to the US Delegation to the Codex Committee on Fish and

Fishery Products. Prior to joining GMA/FPA, Ms. Weddig spent more than five years with a canning operation in Virginia. She earned a B.S. in food science from Virginia Tech in Blacksburg, VA, and a M.S. in nutrition education from Hood College in Frederick, MD.

Ms. Weddig's tenure will overlap with outgoing NFI vice president Bob Collette as she transitions in to her position and cultivates relationships with new colleagues.

Dr. Trevor Ames Appointed Interim Dean at University of Minnesota College of Veterinary Medicine

Dr. Trevor R. Ames has been appointed interim dean of the University of Minnesota College of Veterinary Medicine by Dr. Frank Cerra, senior vice president for health sciences, effective June 18. Dr. Ames will take over for Dr. Jeffrey S. Klausner, who has resigned to become president and chief executive officer of the Animal Medical Center in New York City.

Dr. Ames joined the college faculty in 1981 and has been the chair of veterinary population medicine department for the past 10 years. A diplomate of the American College of Veterinary Internal Medicine, Dr. Ames received his D.V.M. in 1978 from the Western College of Veterinary Medicine at the University of Saskatchewan and his master of science degree in 1981 from the University of Minnesota. His research interests include infectious diseases of horses and cattle, bovine respiratory disease complex, and equine and bovine vaccines. His

clinical interests include large animal internal medicine diseases, and his teaching responsibilities include lectures in virology, large animal multi-systemic diseases, and large animal respiratory diseases.

"Interim Dean Ames will provide outstanding leadership for the College as it pursues its strategic goals and directions and is a proven leader in veterinary medicine. He will serve us well in representing the college inside and outside the University," said Dr. Cerra.

During his tenure as interim dean, Dr. Ames will serve with all the rights, privileges, responsibilities, and authority of the permanent dean. He will serve in this position for nine to twelve months until a permanent dean has been appointed and begun work. Interim Dean Ames will be eligible to be considered for the permanent dean position.

Sargento Promotes Three in Consumer Products Division

Sargento Foods Inc. has announced three promotions in the Consumer Products Division.

Steve Foerstner, Ed Finnie and Brad Deckard have been promoted to divisional sales managers.

Mr. Foerstner has been elevated to divisional sales manager in the Midwest region. Since joining Sargento in 1991, he has held the following positions – national accounts sales manager and national customer business manager. The married father of three earned a bachelor's degree in marketing from Xavier University.

Mr. Finnie has been promoted to divisional sales manager for the

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Northeast and Eastern Great Lakes regions. Previously, he held the positions of regional sales manager – Boston, national accounts sales manager and national customer business manager. Mr. Finnie earned his bachelor's degree in marketing from Western New England College.

Mr. Deckard will now assume the role of divisional sales manager, and is responsible for sales management of the Southeastern region. Prior to this move, he held the title of national customer business manager. Mr. Deckard earned a bachelor's degree in advertising from the University of Florida. He also holds a master's degree in business administration from Florida Metropolitan University.

Key Technology Appoints Saeed Tasbihgou Managing Director of European Operation, Key Technology BV

Key Technology, Inc. announces the appointment of Saeed Tasbihgou as managing director of Key Technology BV, the company's European operation. Mr. Tasbihgou is responsible for providing the operational leadership that brings Key's automated inspection, specialized conveying, product

preparation systems, and service to customers in the food processing and industrial markets throughout Europe, Africa, and the Middle East. He is based at Key's European headquarters in the Netherlands, which provides sales, service, and spare parts as well as an extensive application testing laboratory and manufacturing, engineering, and research and development.

Mr. Tasbihgou brings more than 20 years of business leadership experience to his position at Key Technology. Most recently, he was service operations manager for Philips N.V. Previously, he was managing director and senior consultant with Techmash BV. Prior to that, he held a variety of management positions with Apple Computer, Inc. He holds a bachelor's degree in management from Saint Mary's College and a bachelor's degree in industrial engineering from San Jose State University.

SQF Institute Announces New Appointments

Christina Kelley will be the director of food Technology – SQF program.

Ms. Kelley will be responsible for the technical aspects of the SQF program, which will include supporting the SQFI technical

committees, servicing and supporting SQF training centers and certification bodies, overseeing the registration of SQF auditors and consultants, and coordinating reviews of all SQF training courses and other program documents.

Ms. Kelley comes to us from Kellogg's and prior to that Tyson Foods, Inc. She has had extensive experience in the development of prerequisite and HACCP-based food safety programs for a wide range of product types.

Amanda Bond-Thorley will be the manager of food technology – SQF program.

Ms. Bond-Thorley will be responsible for the marketing and communications aspects of the SQF program, which will include developing marketing strategies, compiling and distributing the SQF newsletter, managing the design and production of marketing materials, generating new business, coordinating and managing training delivery systems, planning and executing the SQF international conference and other meetings, and improving and maintaining the SQF Web site.

Ms. Bond-Thorley comes to us from The German Agricultural Marketing Board-CMA. She has had wide-spread experience in marketing communications within the food industry.

2007 World Food Prize Laureate Revolutionized Post-harvest Technology

Dr. Philip E. Nelson of Purdue University was named winner of the \$250,000 World Food Prize for his innovative breakthrough technologies which have revolutionized the food industry, particularly in the area of large-scale storage and transportation of fresh fruit and vegetables using bulk aseptic food processing.

Dr. Nelson was announced as the 2007 Laureate by Ambassador Kenneth M. Quinn, president of the World Food Prize Foundation, at a ceremony at the US State Department on June 18 hosted by assistant secretary for economic, energy and business affairs Daniel Sullivan. Also participating in the announcement ceremony were World Food Program executive director Josette Sheeran, acting administrator of the US Agency for International Development (USAID) Henrietta Fore, Congressman Tom Latham (R-IA) and World Food Prize Selection committee chairman and Nobel Peace Prize Laureate Dr. Norman Borlaug.

In making the announcement, Ambassador Quinn stated that Dr. Nelson's food science research has significantly reduced post-harvest waste and spoilage and greatly increased the availability and accessibility of nutritious food worldwide, particularly in emergency situations.

"Dr. Nelson's pioneering work, which began with tomatoes and

later included a variety of seasonal crops, has made it possible to produce ultra-large scale quantities of high quality food," Ambassador Quinn said. "This food can then be stored for long periods of time and transported to all corners of the world without losing nutritional value or taste."

Dr. Nelson's research led to the discovery of methods and equipment to preserve perishable food at ambient temperatures in very large carbon steel tanks (beginning with 100 gallon tanks and increasing in capacity to 8 million gallons). By coating the tanks with epoxy resin and sterilizing the valves and filters, food products were able to be stored and removed without reintroducing contaminants. As a result, enormous quantities of pathogen-free food could be distributed to plants around the world for final processing and packaging.

Later partnering with the Scholle Corporation, Dr. Nelson developed a low-cost aseptic "bag-in-box" system for preserving and shipping foods. By the 1980s, this technology had spread throughout the global food industry. Working with another company, Fran Rica Manufacturing (now part of FMC), Dr. Nelson engineered a variation of the bag sealing fitment as a membrane, which ruptures during the fill and then reseals with a sterilized foil cap. This is now the standard technology used for processing and packaging of aseptically processed foods worldwide.

In the developing world, these technologies have made it affordable

and convenient to transport and deliver a variety of safe food products without the need for refrigeration, averting loss due to spoilage. Citrosuco, an orange juice producer based in Brazil, has used the technology developed by Dr. Nelson to ship up to eight million gallons of orange juice to the United States and Europe. The technology has also been applied to bring potable water and emergency food aid to survivors of the 2004 tsunami in Southeast Asia and the victims of Hurricane Katrina in 2005, as well as to other crisis situations worldwide, and is used in school nutrition programs in developing countries.

"Affordable and safe movement of food is critical in fighting world hunger and Dr. Nelson's technologies will help reach those in need," said Ms. Sheeran. The World Food Program was one of several organizations to support the nomination of Dr. Nelson.

Dr. Nelson has been involved in the storage and packaging of food since childhood. He spent his early years working on his family's tomato farm and canning factory in Morristown, Indiana and once earned the crown of "Tomato King" at the Indiana State Fair.

The 2007 World Food Prize will be formally presented to Dr. Nelson at a ceremony at the Iowa State Capitol on October 18, 2007. The ceremony will be held as part of the World Food Prize's Norman E. Borlaug International Symposium, which this year focuses on "Biofuels and Biofood: The Global Challenges of Emerging Technologies."



Cryptosporidiosis Surveillance and Waterborne Outbreaks in Europe

Cryptosporidium causes diarrheal disease that can be particularly severe in immunocompromised individuals. *Cryptosporidiosis* is a notifiable disease at European Union level, and surveillance data are collected through the European Basic Surveillance Network. The disease distribution in Europe for 2005 showed 7,960 *Cryptosporidiosis* cases reported from 16 countries. The crude incidence rate was 1.9 cases per 100,000, although there were considerable differences in the rates of *Cryptosporidiosis* between countries. Infection was more commonly reported in young children. A pronounced seasonal peak was observed in the autumn of 2005, with 59% of the cases reported between August and November, although Ireland and Spain experienced a peak in spring and summer, respectively. *Cryptosporidiosis* outbreak investigations and analytic studies have associated the disease with drinking water supplies, animal contact, travel, and swimming pools. Contamination of the source water for drinking water supplies, as well as inadequate water treatment can be responsible for *Cryptosporidiosis* outbreaks. Routine *Cryptosporidiosis* surveillance from North West England over 17 years showed that the cases occurred predominantly in spring and autumn. British drinking water regulations and improvements in drinking water treatment have coincided with a decline in *Cryptosporidiosis* incidence. Improvements in *Cryptosporidiosis* surveillance such as detection, recording and reporting will help to recognize outbreaks and monitor interventions.

OIE Recognizes New Zealand BSE Risk as Negligible

New Zealand has been granted negligible BSE risk disease status at the 75th General Session of the World Organization for Animal Health (OIE), held in Paris last week.

A new classification criteria for official sanitary status recognition on bovine spongiform encephalopathy (BSE) was adopted in 2006. New Zealand joins Australia, Argentina, Uruguay and Singapore in the most favorable category. The United States, Canada, Chile, Brazil, Switzerland and Taipei, China have BSE-controlled risk status, which places restrictions on trading bovine risk products; that negligible risk status countries are not required to meet.

Biosecurity New Zealand Assistant Director General, Barry O'Neil, welcomed the OIE status. "This confirms what we have known for a long time — New Zealand is BSE-free. The negligible risk recognition gives New Zealand a status that will assist exporters."

FAO's Food Quality and Standards Service Launches Its New Web Site

The Food Quality and Standard's Service (AGNS) is pleased to announce the launch of our new Web site: <http://www.fao.org/ag/agn/agns>.

"As part of our ongoing commitment to improve communications and meet the food safety and quality information requirements of FAO's Member Countries and our food safety and quality partners worldwide, AGNS has redesigned

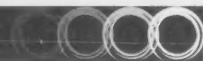
and updated the content of its Web site. This extensive work was necessary to both improve the visibility of AGNS' work in the field of food safety and quality and to ensure that our core audiences and beneficiaries have the opportunity to access relevant and recent food safety and quality publications and information online through a more accessible and user-friendly Web site."

FDA Implementing Initiative to Reduce Tomato-related Foodborne Illnesses

The US Food and Drug Administration (FDA) will begin a multi-year Tomato Safety Initiative to reduce the incidence of tomato-related foodborne illness in the United States.

"Produce is an important part of a healthy diet and FDA wants to improve its safety by better understanding the causes of foodborne illness and by promoting more effective methods of safe food production, delivery, and preparation," said Robert Brackett, Ph.D., director of FDA's Center for Food Safety and Applied Nutrition. "This initiative is part of a strategy to reduce foodborne illness by focusing food safety assessments on specific products, practices, and growing areas that have been found to be problematic in the past."

The initiative, part of FDA's Produce Safety Action Plan, is a collaborative effort between FDA and state health and agriculture departments in Florida and Virginia. Several universities and members of the produce industry also are part of the effort. It will begin during this year's growing season for Virginia in the summer and for Florida in the fall.



During the past decade, the consumption of fresh and fresh-cut tomatoes has been linked to 12 different outbreaks of foodborne illness in the United States. Those outbreaks include 1,840 confirmed cases of illness. The majority of these outbreaks have been traced to products from Florida and the eastern shore of Virginia; however, tomato-associated outbreaks also have been traced to tomatoes from California, Georgia, Ohio, and South Carolina. The effort will include identifying practices or conditions that potentially lead to product contamination, which will allow FDA to continue to improve its guidance and policy on tomato safety. The initiative will evaluate the need for additional produce safety research, education, and outreach.

Other components of the initiative include:

- continuing outreach with the industry at all points in the supply chain;
- facilitating and promoting research on tomato safety;
- communicating early and often in the event of an outbreak, and,
- continuing to build and strengthen collaborative relationships with federal, state and local public health officials in disease prevention, detection, and outbreak response.

FDA investigators in coordination with their respective state counterparts will visit tomato farms and packing facilities in Florida and Virginia to assess food safety practices and use of Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs). During their visits, officials will also evaluate a variety of environmental factors including irrigation water, wells,

procedures for mixing chemicals, drought and flooding events, and animal proximity to growing fields.

The Tomato Safety Initiative complements the Leafy Greens Initiative launched in 2006.

Refrigerated Carrot Juice and Other Refrigerated Low-acid Juices

This guidance is intended for processors of refrigerated carrot juice and other refrigerated low-acid juices, which can pose a risk of botulism poisoning if juice that is not processed to eliminate or prevent the growth of *Clostridium botulinum* spores that may be present is subsequently stored without proper refrigeration.

The recommendations in this guidance only pertain to low-acid juice products subject to the pathogen reduction provisions of the Hazard Analysis Critical Control Point (HACCP) requirements of 21 CFR Part 120 (the juice HACCP regulations). This guidance does not pertain to low acid and acidified juice products subject to the requirements of 21 CFR Parts 108, 113 and 114. (Such products are not subject to the pathogen reduction provisions in the juice HACCP regulations, 21 CFR 120.24.) Further, these recommendations do not pertain to any other foods that need refrigeration by consumers to maintain product safety. For other foods that need refrigeration by consumers to maintain product safety, see the guidance for the labeling of such foods at <http://www.cfsan.fda.gov/guidance.html>.

FDA's guidance documents, including this guidance, do not establish legally enforceable responsibilities. Instead, guidances describe the

Agency's current thinking on a topic and should be viewed only as a recommendation, unless specific regulatory or statutory requirements are cited. The use of the word should, in Agency guidances, means that something is suggested or recommended, but not required.

Pennsylvania Governor Rendell Says New Online Restaurant Inspection Reports to Improve Consumer Safety

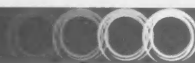
For the first time, Pennsylvania consumers can access timely, complete inspection reports for restaurants in the state.

The new online database, at www.agriculture.state.pa.us/pafood-safety, is part of the Governor's efforts to increase food safety in Pennsylvania.

"Food safety is one of the highest priorities in Pennsylvania," Pennsylvania Governor Edward G. Rendell said. "Providing access to restaurant inspections will help consumers make better decisions about where they eat and the information will better help them understand the factors that affect their safety."

At Governor Rendell's direction, the State Department of Agriculture invested in technology to improve the effectiveness and efficiency of restaurant inspections. In 2006, the department began using the Garrison Enterprises Digital Health System, which gave inspectors tablet computers to do their jobs and immediately relay their results to the state's database.

"By using the Garrison System, our inspectors are able to do their jobs more efficiently and accurately," said Agriculture Secretary Dennis



Wolff. "With the addition of complete inspection reports online, the public now has tremendous access to timely and complete information."

In addition to technological advances, the department has changed internal processes including risk-based inspections, employee health monitoring and other modern food safety advancements. The department has proposed amendments to the 60-year old Public Eating and Drinking Places Law, Act 369, to better reflect current business practices, modern science and the Pennsylvania Food Code.

Governor Rendell is encouraging the General Assembly to pass legislation that will help prevent foodborne illness by improving Agriculture's ability to enforce food safety regulations. The Governor also supports standardizing the inspection and reporting process so that all eating establishments are inspected using the same criteria and the public receives the results in a common format.

Through legislation, the Governor aims to:

- Make food safety inspections uniform across the state, regardless of jurisdiction.
- Make food safety inspection reports available to the public, regardless of jurisdiction.
- Increase fees and penalties for re-inspections and failure to meet safety standards.
- Require restaurants to have at least one supervisor present at all hours of operation who has received food employee certification.
- Avoid duplication of inspections between state and local inspectors.

Pennsylvania made public safety advances in 2004 with the creation of the Food Employees Certification Law – which requires all establishments to have at least one manager certified in safe-food handling if they serve food that could make people sick if not properly handled. To date, nearly 50,000 food establishment employees have been trained under this law.

For more information about Pennsylvania's food safety programs, visit www.agriculture.state.pa.us/pa-foodsafety.

Food Safety; Perception of Risk Among European Consumers

Europeans think that their health is more likely to be adversely affected by environmental pollution, car accidents or serious illness than by the food they eat.

In general, food has positive connotations, being associated primarily with taste and pleasure. Less than one in five consumers spontaneously link food with health and, when asked to cite specific food-related concerns, no single issue achieves particular prominence. Previous food scares, such as those surrounding Bovine Spongiform Encephalopathy (BSE) or dioxins, do not currently appear to be of major concern to European consumers. Issues such as food poisoning, residues in food, and obesity are more readily recalled.

When presented with a list of potential food safety risks, consumers appear slightly more concerned about external risk factors that are beyond their control. They are less worried about personal factors such as food allergies and those linked to their own behavior, such as food

preparation, hygiene and weight gain. In general, women tend to be more worried about food safety than men.

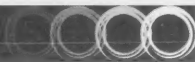
Over three in five European consumers are aware of EU food safety policies. A higher level of awareness (85%) is shown for health warnings on cigarette packs, reflecting the high impact of anti-smoking policies.

Overall, there is a strong level of confidence in the actions that public authorities take in the field of health. Most people believe that health concerns are taken seriously (54%) and that authorities act quickly (55%), but a skeptical 47% of respondents consider that economic interests of producers would take priority over consumer health.

In respect of food safety issues, almost 60% of EU consumers think that public authorities take account of the latest scientific evidence when making policy decisions. Almost half commend the authorities for their role in informing the public about food-related risks. Although opinions are divided on the progress of food safety over the past 10 years, almost half the population consider that EU authorities are currently dealing appropriately with food safety risks.

Media coverage of health-related risks reaches most consumers in the EU. While people more readily recall having seen or heard media reports on risks associated with smoking, obesity, alcohol and infectious diseases, over 60% of consumers can recollect reading or seeing something about unsafe or unhealthy food within the past six months or less.

Of those respondents who were aware of media reports surrounding the safety of a particular type of food, more than half declared that they had changed their eating habits as a result and avoided



that food either temporarily (37%) or permanently (16%). However, over 40% of people either ignore stories about food safety or do nothing despite being worried. This finding has implications for risk communications, not least because the media has an important role in raising awareness and, ultimately, in motivating dietary change.

Finally, it appears that the most trusted sources of information about serious food risks are consumer groups, doctors/physicians and scientists, followed by public authorities. Media generate a comparatively low level of trust, but the least trusted sources are economic operators (manufacturers, farmers and retailers).

State Public Health Director Warns of *Salmonella* Contamination When Handling Birds

Dr. Eric E. Whitaker, state public health director, is warning the public about handling birds, such as baby chicks and ducks, and the risk of disease. Two Illinois *Salmonella* ser. Montevideo cases from separate households in Madison County match a multi-state outbreak pattern linked to contact with birds (ducklings and chicks). Both cases have reported contact with birds purchased from the same local chain feed store and both have onset of illness in May 2007. It is not yet known how many locations across Illinois have received infected birds so anyone purchasing animals needs to be cautious.

"A person can contract salmonellosis through contact with animals, such as handling birds, cleaning cages, feeding and touching them," said Dr. Whitaker. "You should always wash your hands with soap and water after any type of contact with animals."

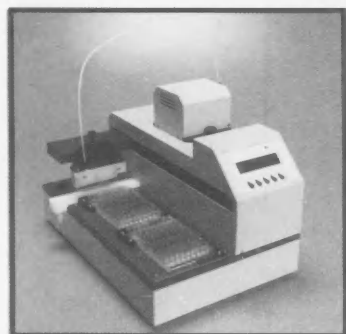
Salmonella bacteria can be found in the feces of animals, including birds. Animals can become infected and can then infect humans in contact with the animal's fecal material. The animal may show no signs of illness.

Symptoms of salmonellosis in people can last several days to a week and include diarrhea and fever. Symptoms usually appear six to 72 hours after exposure to the organism.

If persons have symptoms of diarrhea and fever following contact with baby chicks or ducklings they should seek attention from a health care provider and call their local health department.

www.foodprotection.org

INDUSTRY PRODUCTS



KD Scientific Inc.

Twenty-five Percent Increase in Useable Cells When Dispensing Live Cells from KD Scientific's Ultra Spense 2000

KD Scientific's UltraSpense 2000 eliminates edge effects and delivers more viable cells more uniformly to 384 well microplates when compared to conventional peristaltic dispensers.

UltraSpense 2000 eliminates edge effects and fluid drops sticking to the dispensing tips when dispensing live cells. The net result is that the accuracy of seeding is much improved with the use of the UltraSpense, leading to more reliable results.

As a result, more of the wells are usable for assays making productivity and throughput increase dramatically. By simply recovering the perimeter row of a 384 well plate, a 25% gain in usable assays is achieved with CHO, Hek293 and Cos-7 cells.

UltraSpense 2000 solves many problems experienced with peristaltic dispensers with a specially designed coated manifold that uniformly distributes material to

all 8 tips. This is combined with a proprietary pumping algorithm that overcomes the natural tendency for fluids to accumulate on the outside of the manifold tips.

In addition, without the potential for uneven tubing wear associated with peristaltic rollers, the UltraSpense 2000 maintains its consistent performance after millions of dispense cycle.

These new technologies deliver inherently greater accuracy and consistent volumes across a wide range of viscosities with high reliability. The improved technology is simple to use and saves in operating and maintenance costs.

KD Scientific designs, manufactures and sells a range of quality fluidics equipment used by research laboratory markets worldwide.

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Eriez® Introduces E-Z Tec XR-11 and XR-21 — The New Way to Identify Contaminants by Using an Economical X-Ray Inspection System

A new generation of X-Ray Inspection Systems can be economical. The XR-11 and XR-21 E-Z Tec® X-Ray Inspection Systems provide a cost-effective solution for packaged and loose products with up to 12" and 14" belt widths respectively, according to Eriez®, the manufacturer of the units.

Eriez' new automated X-Ray inspection systems employ advanced linear array technology for superior

sensitivity, speed and sophistication. They provide real-time analysis of process and packaged foods, pharmaceuticals and other goods requiring the highest levels of product integrity.

X-Ray Systems monitor product and package attributes such as count, fill level, mass and broken or damaged product while detecting unwanted metals, stone, glass, bone and some plastics.

Product inspection is achieved through a computer-controlled family of low energy generators and a high-performance computer image analysis system. This feature makes the E-Z Tec superior at detecting small statistical variations in the product that signal contamination or deviation from accepted specifications. Sophisticated image processing software provides immediate analysis, detection and rejection automatically.

Eriez E-Z Tec X-Ray Inspection Systems are easy to set up and an integral system for HACCP/AIB Compliance.

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PEF Pasteurization Laboratory Unit for Process Development and Microbiological Trials from Diversified Technologies

A new PEF (Pulsed Electric Field) laboratory unit for performing process development testing with liquefied food products is being introduced by Diversified Technologies.

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

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INDUSTRY PRODUCTS

Diversified Technologies' PEF Pasteurization Lab Unit is a non-thermal, all solid-state system which passes juices and liquefied dairy products through a chamber and subjects them to brief pulses of very high voltage, resulting in >5 log kill. Unlike heat processing, PEF pasteurization does not alter their flavor.

Featuring a 300 l/h capacity, with 25 kV, 25 kW power levels, Diversified Technologies' PEF Pasteurization Lab Unit lets research laboratories conduct a wide range of process development studies. Scalable to production environments with up to 10,000 l/h throughput, PEF systems require much less energy to operate than heat processing.

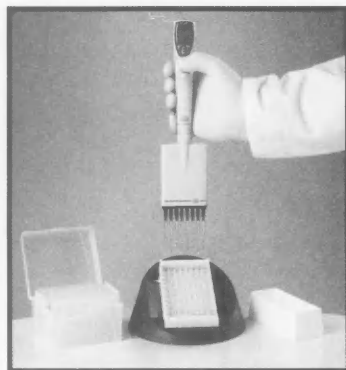
Diversified Technologies, Inc.
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Bedford, MA
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Biohit Has Introduced the Ergo-Mate, an Ergonomic Pipetting System Designed to Aid in Compliance with ISO 8655

ISO 8655 recommends when pipetting to touch off samples on the wall of the receiving vessels, especially with small volumes.

Ergo-Mate removes the need to hold the plate at any angle and allows for safe dispensing. The results are that pipetting is easier, safer and more precise with the angled Ergo-Mate.

When reversed, the Ergo-Mate creates an ideal aerosol barrier for use in hoods or on bench top surfaces.



Biohit, Inc.

It is ideal for safe transporting of plates and can be reversed for and used for flat surface pipetting or as an incubation station with a lid.

In addition to the Ergo-Mate, Biohit is a manufacturer of ergonomically designed Multichannel Pipettors. The mLINE Series is the lightest mechanical pipettor incorporating low ejection and pipetting forces with the accuracy/precision expected from an IVD manufacturer. Biohit's eLINE is the only electronic multichannel pipettor with electronic tip ejection. Both series are designed under IVD/CE manufacturing standards.

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BAX® System Real-time PCR Assay for *Campylobacter* Certified by AOAC-RI

A new BAX® system assay from DuPont Qualicon that uses real-time PCR to detect *Campylobacter* has been certified as Performance TestedSM Method No. 040702 by the AOAC Research Institute in Gaithersburg, MD.

Validation studies on enriched

samples of ready-to-eat turkey and chicken carcass rinses compared BAX® system performance to the ISO 10272-1:2006 culture method. AOAC-RI found that qualitative results with the BAX® system demonstrated sensitivity that was equivalent to the reference method, with 99 percent specificity.

The BAX® system real-time PCR assay for *Campylobacter*, developed in alliance with Applied Biosystems, detects and differentiates three foodborne species of *Campylobacter* (*C. jejuni*, *C. coli* and *C. lari*) in the same sample. With less than 90-minutes processing time, the BAX® system delivers next-day results on enriched samples.

"This new assay offers poultry customers a fast, sensitive and highly accurate method for detecting pathogenic *Campylobacter*" said Kevin Huttman, president of DuPont Qualicon. "Adding this AOAC certification to our portfolio of certified products provides even greater value to food businesses that choose the BAX® system as their preferred diagnostic method."

Food processing companies around the world rely on the BAX® system to detect pathogens or other organisms in raw ingredients, finished products and environmental samples. The automated system uses leading-edge technology, including polymerase chain reaction (PCR) assays, tableted reagents and optimized media, to also detect *Salmonella*, *Listeria*, *E. coli* O157:H7, *Enterobacter sakazakii* and *Staphylococcus aureus*.

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New Benchtop Refrig-

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INDUSTRY PRODUCTS



Jeio Tech, Inc.

erated Shaking Incubator from Jeio Tech, Inc.

The new SI-600R from Lab Companion combines a bench-top refrigerated incubator with a dual-action orbital and reciprocating shaker.

This versatile unit fulfills a variety of molecular biology, general incubation, and cell culture applications.

Selectable between orbital or reciprocating action the speed range is from 10 to 300 rpm. The SI-600-R can be programmed for a run time from 10 seconds to 1,000 hours and forward-backward-pause cycles.

The platform is 16.1" x 16.1" and can be equipped with a wide range of clamps, racks and platforms.

The temperature range is 15°C to 60°C with uniformity of $\pm 1.0^\circ\text{C}$ at 38°C.

Additional features include microprocess PID control, auto-tuning and calibration. A digital timer is included with a range of 1 min to

100 hours and a delayed on/off.

Over-temperature protection, door opening alarm, digital LED display for temperature, speed, and shaking motions are all standard.

The Lab Companion SI-600R is one of a complete line of Shakers, Incubated Shakers, Separatory Funnel Shakers, and Hot Plate Shakers.

Jeio Tech, Inc.

847.298.6613

Des Plaines, IL

www.jeiotech.com

TandD Corporation Has Introduced a New Family of Wireless Data Loggers

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The handheld portable data collector features real time monitoring with audible alarms, the ability to download logged data from the loggers and view the results with graphical displays. In addition, the data can be downloaded via USB connection to a PC.

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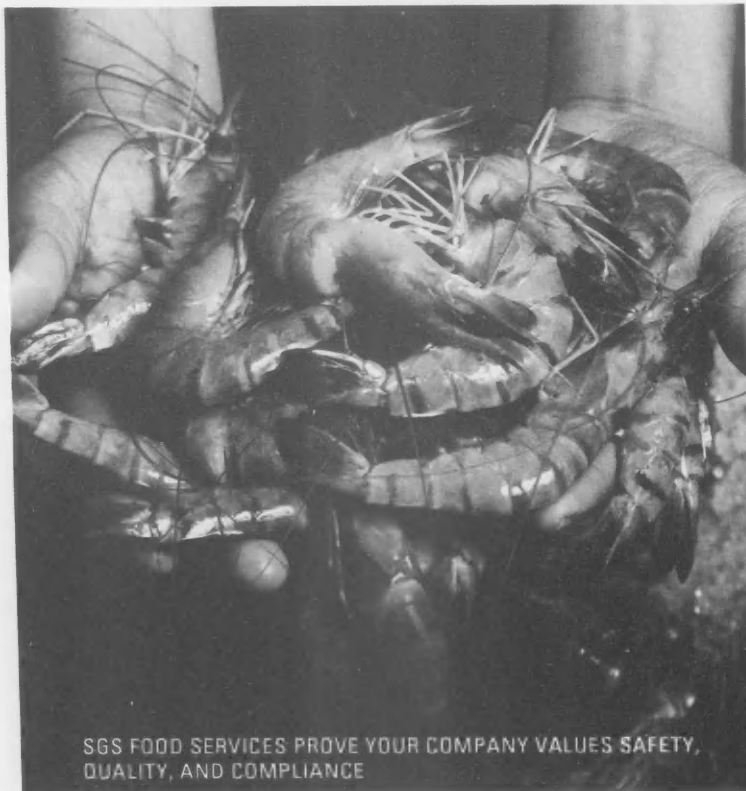
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COMING EVENTS

SEPTEMBER

- **11-12, GMA/FPA Advanced HACCP: Verification and Validation Workshop**, GMA/FPA Conference Center, Washington, D.C. For more information, contact Jenny Scott at 202.639.5985 or go to <http://www.fpa-food.org/content/FSW.asp>.
- **11-12, Meat & Poultry HACCP Accredited Workshop**, University of Georgia Food Science, UGA Campus, Athens, GA. For more information, contact Marian at 706.542.2574; E-mail: marianw@uga.edu.
- **12, Ohio Association for Food and Environmental Sanitarians Annual Meeting**, Ohio Dept. of Agriculture, Reynoldsburg, OH. For more information, contact Gloria Swick-Brown at 614.466.7760; E-mail: gloria.swick-brown@odh.ohio.gov.
- **12-13, China International Food Safety and Quality Conference and Expo**, The Landmark Tower Hotel, Beijing, China. *Program assistance provided by IAFFP.* For more information, go to www.chinafoodsafety.com.
- **16-20, 121st AOAC Annual Meeting and Exposition**, Anaheim, CA. For more information, call 301.924.7077 ext 112, 124, and 146 or go to www.aoac.org/meetings.
- **18-20, New York State Association for Food Protection 84th Annual Conference**, E. Syracuse, NY. For more information, contact Janene Lucia at 607.255.2892; E-mail: jgg3@cornell.edu.
- **19-21, Washington Association for Food Protection Annual Meeting**, Campbell's Resort and Conference Center, Lake Chelan, WA. For more information, contact Stephanie Olmsted at 206.660.4594; E-mail: Olmsted@safeway.com.
- **24-26, Indiana Environmental Health Association Fall Conference**, Radisson Hotel, Merrillville, IN. For more information, contact Pat Minnick at 765.483.4458; E-mail: pminnick@co.boone.in.us.

- **24-27, Dairy Technology Workshop**, Randolph Associates, Inc., Birmingham, AL. For more information, call 205.595.6455; E-mail: Henry.Randolph@raiconsult.com.
- **25-27, Wyoming Environmental Health Association Annual Educational Conference**, Little America Hotel & Resort, Cheyenne, WY. For more information, contact Doug Evans at 307.686.8036; E-mail: devans2@state.wy.us.

OCTOBER

- **3-4, Advanced HACCP for Meat & Poultry Processors Workshop**, University of Georgia Food Science, UGA Campus, Athens, GA. For more information, call 706.542.2574; E-mail: marianw@uga.edu.
- **7-10, AACC International Annual Meeting**, San Antonio Convention Center, San Antonio, TX. For more information, go to <http://meeting.aaccnet.org>.
- **9-11, North Dakota Environmental Health Association Educational Conference**, Bismarck, ND. For more information, contact Debra Larson at 701.328.1291; E-mail: djlanson@state.nd.us.
- **10-11, Associated Illinois Milk, Food and Environmental Sanitarians Annual Meeting**, Stoney Creek Inn, East Peoria, IL. For more information, contact Steve DiVincenzo at 217.785.2439; E-mail: steve.divincenzo@illinois.gov.
- **11-12, GMA/FPA HACCP for Juice and Other Beverages Workshop**, GMA/FPA Conference Center, Washington, D.C. For more information, contact Jenny Scott at 202.639.5985 or go to <http://www.fpa-food.org/content/FSW.asp>.
- **15-17, GMA/FPA Prerequisite Programs and Sanitary Design Workshop**, Cornell University's Statler Hotel, Ithaca, NY. A workshop to formalize your HACCP foundation. For more information, contact Bob Gravani at 607.255.3262; or go to <http://www.fpa-food.org/content/FSW.asp>.

- **15-17, 2nd Food Processing Suppliers Association**, Las Vegas Convention Center, Las Vegas, NV. For more information, call 703.761.2600 or go to www.fpsa.com.
- **16-17, 11th Annual Dairy Cleaning and Sanitation Short Course**, Cal Poly Dairy Products Technology Center, San Luis Obispo, CA. For more information, contact Laurie Jacobson at 805.756.6097; E-mail: ljacobso@calpoly.edu.
- **18-19, IAFFP 3rd European Symposium**, Sheraton Roma Hotel & Conference Center, Rome, Italy. For more information, call 800.369.6337 or go to www.foodprotection.org.
- **21-24, UWRF 27th Food Microbiology Symposium and Workshop**, *Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology*, University of Wisconsin-River Falls, River Falls, WI. For more information, call 715.425.3704 or go to www.uwrf.edu/foodscience, click on workshops, then the link to the food microbiology symposium.
- **24-27, Worldwide Food Expo**, McCormick Place, Chicago, IL. For more information, call 703.934.5514 or go to www.worldwidefoodexpo.com.

NOVEMBER

- **3-7, APHA 135th Annual Meeting and Expo**, Washington, D.C. For more information, call 202.777.APHA (2742) or go to www.apha.org.

IAFFP UPCOMING MEETINGS

AUGUST 3-6, 2008
Columbus, Ohio

OCTOBER 18-19, 2008
Rome, Italy

JULY 12-15, 2009
Grapevine, Texas

COMING EVENTS

- **5-7, Basic HACCP: A Food Safety System**, University of Davis-California, Davis, CA. For more information, call 800.752.0881 or go to www.extension.ucdavis.edu/agriculture.
- **6-7, 2nd Annual International Conference for Food Safety/Quality**, San Francisco, CA. For more information, go to www.foodhaccp.com.
- **7-9, Dairy Practices Council Conference**, Four Points Sheraton, Harrisburg, PA. For more informa-

tion, call 732.203.1947 or go to www.dairypc.org.

- **7-9, 4th International Symposium: Milk Genomics and Human Health**, Napa, CA. For more information, contact Jennifer Giamboni at info@imgconsortium.org.
- **8, Ontario Food Protection Association 49th Annual Meeting**, Mississauga Convention Centre, Mississauga, Ontario. For more information, contact Gail Seed at 519.463.5674; E-mail: seed@golden.net.

- **8-9, The Advanced HACCP Workshop**, University of Davis-California, Davis, CA. For more information, call 800.752.0881 or go to www.extension.ucdavis.edu/agriculture.

DECEMBER

- **3-5, HTST Workshop**, Randolph Associates, Inc., Murfreesboro, TN. For more information, call 205.595.6455; E-mail: Henry.Randolph@raiconsult.com.

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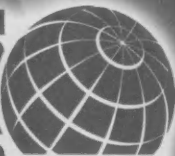
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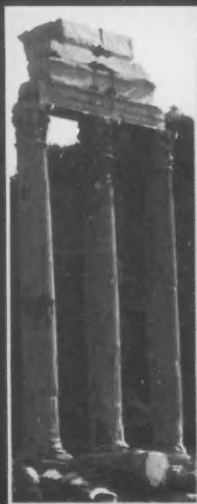
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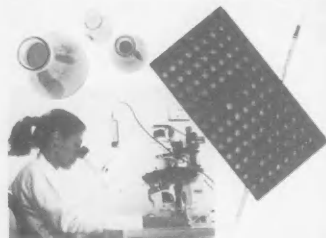


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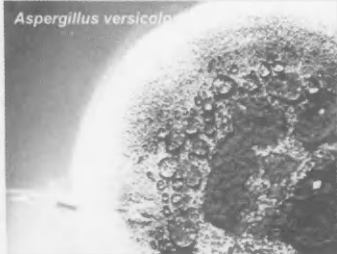
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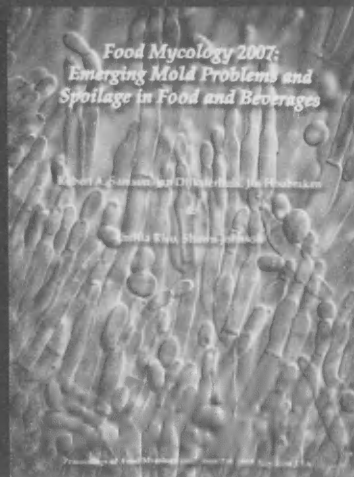
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