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MAY 2005

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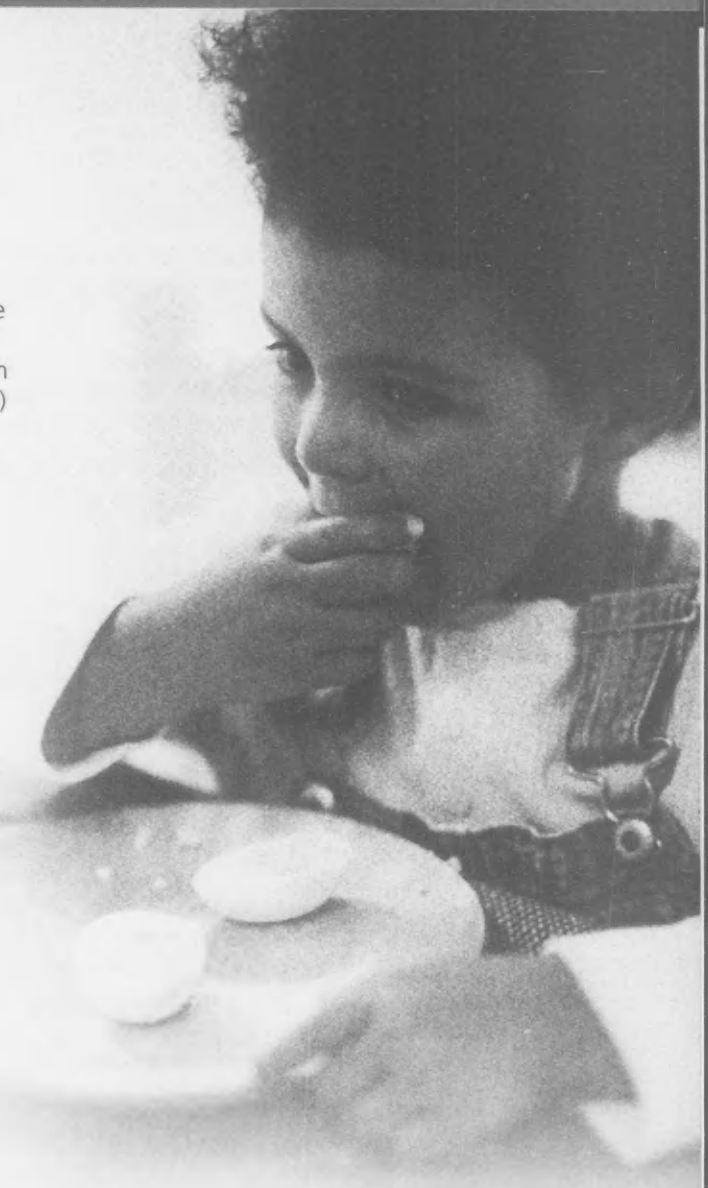

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References:

[1] Rose, Bonnie E. 2001. Isolation and identification of *Salmonella* from meat, poultry and egg products. *In* Microbiology laboratory guidebook, 3rd ed., Food Safety and Inspection Service, U.S. Department of Agriculture, Washington, D.C.

[2] U.S. Food and Drug Administration. 2003. Bacteriological analytical manual (online), AOAC International, Gaithersburg, MD.

[3] International Organization for Standards (ISO). Microbiology of food and animal feeding stuffs – Horizontal method for the detection of *Salmonella* spp., 4th Edition, ISO 6579:2002.

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International Association for Food Protection

FOOD PROTECTION TRENDS

VOLUME 25, NO. 5

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

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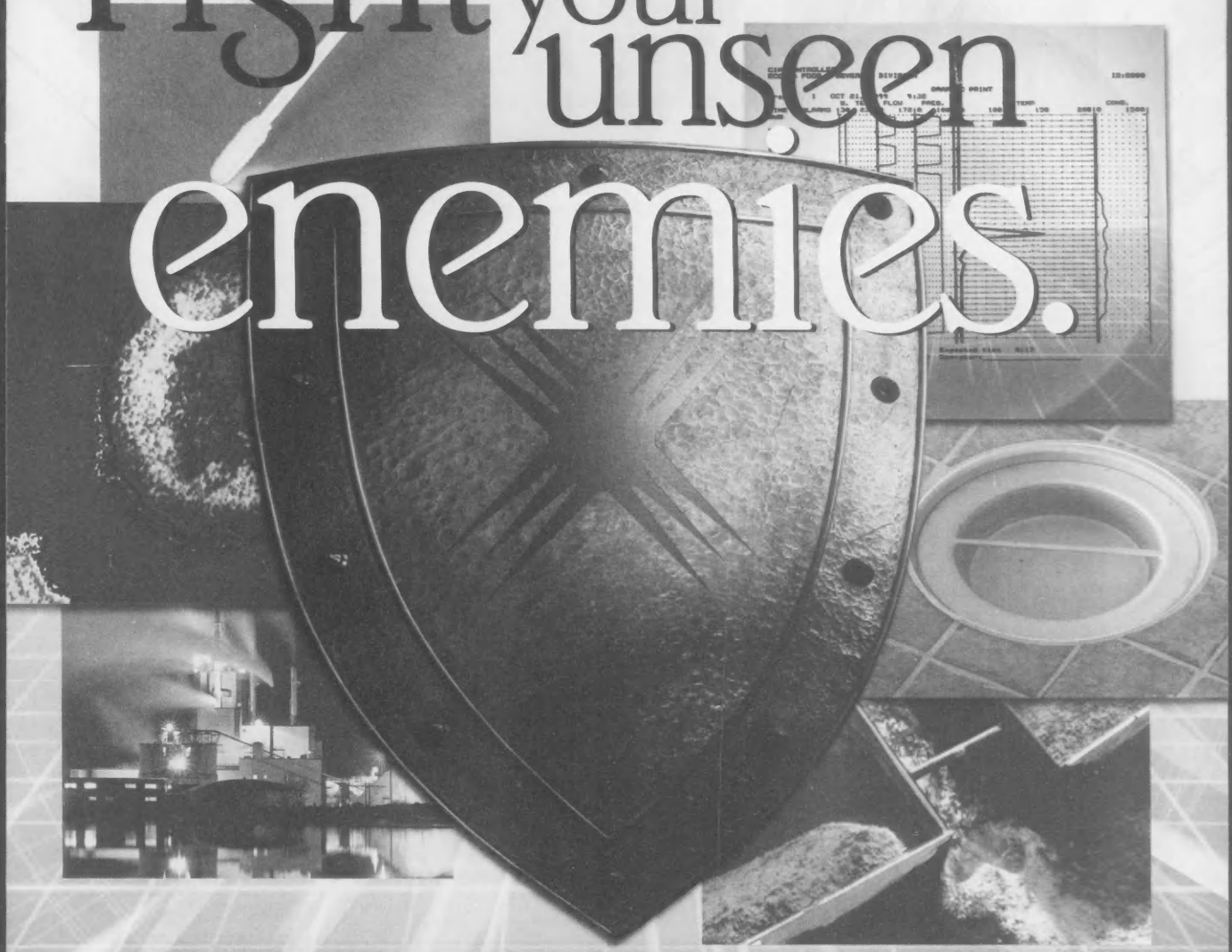

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"A VIEW FROM WISCONSIN"

By **KATHLEEN A. GLASS**
PRESIDENT

"If you share in the vision of IAFP and the Foundation Fund, I invite you to act by donating to the Fund, and be part of the positive change in the world."

The humanitarian Mohandas Karamchand Gandhi said, "You must be the change you wish to see in the world." This month, we recognize and thank the individuals and organizations who demonstrate their commitment to change and improve food safety in the world through donations to the IAFP Foundation Fund, by being Sustaining Members, or by sponsoring events at the Annual Meeting (or perhaps all three). While each of these programs has slightly different direct or indirect benefits to the sponsor, all serve to support current IAFP activities, enhance the educational experience for all attendees at the Annual Meeting, or will expand future programming that advances our mission.

For those of you not familiar with the Sustaining Member Program, Sustaining Members are organizations who provide additional funding to support our existing educational programs; Members at the Gold and Silver levels provide speaker travel funding through a higher level of giving. We are proud to announce that we now have 79 Sustaining Members, including nine Silver and four Gold Sustaining Members. All Sustaining Members receive monthly recognition in our journals and on the Association's Web site, discounts on advertising and exhibit space, and full membership benefits for an individual from within the organization. Silver and Gold Sustaining Members receive additional complementary memberships for individuals, and are further recognized by promoting their logo and company profile in *Food Protection Trends*. Be sure to check out pages 340–341 to see the list of current Sustaining Members and for other program details, see page 335.

The IAFP Foundation Fund, which relies on contributions from individuals and corporations, supports other essential programs. You or your company benefit both directly and indirectly from donating to the Foundation Fund. For instance, the Fund sponsors the prestigious Ivan Parkin Lecture as well as supporting travel for other exceptional speakers to our Annual Meeting, both of which greatly enhance the educational programming for the nearly 1,600 conference attendees. On a daily basis, the Fund provides no-charge access to nearly 200 titles of audiovisual materials, including Spanish language videos, which can be used for employee training programs. Each year, the Fund assists food safety professionals globally by shipping surplus volumes of the *Journal of Food Protection* and *Food Protection Trends* to scientists in developing countries through FAO in Rome.

The Foundation Fund is particularly committed to fostering the professional development of students and young scientists in our field. One program supported by the Foundation Fund is the Developing Scientist Competition, which recognizes outstanding food safety research by graduate and undergraduate research students. As you recall from previous columns, both the IAFP Strategic Plan and the Foundation Fund Vision target expanding our support of future food safety scientists through establishing scholarships and travel grants for needy students and research scientists. We recently initiated travel grants to be awarded to two qualified students to attend IAFP 2005 and we hope to increase the number of scholarships during the upcoming years. Furthermore, our vision is to sponsor travel for deserving scientists from developing countries to our Annual Meeting as well as sponsoring international workshops on food safety.

Although we have plans to expand our programming, we will not be able to support new initiatives without increasing our budget. It is the ambitious goal of the Association to raise the Foundation to a self-

sustaining level of $1 million by 2010. As an individual, you can easily donate to the Fund at the same time you renew your membership. If every member or affiliate makes a modest annual donation of $10, $50, $100 or more, we will make substantial progress in reaching our goal.

We greatly appreciate the support from all of our Members, Affiliates, corporate sponsors, and Sustaining Members. But this month, I would like to give special recognition to Paul Hall and Kraft Foods who recently donated $50,000 to the IAFP Foundation Fund. This contribution is in addition to their Gold Sustaining Membership and their sponsorship of the Annual Meeting Opening Session Cheese and Wine Reception! While Kraft Foods has made sizable donations to the Fund in the past, this support is by far the largest singular gift presented to the Fund by any entity. This extraordinary contribution is a bold statement by Paul and Kraft that they are committed to IAFP and the Foundation Fund Vision and that they want to "be the positive change they wish to see in the world." Their gift will be instrumental in expanding programs that promote the education and professional development of students and food safety scientists from around the world. On behalf of IAFP, as well as all the beneficiaries of the IAFP Foundation Fund, I want to extend our deepest gratitude to Paul Hall and Kraft Foods for the generous gift and applaud them for their leadership. We hope that this donation serves as a prime example to other corporations and individual food safety professionals to support IAFP, its Foundation Fund, and its mission.

If you share in the vision of IAFP and the Foundation Fund, I invite you to act by donating to the Fund, and be part of the positive change in the world. As always, I welcome your comments and ideas. Please feel free to email me at kglass@wisc.edu and let me know your view.

Kraft Donates $50,000 to IAFP Foundation Fund

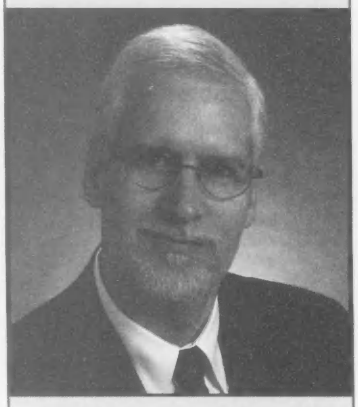
IAFP thanks Kraft Foods for their generous contribution to the IAFP Foundation Fund. A special "Thank You" to Paul Hall, Senior Director Microbiology & Food Safety at Kraft Foods North America for his efforts to make this happen!

Kraft Foods is a dedicated supporter of IAFP. They have not only displayed support through this substantial contribution but through their sponsorship of activities at the Annual Meetings and in their role as a Gold Sustaining Member. We appreciate all Kraft has done for the Association!

This gift is instrumental in expanding Foundation programs that promote the education and professional development of students and food safety scientists from around the world. The goal of the Foundation is to grow the Fund to a self-sustaining level of $1 million by 2010.

Show your support of the Foundation by contributing today!

"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR



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

"We look forward to seeing you in Baltimore at IAFP 2005"

This issue of *Food Protection Trends* is our pre-Annual Meeting issue and is loaded with information about IAFP 2005. Please take time to review the Annual Meeting pages beginning on page 400. There you can learn about our Opening Session "Ivan Parkin Lecture" all the way through the Closing Session featuring the "John H. Silliker Lecture." Excellent educational sessions, exhibitors' new products and services, networking opportunities and a little fun are packed into the three-day meeting. I'll cover the high points in this month's article. In addition, I want to let you know about the new look of the IAFP Web site, the Secretary election results, Bylaw changes and remind you about the schedule changes for IAFP 2005. So, here we go!

Take a look at the next page to see what the newly redesigned IAFP Web site looks like and then visit www.foodprotection.org to navigate the thousands of pages! Many months of work has gone into this redesign – we hope you like the new, easy to use layout and dropdown menus. If you have comments or suggestions about the new layout, feel free to let me know of your input.

This month, we announce the election results for the new IAFP Secretary (see page 375). Stan Bailey was elected by a majority vote and will begin his service to IAFP as Secretary upon conclusion of IAFP 2005. Stan has been an active Member for more than 17 years. We congratulate Stan and look forward to his joining the Executive Board. We also want to recognize LeeAnne Jackson for her willingness to stand for election. Although LeeAnne was not elected, we applaud her for her past involvement in Association activities and look forward to her continued participation.

I want to call your attention to the IAFP Bylaws changes that begin on page 371. These changes will be voted on at the Business Meeting held on Tuesday beginning at 12:15 p.m. Be sure to review these changes prior to the Business Meeting.

The Business Meeting is one of the functions that will be affected by a schedule change this year. I mentioned these changes in my March column, but feel it is important to again call your attention to them. Our session times will remain the same as in previous years (8:30 a.m. – 12:00 p.m. and 1:30 p.m. – 5:00 p.m.). The poster sessions will begin at 8:00 a.m. to allow additional viewing time prior to the start of the oral sessions. In addition, the Exhibit Hall will open at 8:00 a.m. with coffee and pastries available. This will provide a great way to start the day on Monday and Tuesday!

The other noticeable change in the schedule is moving our short afternoon sessions (along with the John H. Silliker Lecture) from Tuesday to Wednesday. You will want to stay until the end of the meeting to hear Michiel van Schothorst deliver the John H. Silliker Lecture titled "Managing the Safety of Internationally Traded Food." This will be a thought-provoking presentation to conclude the 92nd Annual Meeting!

We encourage you to arrive in Baltimore on Saturday so that you can participate in the Committee and Professional Development Group (PDG) meetings that take place on Sunday. Everyone is invited to attend these meetings. Yes, some of the Committees have appointed Members, but all interested people may attend these meetings. PDGs many times are the starting point for our great symposia. By attending the PDG meetings, you can become a part of next year's program! Members and nonmembers are welcome to join IAFP PDGs (of course we would like you to become an IAFP Member too if you are not already one!). The Committee and PDG meeting schedule is available online at the new IAFP Web site (look under Meetings and Education, then IAFP 2005). Choose a Committee or PDG covering your area of interest and get involved.

If you do plan to arrive on Saturday, we have a few optional activities for you to consider. A golf

tournament is scheduled for Saturday morning, or you might choose to board the tour to our Nation's Capital, Washington, D.C. In addition to those activities, a group of tickets for the Baltimore Orioles vs. the Toronto Blue Jays baseball game are being held for your use. These Saturday activities provide the base to build upon for our daytime tours that are offered Sunday through Wednesday.

In addition to the pre-meeting activities, we have a fun-filled Monday Night Social planned aboard the Bay Lady. The evening begins with a cruise in Baltimore's Inner Harbor, down the Patapsco River to the Francis Scott Key Bridge (Francis Scott Key wrote the Star Spangled Banner!). Then we return to the Inner Harbor after dusk to view the sparkling city lights. On Tuesday night, a limited number of attendees will be able to participate in our Little Italy dine-around by visiting three of the fabulous Italian restaurants, one for each course. Then on Wednesday night, we will honor our Award recipients during the Banquet.

We look forward to seeing you in Baltimore at IAFP 2005. It is sure to be another valuable, educational experience. You can't afford to miss this meeting if your interest is in food safety! Besides the great educational aspects of IAFP 2005, Baltimore is a historic city with so much to offer. You will want to spend some extra time to explore the city and surrounding area. If you haven't been to Baltimore, I am certain you will be pleasantly surprised. Come see us at IAFP 2005!

ARTICLES

Food Protection Trends, Vol. 25, No. 5, Pages 346–350

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

International Association for Food Protection

The Bactericidal Effects of Lactic Acid and Trisodium Phosphate on *Salmonella* Enteritidis Serotype pt4, Total Viable Counts and Counts of *Enterobacteriaceae*

THEO S. KANELLOS[1] and ANGELIKI R. BURRIEL[2*]

[1]Royal Veterinary College, Boltons Park, Hawkshead Road, Potters Bar, Herts, EN6 1NB, UK; [2]Faculty of Veterinary Medicine, University of Thessaly, Karditsa 43100, Greece

SUMMARY

A common practice in the food industry, decontamination of broiler meat, is based on important public health concerns. A frequently used decontaminant is lactic acid (LA), whereas trisodium phosphate (TSP) is a recent and very promising addition to the permitted agents. In this study, we evaluated the bactericidal activities of LA and TSP against experimentally or naturally occurring *Enterobacteriaceae*, including *Salmonella* spp., and the total viable counts of bacteria. Both agents significantly reduced the levels of *Salmonella* Enteritidis serotype pt4 in experimentally contaminated chicken drumsticks. Reductions in bacterial numbers ranged from 0.50 to 0.75 $\log_{10}$ for LA and 0.80 to 1.80 $\log_{10}$ for TSP, depending on treatment scheme and time of exposure. The $\log_{10}$ reductions of total viable counts (TVC) and counts of *Enterobacteriaceae* normally contaminating the skin of poultry drumsticks, ranged from 0.67 to 1.47 for LA and from 1.72 to 3.43 for TSP. The reductions were statistically significant ($P < 0.01$) in favor of TSP when the two agents were compared. As expected, LA reduced the pH of skin (normally 6.6–6.9) to values below normal (5.8 – 6.3); in contrast, TSP increased the chicken skin's pH (7.0 – 7.8).

INTRODUCTION

Mass production and distribution of foods of animal origin have increased the risk of adverse effects on consumers' health, so that new measures are urgently needed to protect humans from important foodborne pathogens *(3, 7, 10, 23)*. Among the microorganisms of most concern are members of the genus *Salmonella*, belonging to the family *Enterobacteriaceae*. *Salmonella* spp. are of increased public health importance due to their prevalence among animals and consequently their prevalence in foods of animal origin *(7, 10)*. In Britain, human illness from *Salmonella* Enteritidis, mainly serotype pt4, has dramatically increased in the last decade and has reached epidemic proportions in some areas *(7, 12)*. However, *Salmonella* spp. is not the only genus of *Enterobacteriaceae* with public health importance. *Escherichia coli* serotype O157:H7, *Yersinia enterocolitica* and other microorganisms are also important foodborne pathogens *(3, 23)*. *Enterobacteriaceae* contaminate meat mainly during the slaughter process *(3, 13, 23)*. Mixing of carcasses infected and uninfected

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with *Salmonella* spp. or the use of contaminated utensils for cutting clean products *(28)* are the usual means of cross-contamination. Although all kinds of meats are possible sources of such pathogens, poultry meat is one that contributes most to human infections because of its processing procedures. Poultry meat is processed with its skin, which is easily contaminated with pathogens present in broiler housing facilities *(13)*. The potential spreading of foodborne infections has resulted in a variety of measures implemented in the slaughtering process that propose to prevent cross-contamination between carcasses *(3, 13, 23)*. Among the measures is chemical treatment of broiler meat with a variety of decontaminants *(18, 23, 25)*. Lactic acid (LA), an organic acid, is one such agent used effectively for many decades. Its use has increased poultry meat shelf life and consumer safety, although it can have adverse sensory effects used inappropriately *(14, 18, 22, 23, 26)*. Concentrations of LA between 1 and 3% are suggested as optimum for safety and product quality *(14, 16, 18, 22)*. In recent years, trisodium phosphate (TSP) which traditionally has been used as a cheese emulsifier *(15)*, meat-curing agent *(20)*, or food preservative (EU Commission, Health and Consumer Protection Directorate General, 15-4-2003), has also being allowed as a food decontaminant in the United States *(8)*. Its promising properties have been evaluated repeatedly under experimental and field conditions *(2, 4, 11, 21, 25)*. TSP concentrations of around 8–12% have been effective in decontaminating broiler carcasses with regard to various pathogenic microorganisms *(21, 25)* without causing any undesirable organoleptic changes detectable by consumers of cooked poultry meat *(4, 11)*.

The present investigation evaluated the bactericidal effects of 1.5% LA and 12% TSP solutions on drumsticks experimentally contaminated with *Salmonella* spp. and estimated the bactericidal effects of the two agents on the total viable counts (TVC) of bacteria and counts of naturally occurring *Enterobacteriaceae* on the skin of chicken carcasses, as an indicator of the efficacy of LA and TSP against other microbial food contaminants and possibly in extending the shelf life of chicken meat.

MATERIALS AND METHODS

Decontaminants

LA and TSP (Sigma Chemicals CO) were used for treating poultry meat to reduce the numbers of microorganisms of public health importance. The bactericidal effect of the two agents was evaluated through estimation of the viable *Salmonella* Enteritidis serotype pt4 after experimental contamination of chicken drumsticks and the estimation of the TVC of bacteria and counts of *Enterobacteriaceae* naturally occurring on chicken drumsticks.

Chicken drumsticks experimentally contaminated with *Salmonella* Enteritidis serotype pt4

Sixty drumsticks, locally purchased (UK), were contaminated experimentally with *S.* Enteritidis serotype pt4, a field isolate (The Royal Veterinary College) resistant to 0.04% nalidixic acid. Before inoculation of drumsticks, *S.* Enteritidis was subcultured in Brain Heart Infusion Broth (BHIB, Oxoid, UK) and incubated at 37°C for 24 hours. The 24-hour culture was centrifuged and the bacterial sediment was diluted to a final concentration of 10^7 colony-forming units (CFU) per ml in attachment medium prepared according to Notermans and Kampelmacher *(19)*. A final volume of five liters was made in a sterile container large enough to comfortably hold 20 fully subemerged drumsticks. The container with the drumsticks was placed in an agitating water bath for 15 minutes at 21°C (to resemble room temperature). After inoculation, the drumsticks were removed from the culture solution and left to drain for two minutes before decontamination was attempted.

Three decontamination trials were performed, using 20 drumsticks in each. The first batch of 20 contaminated drumsticks was divided into four groups of five drumsticks. One group, examined immediately after the two-minute draining was used as the positive control for enumerating the attached microorganisms. The remaining three groups of five drumsticks were decontaminated for 15 seconds in either sterile tap water, 1.5% LA or 12% TSP. Each chemically decontaminated drumstick was rinsed five times by dipping in five separate containers, in each of which was 100 ml of sterile tap water. The drumsticks were then left to drain for five minutes before the microbiological examination of skin samples took place. Although the same process of contamination was used for the remaining two batches of 20 drumsticks, the duration of their decontamination and/or the time between decontamination and microbiological examination varied. One batch of 20 drumsticks was handled as already described, but after the decontaminants had been washed off, all drumsticks, including controls, were placed in separate sterile bags and left to rest for 24 hours at 4°C. This procedure mimicked the transfer of products from slaughterhouses to consumer outlets. The other batch of drumsticks was contaminated as described, but the decontamination process in either sterile tap water, LA or TSP lasted for 24 hours at 4°C in order to determine the effect of these agents on the sensory characteristics of the meat under extreme conditions.

A five-gram sample of skin from each drumstick was aseptically removed from 3 or 4 different sites and placed in 45 ml sterile Tryptic Soya Broth supplemented with 0.3% w/v yeast extract (TSBY, Oxoid, UK). Each skin sample was homogenized for three minutes. Ten-fold serial dilutions were made in TSBY media from each homogenate. The total number of *Salmonella* spp. surviving decontamination was recovered on Tryptone Soya Yeast (TSY) agar containing 150 units per ml of catalase (Sigma Chemicals, UK) and prepared according to van Netter et al. *(27)*. Inoculated *S.* Enteritidis serotype pt4 was enumerated on TSY agar overlaid, after inoculation, with xylose-lysine-deoxycholate agar (TSY-XLD) (Oxoid, UK) containing 0.04% nalidixic acid and left to solidify for five hours at 25°C. Inoculated media were incubated for 34 hours at 37°C. Triplicate inoculations were made for each dilution of homogenate. Counting of microorganisms was undertaken for plates having 7–100 CFU. The mean CFU was determined as a count per gram of skin sample *(17)* and converted to $\log_{10}$ for ease of comparison.

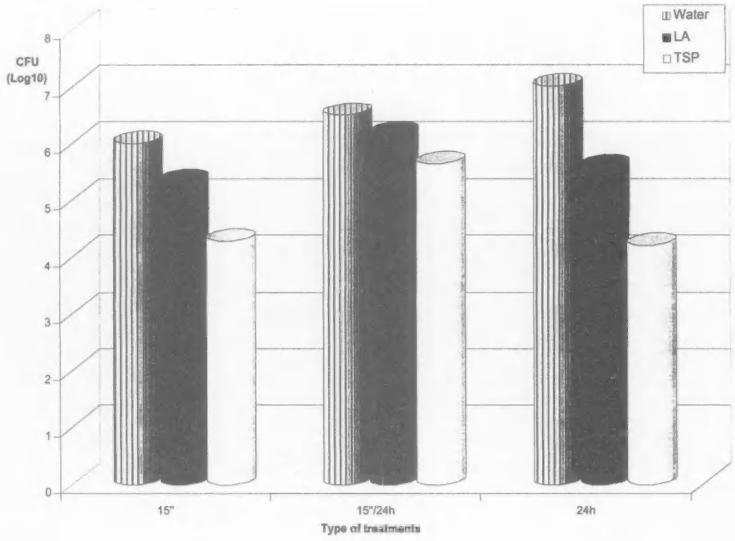
Total Viable Counts (TVC) of bacteria and *Enterobacteriaceae* naturally occurring on drumsticks

In this experiment, 60 drumsticks purchased from the same local supplier (UK) as the previous ones were left uninoculated. TVC of naturally occurring bacteria and counts of naturally occurring *Enterobacteriaceae* were determined before and after treatment of samples with either sterile tap water, 1.5% LA or 12% TSP. Drumsticks were prepared as previously described and with the same treatment-time schemes and method of preparing homogenates. Triplicate TSY agar plates were inoculated with serially diluted sample homogenates and incubated at 30°C for 72 hours for TVC determinations. For enumerating *Enterobacteriaceae*, TSY agar plates were overlaid after their inoculation with violet-bile-

TABLE 1. Mean CFU (log_{10}) of *Salmonella* serotype pt4 in experimentally contaminated drumsticks and their skins' pH (in parentheses) after different treatment schemes

Treatment method	15 s treatment	24 h rest at 4°C	24 h treatment
Lactic acid	5.59 (5.8–6.3)	5.68 (6.0–6.3)	2 (5.5–5.7)
Trisodium phosphate	5.28 (7.2–7.8)	4.74 (7.0–7.2)	2.31 (7.7–8.0)
Water	6.06 (6.3–6.6)	6.37 (6.2–6.5)	7.39 (6.3–6.5)
Untreated	6.09 (6.6–6.9)	6.42 (6.6–6.9)	5.93 (6.6–6.9)

FIGURE 1. Enumeration of TVC on chicken skin samples after treatments with water, LA or TSP



glucose agar (VBG, Oxoid, UK) and incubated at 37°C for 24 hours. The mean bacteria counts per gram of skin sample were determined and converted in log_{10} for comparison purposes.

Measurement of pH and sensory appearance of drumsticks

The pH values were determined in drumstick skin homogenates before and after their treatment. In brief, samples were minced twice in a laboratory grinder (plate 5 mm) and thoroughly mixed. The pH was measured by use of a Corning 240 pehameter with a composite glass-calomel electrode (CAMLAB). Sensory defects were considered to be all changes affecting the appearance, color and texture of poultry meat.

Statistical analysis

The mean values of bacterial counts (log_{10}) obtained in each experiment were compared by use of the analysis of variance statistical test (Minitab, USA).

RESULTS

Chicken drumsticks contaminated experimentally with *Salmonella* Enteritidis serotype pt4

A highly significant ($P < 0.05$) reduction of *Salmonella* serotype pt4 was observed with a 24-hour treatment of drumsticks using either LA or TSP solution (Table 1). However, some live microorganisms were still recovered. In contrast, with water treatment alone, a significant ($P < 0.05$) increase in *Salmonella* counts was seen 24 hours post-contamination. The reductions in the CFU (log_{10}) of inoculated *Salmonella* after 15-second treatment with either LA or TSP were also significant ($P < 0.05$). Rinsing with only water did not affect the numbers of attached microorganisms. No significant changes were observed in the CFU counts of untreated drumsticks regardless of time of exposure.

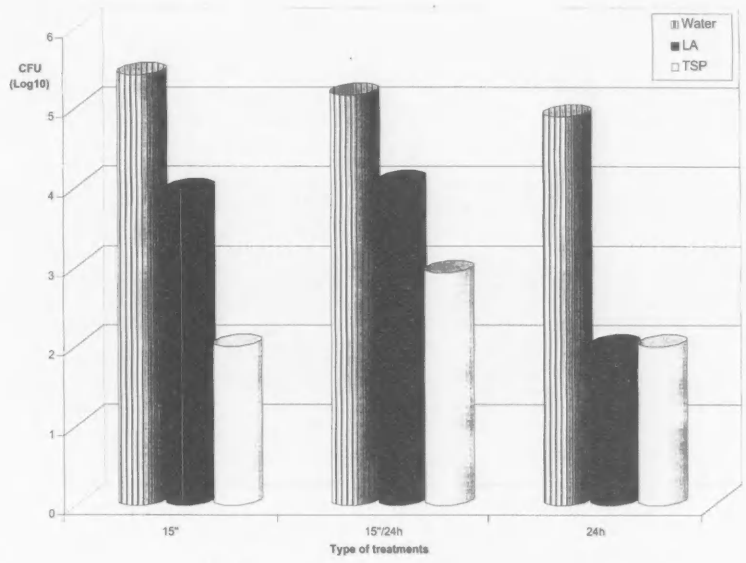
TVC of bacteria and *Enterobacteriaceae* naturally occurring on drumsticks

The counts of TVC (Fig. 1) and *Enterobacteriaceae* (Fig. 2) recovered after treatment with tap water, LA or TSP with the different treatment schedules varied considerably. In particular, no significant changes were observed in the counts of TVC and *Enterobacteriaceae* when drumsticks were treated with only water. Reductions in TVC ($P < 0.05$) and *Enterobacteriaceae* ($P < 0.001$) occurred when drumsticks were treated with either LA or TSP. The reductions of TVC were significantly ($P < 0.05$) greater after TSP treatment than after LA treatment. The reductions were even higher ($P < 0.01$) for *Enterobacteriaceae*, regardless of treatment-time scheme.

pH and sensory appearance of drumsticks

The pH values, given in Table 1 in parentheses, remained almost unchanged and ranged between 6.2 and 6.9 for untreated and water-treated chicken drumsticks. The pH values of drumsticks treated with LA were below those of drumsticks that were untreated or treated with TSP. The sensory characteristics of drumsticks were affected by treatments lasting 24 hours. Drumsticks treated with LA were more severely affected than those treated with TSP. With LA treatment the drumsticks appeared soft, edematous and with

FIGURE 2. Enumeration of *Enterobacteriaceae* on chicken skin samples after treatments with water, LA or TSP



a gelatinous skin, while those treated with TSP showed only some skin discoloration and a distinct odor.

DISCUSSION

The sensory changes of the meat after prolonged treatment with LA observed here are similar to those reported after shorter treatment times *(23)*. However, the sensory defects caused by TSP were milder than those caused by LA for the same treatment time. Others *(4, 11)* have also reported a similar milder effect of TSP on the hedonic scores of meat. Decontaminant concentrations and treatment times should be such that, although organoleptic properties of meats should not be affected *(9, 14, 18, 20)*, the decontaminant should be highly effective as a bactericide, thus safeguarding consumer health. However, the decontaminant's effectiveness also depends on the contaminating microorganisms, species or serotypes, as their naturally occurring or acquired resistance will affect the effectiveness of a used decontaminant. The results of this study have shown that TSP is more effective than LA at reducing the bacterial load, not only of the highly pathogenic *S.* Enteritidis serotype pt4, but also of TVC and other *Enterobacteriaceae* normally occurring on the skin of broiler meat. TSP was recently approved as a food decontaminant in the United States *(8)* and is currently under review for final approval by the EU (EU Commission, Health and Consumer Protection Directorate General, 15-4-2003). TSP has been suggested as an alternative decontaminant for poultry carcasses *(1, 2, 5, 21)*, and its effectiveness was also confirmed in this study when it was compared under identical conditions with LA, which has been used effectively for many decades *(1, 14, 18, 26)*. The survival of more *Salmonella* serotype pt4 after treatment with LA could have resulted partly from resistance to LA. This resistance could also have contributed to the increasing prevalence of foodborne human infections from this serotype *(7)*. Such possible resistance suggests a need for alternative methods of decontaminating poultry meat safely *(6)*. One such alternative appears to be use of TSP. The pH values observed here after treatment with each decontaminant are within ranges that inhibit the multiplication of most bacteria, thus adding to the bactericidal effects of LA and TSP. The rise of pH values with TSP treatment helps in the removal of fat films; thus it is also working as a detergent *(5)*. Complete inactivation of TSP action with rinsing in only water is not possible; thus, residual TSP favors persistence of high pH on normal broiler skin *(5)*, as was observed here (Table 1). This residual effect was noted with the pH values of skins left to rest after treatment for 24 hours at 4°C, which were virtually unchanged compared to those of skin examined within minutes after treatment.

Although the greatest reduction in bacterial numbers was observed after a 24-hour continuous treatment, such treatment is not desirable because of the organoleptic defects it causes. This treatment was implemented here only as means to evaluate the resistance of the tested *Salmonella* serotype as well as to determine under extreme conditions the effect of these decontaminants on the organoleptic characteristics of poultry meat. Interestingly, the long treatment did not completely eliminate the inoculated microorganism, a finding that may partly explain the increasing number of human cases of salmonellosis attributed to this serotype in Britain *(7, 12)*. This survival was observed with use of both decontaminants, showing the importance of preventing meat cross-contamination.

However, a fifteen-second treatment reduced the attached microorganisms between 0.5 and 0.75 $\log_{10}$ for LA and between 0.80 and 1.8 $\log_{10}$ for TSP, either with immediate examination or after 24 hours rest at 4°C. These reductions are somewhat lower than those reported for other *Salmonella* serotypes with use of the same decontaminants and similar treatment schemes *(1, 21)*. Perhaps the serotype used here was more resistant than the serotypes used by others *(2, 4, 11, 21, 25)*. A view also supported by the evidence shown here is that both agents were more effective against TVC and *Enterobacteriaceae*. The reductions observed in this case were between 0.67 and 1.47 $\log_{10}$ for LA and between 1.72 and 3.43 $\log_{10}$ for TSP.

Comparative information on the bactericidal activities of LA and TSP are continuously accumulated in the United States and the European Union, but more research is needed on residual effects. The EU is continuously revising its regulations on such treatments (EU Commission, Health and Consumer Protection Directorate-General, 13-4-2003). One concern is the effect of TSP on the phosphorus content of meat. The EU is currently recommending a maximum tolerable daily intake of phosphorus from all sources of up to 70 mg/kg body weight. Nevertheless, more research on field conditions is needed to properly evaluate safety and residual effects of TSP use on poultry meat. One other aspect needing to be investigated is the cost/benefit ratio for such treatment applications *(24)* compared to other methods. In addition, results of the use of TSP as a decontaminant for other kinds of meats have yet to be

extensively reported, although TSP is permitted in the EU as a food additive assigned the code E 339iii (EU Commission, Health and Consumer Protection Directorate-General, 13-4-2003). Thus, more research is needed for the accumulation of knowledge concerning such products.

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REFERENCES

1. Bautista, D., S. Barbut, M. Griffith, and N. Sylvester. 1995. Evaluation of bacteriocides to improve the microbiological quality of turkey carcasses, p. 231–237. *In* R.C. Briz (ed.), Poultry Products Microbiology, European Regulations and Quality Assurance Systems. Zaragoza, Spain.
2. Bender, F. G., and T. Elfstrum. 1994. Effect of trisodium phosphate on pathogenic bacteria on post water-chilled broilers treated in a commercial poultry plant, p. 231–232. Proceedings of European Poultry Conference vol. I, WSPA, United Kingdom.
3. Bosilevac, J. M., T. M. Arthur, T. L. Wheeler, S. D. Shackelford, M. Rossman, J. O. Reagan, and M. Koohmaraie. 2004. Prevalence of *Escherichia coli* O157 and levels of aerobic bacteria and *Enterobacteriaceae* are reduced when hides are washed and treated with cetylpyridinium chloride at a commercial beef processing plant. J. Food Prot. 67:646–50.
4. Capita, R., C. Alonso-Calleja, and M. Sierra. 2000. Effect of trisodium phospate solutions washing on the sensory evaluation of poultry meat. Meat Sci. 5:471–474.
5. Capita, R., C. Alonso-Calleja, M. C. Garcia-Fernandez, and B. Moreno. 2002. Review: trisodium phosphate (TSP) treatment for decontamination of Poultry. Food Sci.Tech. Int. 8:11–24.
6. Corry, J. E., C. James, S. J. James, and M. Hinton. 1995. *Salmonella*, *Campylobacter* and *Escherichia coli* O157:H7 decontamination techniques for the future. Int. J. Food Microbiol. 28:187–96.
7. Ejidokun, O. O., D. Killalea, R. M. Coope, S. Holmyard, A. Cross, and C. Kemp. 2000. Four linked outbreaks of *Salmonella* Enteritidis phage type 4 infection–the continuing egg threat. Comm. Dis. Publ. Health. 3:95–100.
8. Giese, J. 1993. *Salmonella* reduction process receives approval. Food Technol. 47:110–114.
9. Gill, C. O., and M. Badoni. 2004. Effects of peroxyacetic acid, acidified sodium chlorite or lactic acid solutions on the microflora of chilled beef carcasses. Int. J. Food Microbiol. 91:43–50
10. Hald, T., D. Vose, H. C. Wegener, and T. A. Koupeev. 2004. Bayesian approach to quantify the contribution of animal-food sources to human salmonellosis. Risk Anal. 24:255–69.
11. Hollender, R., F. G. Bender, R. K. Jenkins, and C. L. Black. 1993. Consumer evaluation of chicken treated with a trisodium phosphate application during processing. Poul. Sci. 72:755–759.
12. Ispahani, P., and R. C. Slack. 2000. Enteric fever and other extraintestinal salmonellosis in University Hospital, Nottingham, UK, between 1980 and 1997. Eur. J. Clin. Microbiol. Inf. Dis. 19:679–87.
13. James, W. O., J. C. Prucha, R. L. Brewer, W. O. Williams Jr., W. A. Christensen, A. M. Thaler, and A. T. Hogue. 1992. Effects of countercurrent scalding and postscald spray on the bacteriologic profile of raw chicken carcasses. J. Am. Vet. Med. Assoc. 201:705–708.
14. Kolsarici, N. and K. Candogan. 1995. The effects of potassium sorbate and lactic acid on the shelf-life of vacuum-packed chicken meats. Poul. Sci. 74:1884–1893.
15. Lucey, J. A., M. E. Johnson, and D. S. Horne. 2003. Invited review: perspectives on the basis of the rheology and texture properties of cheese. J. Dairy Sci. 86:2725–2743.
16. Mikolajczyk, A., and M. Radkowski. 2002. Elimination of *Salmonella* spp. by lactic acid. Pol. J. Vet. Sci. 5:139–143.
17. Miles, A. A., S. S. Misra, and J. O. Irwin. 1938. The estimation of the bacterial power of the blood. J. Hyg. 3:732–748.
18. Nassar, T. J., A. S. Al-Mashhadi, A. K. Fawal, and A. F. Shalhat. 1997. Decontamination of chicken carcasses artificially contaminated with *Salmonella*. Rev. Sci. Technol. 16:891–897.
19. Notermans, S., and E. Kampelmacher. 1974. Attachment of bacteria strains to the skin of broiler chickens. Br. Poul. Sci. 15:573–585.
20. Rathgeber, B. M., and A. L. Waldroup. 1995. Antibacterial activity of sodium acid pyrophosphate product in chiller water against selected bacteria on broiler carcasses. J. Food Prot. 58:530–534.
21. Salvat, G., P. Coppen, J. C. Allo, S. Fenner, M. J. Laisney, M. T. Toquin, F. Humbert, and P. Colin. 1997. Effects of AvGard treatment on the microbiological flora of poultry carcasses. Brit. Poultry Sci. 38:489–498.
22. Smulders, F. J., P. Barendsen, J. G. van Longtestijn, D. A. Mossel, and G. M. van der Marel. 1986. A review: Lactic acid: considerations in favor of its acceptance as a meat decontaminant. J. Food Technol. 21:419–436.
23. Smulders, F. J., and G. G. Greer. 1998 Integrating microbial decontamination with organic acids in HACCP programmes for muscle foods: prospects and controversies. Int. J. Food Microbiol. 44:149–169.
24. Todd E. C. D. 1989. Preliminary estimates of costs of foodborne diseases in Canada and costs to reduce salmonellosis. J. Food Prot. 52:586–594.
25. Whyte, P., J. D. Collins, K. McGill, C. Monahan, and H. O'Mahony. 2001. Quantitative investigation of the effects of chemical decontamination procedures on the microbiological status of broiler carcasses during processing. J. Food Prot. 64:179–183.
26. van der Marel, G. M., J. G. Van Logtestijn, and D. A. Mossel. 1988. Bacteriological quality of broiler carcasses as affected by in-plant lactic acid decontamination. Int. J. Food Microbiol. 6:31–42.
27. van Netter, P. V., H. van der Zee, and D. A. Mossel. 1984. A note on catalase enhanced recovery of acid injured cells of Gram negative bacteria and its consequences for the assessment of the lethality of L-lactic acid decontamination of raw meat surfaces. J. Appl. Bact. 57:169–173.
28. Zhao, P., T. Zhao, M. P. Doyle, J. R. Rubino, and J. Meng. 1998. Development of a model for the evaluation of microbial cross-contamination in the kitchen. J. Food Prot.

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Effectiveness of Trisodium Phosphate, Lactic Acid and Commercial Antimicrobials against Pathogenic Bacteria on Chicken Skin

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SUMMARY

Treatments were evaluated for their effectiveness in reducing the numbers of inoculated zoonotic bacteria on the skin of chicken drumettes. Antimicrobial treatments were applied to chilled and unchilled drumettes, singly or in a dual sequence, by dipping before or after bacterial inoculation. First, 10% (w/v) trisodium phosphate (TSP) or 3% (v/v) lactic acid (LA), with or without 2% (w/v) NaCl, were used against *Escherichia coli* O157:H7. Second, TSP and proprietary products Sanova (acidified sodium chlorite), $Safe_2O$ (acidified calcium sulfate), Cecure (cetylpyridinium chloride, CPC) and Inspexx 100 (peroxyacetic acid) were used on drumettes against *E. coli* O157:H7, *Campylobacter jejuni* or a cocktail containing two strains of *Salmonella* Typhimurium and one strain of *S.* Heidelberg. Third, selected antimicrobials were evaluated for their ability to control growth of the naturally occurring psychrotrophs on chicken skin and to extend shelf life. Fourth, food grade carbohydrate biopolymers were used as carriers to enhance activity of TSP and Sanova. TSP was twice as effective as LA in reducing the numbers of viable *E. coli* O157:H7 on chicken skin (>2 log CFU/g reduction by TSP) with exposure of 1 min when treated drumettes were stored 24 h at 4°C. Exposures > 20 min did not increase reductions with either treatment. TSP alone or LA followed by TSP (which maintained the skin pH at ≥ 10) gave greater reductions of *E. coli* O157:H7 than LA alone. Antimicrobial treatments (TSP, Sanova, $Safe_2O$, Cecure and Inspexx 100) were more effective against tested bacteria when applied on warm (unchilled) drumettes before bacteria were added. The reductions in numbers of *Salmonella*, *C. jejuni* and *E. coli* O157:H7 were not significantly different among antimicrobials, but reductions with TSP, Sanova and $Safe_2O$ were generally greater than with Cecure and Inspexx 100. Dual treatments of Cecure with other antimicrobials against the *Salmonella* cocktail increased bacterial reductions, particularly when Cecure was used last; however, reductions were not significantly different from those with dual treatment with Cecure. Bacterial reductions following treatment with TSP and Sanova appeared related to the high or low pH values these generated. All treatments delayed the growth of pseudomonads and psychrotrophs naturally present on chicken skin when samples were stored aerobically at 7°C. Sanova, 10% TSP and $Safe_2O$ delayed growth slightly better than Cecure or Inspexx 100, but all antimicrobials extended product shelf life by about 3 d. Carbohydrate biopolymers (TSP in guar or locust bean gum and Sanova in pectin or carboxymethyl cellulose did not enhance antimicrobial action against the *Salmonella* cocktail inoculated on chicken skin drumettes stored for 72 h at 4°C.

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INTRODUCTION

The microbiological quality of fresh eviscerated chickens has become a major concern because fresh poultry is frequently involved in foodborne illness outbreaks caused by *Salmonella* and *Campylobacter*, the predominant pathogens found on raw chicken *(12, 25)*. *E. coli* O157:H7 is not presently associated with poultry. *Salmonella* and *Campylobacter* can survive the conditions used for marketing fresh poultry and cause illness, if adequate handling procedures are not followed. In addition, pseudomonads, the major psychrotrophic spoilage bacteria found on fresh chicken *(9, 20)*, can grow quickly at low temperature and cause early termination of refrigerated shelf life. Several commercial antimicrobial products, such as cetylpyridinium chloride, CPC *(2, 26)*, trisodium phosphate, TSP *(8, 22)*, acidified sodium chlorite *(13, 14, 19)* and organic acids *(23)*, have been evaluated for their ability to reduce pathogen contamination on chicken carcasses, but little comparative information is available on these products *(11)*. Antimicrobial films and coatings are recognized as useful vehicles for extended delivery of inhibitory agents under a variety of conditions *(10)*. The aim of this study was to compare the antimicrobial activity of commercial antimicrobials against *Salmonella* spp., *Campylobacter jejuni* and *E. coli* O157:H7 and from the group tested choose those most active for incorporation in a biopolymer coating to increase their stability and bioactivity. The study examined the effect of processing variables such as contact time and sequence of treatment application on maximizing antimicrobial activity. The effect of treatments upon the appearance of fresh chicken was also informally determined.

MATERIALS AND METHODS

Cultures and inoculation of chicken drumettes

Chilled drumettes (proximal portion of wing, including the humerus) were obtained from a retail outlet and kept at 4°C for ≤ 2 h before use. Unchilled drumettes were also obtained from a local poultry processing plant directly after the defeathering stage, transported to the laboratory in a thermally insulated container and used within 1 h. The temperature of the unchilled drumettes, measured by inserting a thermometer under the skin, ranged between 38 and 40°C. Chilled drumettes were used in experiments reported in Table 1 and Figures 1–3. Unchilled drumettes were used to obtain results presented in Tables 2–5 and Figures 5, 8 and 9. Both chilled and unchilled drumettes were used in tests reported in Figures 4, 6 and 7. Bacterial cultures used to inoculate drumettes were: a nalidixic acid-resistant strain of *E. coli* O157:H7 (≡ E318N, R. Johnson, Health Canada, Guelph, ON), a strain of *Campylobacter jejuni* (≡ SH26) and a cocktail of three ampicillin-resistant *Salmonella enterica* serovars which included strains of *S.* Typhimurium (≡ 02-8425 and ≡ 02-8421) and *S.* Heidelberg (≡ 271), obtained from R. Ahmed, Canadian Science Centre for Human and Animal Health, Winnipeg MB. All test cultures were human clinical isolates except *S.* Heidelberg, which was isolated from chicken liver. Salmonellae and *E. coli* O157:H7 were grown in tryptic soy broth (TSB, Difco division of Becton Dickinson, Sparks, MD) for 24 h at 37°C. Cultures were separately standardized to an OD^{600} of 0.80 using sterile TSB (corresponding to approximately 9 log CFU/ml). In the case of salmonellae, the three strains were grown separately, then standardized and finally combined in equal portions. *C. jejuni* was grown in brain heart infusion broth (Difco) containing 0.5% yeast extract and 10% lysed horse blood (Oxoid, Ltd., Nepean, ON). The culture was incubated anaerobically (CampyPak Plus™, Becton Dickinson Co., Cockeysville, MD) for 48 h at 42°C. Prior to use all cultures were further diluted 1:100 with sterile 0.85% (w/v) saline. Inoculations were performed by dipping triplicate drumettes into 300 ml of a cell suspension containing 7 log CFU/ml for ≤ 15 s. In order to facilitate handling of drumettes, sterilized metal loops made from commercial paper clamps were attached to the proximal joint of each animal limb. Following dipping, the drumettes were hung for 15 min in an enclosed empty glass tank to allow draining and bacterial attachment *(7)*.

Treatment of drumettes with antimicrobials

Solutions of trisodium phosphate (TSP, 10% w/v; Sigma Chemical Corp., St. Louis, MO), lactic acid (LA, 3% v/v; Sigma) and sodium chloride (NaCl, 2% w/v, Sigma) were prepared using potable tap water. Commercial antimicrobials used were: Sanova containing 0.12% acidified sodium chlorite (Alcide Corp., Redmond, WA), Safe$_2$O containing a proprietary amount (≤ 10 %) of acidified calcium sulfate (Mionix, Naperville, IL), Cecure containing 0.5% cetylpyridinium chloride, CPC (Safe Foods Corp., North Little Rock, AR) and Inspexx 100 containing peroxyacetic acid (0.2%), plus, hydrogen peroxide, octanoic acid and acetic acid (Ecolab, St. Paul, MN) were prepared according to the manufacturers' directions. Each solution (100 ml) was transferred to polystyrene cups and within 30 min groups of three inoculated drumettes were dipped for specified times in antimicrobials or water (which served as a negative control). Both the control and treated samples were allowed to drain for 30 s before storage at 4°C in plastic bags (16 × 15 cm; Ziploc, S. C. Johnson & Son Ltd., Brant-ford, ON). Bacterial numbers were determined following prescribed incubation periods. In some cases, a combination antimicrobial treatment was used, consisting of two 30 s dips in different solutions, separated by an interval of 1 min. In other tests, the antimicrobial was applied using one-min dips before or after bacterial inoculation, and results were compared. Drumettes were not rinsed after treatments and were kept at 4°C for 2 h before microbiological evaluation.

The shelf-life extension of unchilled drumettes by these antimicrobials was also investigated by use of naturally present pseudomonads and psychrotrophs as index microorganisms, with 6 log CFU bacteria/g used as the shelf-life endpoint. Following a one-min dip in each antimicrobial and draining for 30 s, the drumettes were transferred to plastic bags and held at 7°C. Microbial evaluations were performed at intervals from 2 to 120 h.

Coating of drumettes with biopolymer films

In tests of biopolymer films, guar and locust bean gums were used with TSP while pectin and carboxymethyl cellulose (CMC) were used with Sanova. Locust bean gum solutions of 1 and 2% (w/v) (Sigma-Aldrich Canada Ltd., Oakville, ON) were prepared using cold water. TSP was added to achieve a final concentration of 10% (w/v). A similar protocol was used for guar gum (Sigma). Pectin (1% w/v) and carboxymethyl cellulose (2% w/v) base solutions (Sigma-Aldrich) were separately prepared in the sodium chlorite solution (Sanova base) supplied by Alcide Corp. Citric acid solution (Sanova activa-

TABLE 1. Effect of antimicrobial treatments on surface pH of chilled drumettes after being inoculated with *E. coli* O157:H7 and stored at 4°C

Treatment[1]	pH during storage (h)[2] 0	24	72	120
TSP (10%)	11.33[a2]	9.66[a]	9.23[a]	8.86[a]
LA (3%)	3.33[e]	4.53[e]	4.76[e]	4.80[e]
TSP (10%) followed by LA (3%)	5.26[d]	7.06[c]	7.06[c]	6.83[c]
LA (3%) followed by TSP (10%)	10.36[b]	9.60[a]	8.90[b]	8.63[b]
TSP (10%) dissolved in 2% NaCl	10.56[b]	9.10[b]	8.96[b]	8.63[b]
LA (3%) dissolved in 2% NaCl	3.56[e]	4.80[f]	4.60[e]	5.15[d]
Control (water)	6.36[c]	6.50[d]	6.63[d]	6.66[c]

[1]20 and 10 min dips in solutions of trisodium phosphate (TSP) and lactic acid (LA), respectively

[2]Means within the same column with different letters are significantly ($P < 0.05$) different, n = 3. Data above are for results presented in Fig. 3

TABLE 2. Surface pH of unchilled drumettes treated[1] with commercial antimicrobials and stored at 7°C ≤ 5 days

Antimicrobial	Storage period (h)[1] 2	24	73	120
Water (control)	6.16[b]	6.25[b]	6.48[bc]	7.30[b]
TSP (10%)	9.92[a]	7.83[a]	7.48[a]	7.58[a]
Sanova	3.86[e]	5.20[c]	5.48[e]	7.29[b]
Safe$_2$O	5.00[d]	5.90[b]	6.17[d]	7.30[b]
Cecure	6.03[bc]	6.24[b]	6.43[c]	7.18[b]
Inspexx100	5.94[c]	6.32[b]	6.54[b]	7.24[b]

[1]By dipping in the antimicrobial for 1 min

[2]Means within the same column with different letters are significantly ($P < 0.05$) different, n = 6. Data above are for results presented in Fig. 4

tor) was added according to the manufacturer's instructions to give a final concentration of 0.12% (w/v) acidified sodium chlorite. Unchilled drumettes inoculated as previously described were dipped < 15 s in the biopolymer solutions or in solutions containing 10% TSP, 0.12% Sanova, or tap water (controls) and allowed to drain as previously described.

Microbial analysis and surface pH determination

For sampling, the whole skin from each treated drumette was aseptically removed using a scalpel and pummeled in a Stomacher Lab-Blender 400 (Seward Medical, London, UK) for 2 min in 45 ml sterile, buffered peptone water (10 g peptone, 5 g NaCl, 3.5 g Na_2HPO_4, 1.5 g KH_2PO_4 per liter) according to Kim and Slavik *(15)*. Following serial dilution with 0.1% peptone water, the samples were surface-plated on prepoured agar. Salmonellae were selected by use of XLD agar (Difco) containing 100 ppm ampicillin (Sigma-Aldrich), while *E. coli* O157:H7 was enumerated on MacConkey agar (Difco) containing 40 ppm nalidixic acid (Sigma-Aldrich). XLD plates were incubated for 24 h at 37°C and MacConkey agar plates for 48 h at 37°C. Karmali agar base (Oxoid Ltd., Basingstoke, England) containing a growth supplement (Oxoid, SR 139) was used for enumerating *C. jejuni*. Plates were incubated for 48 h at 42°C under microaerophilic conditions. Reductions in viable bacteria were calculated as log CFU/g control -log CFU/g treated sample.

Following incubation for 48 h at 25°C pseudomonads were counted on *Pseudomonas* agar base (Oxoid) containing an antibiotic supplement (Oxoid, SR103). Psychrotrophic bacteria were enumerated on plate count agar (Difco) after incuba-

TABLE 3. Reductions[1] in numbers of inoculated bacteria on unchilled drumettes treated[2] 1 min with commercial antimicrobials and stored at 4°C for 2 h

	Reductions (log_{10} CFU/g)		
	Salmonella cocktail[3]	*Campylobacter*	*E. coli* O157:H7
TSP (10%)	1.56[a4]	1.89[a]	2.70[a]
Sanova	1.11[b]	1.56[b]	1.31[b]
$Safe_2O$	1.20[a]	1.72[ab]	0.71[cd]
Cecure	1.36[a]	1.40[a]	1.11[bc]
Inspexx 100	0.04[c]	0.32[c]	0.63[d]

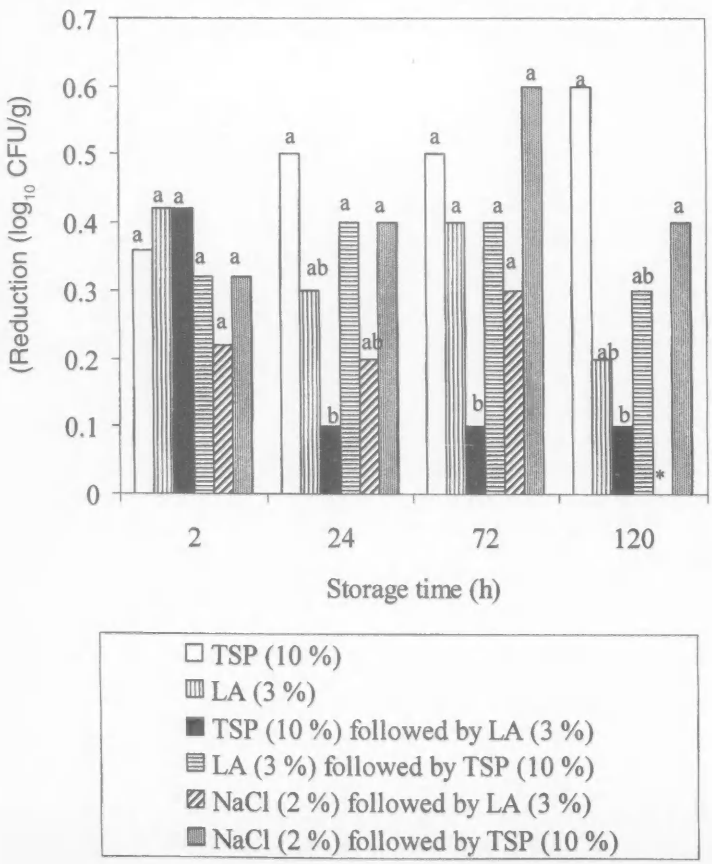
[1]Reduction = log_{10} CFU/g of control - log_{10} CFU/g treated sample

[2]Drumettes were treated before bacterial inoculation. Initial inoculated number was 4–5 log CFU/g

[3]Cocktail consisting of one strain of *S.* Heidelberg and two strains of *S.* Typhimurium

[4]Means within the same column with different letters are significantly ($P < 0.05$) different, n = 6

FIGURE 1. Reduction of *E. coli* O157:H7 on chilled drumettes held at 4°C for up to 120 h following 30 s dipping in trisodium phosphate (TSP), lactic acid (LA) or NaCl singly or sequentially. Drumettes were inoculated before antimicrobial treatment and were not rinsed between or after treatment. Means at the same storage time with different letters are significantly ($P < 0.05$) different. * Negative values were obtained at 120 h when NaCl was followed by LA treatment.



tion for 10 days at 7°C. The surface pH of each treated sample was measured at 3 locations and average values were reported (pH meter IQ240, IQ Scientific Instruments Inc., San Diego, CA).

STATISTICAL ANALYSIS

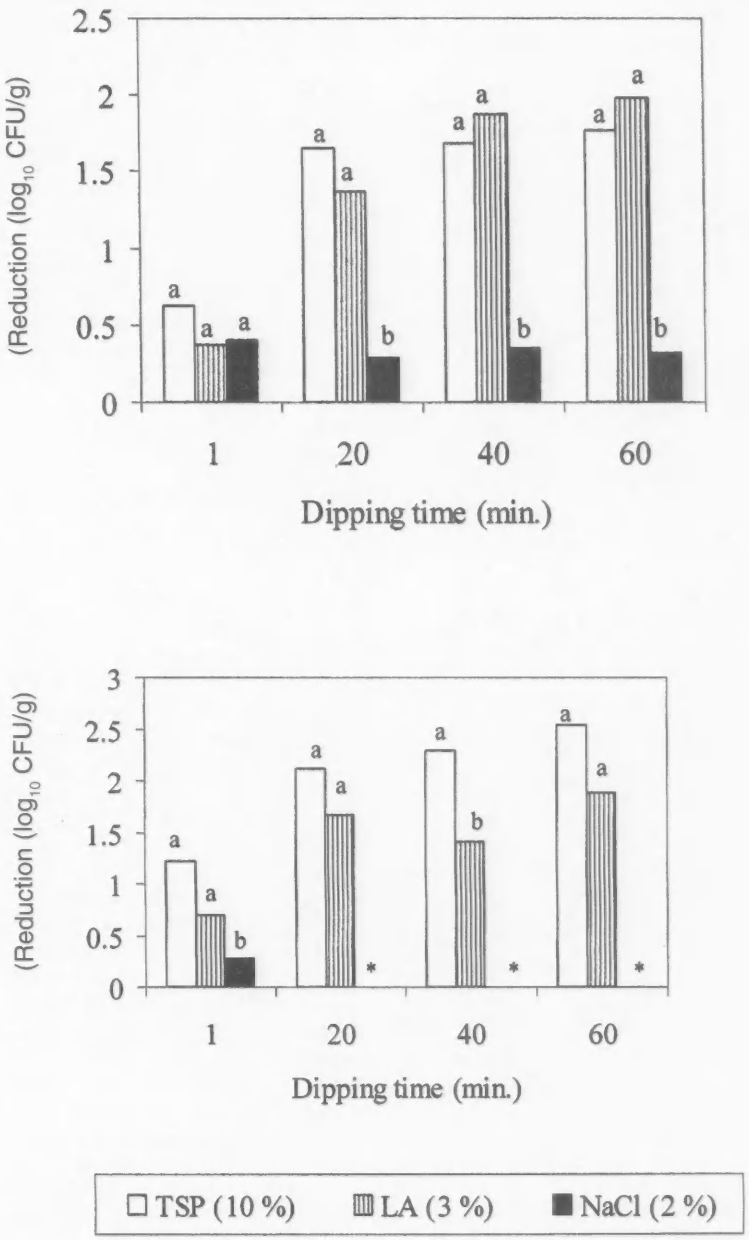
Results are presented as means ± standard deviation (SD). The statistical analytical system (SAS Institute Inc., Cary, N.C.) package (Version 8.2) was used to compare means of microbial numbers for each treatment at each sampling time. A significance level of 5% was used for all comparisons. Means were calculated from one (Table 1, Fig. 1–3) or two (Tables 2–5, Fig. 4–9) experiments in which triplicate samples per treatment (n = 3 or 6, respectively) were plated in duplicate.

RESULTS

Trisodium phosphate and lactic acid treatments

The initial *E. coli* O157:H7 levels on the drumettes following dipping in the inoculum ranged between 4 and 5 log CFU/g. All data are presented as log CFU/g. Although there was some variability in skin thickness, based on 10 measurements, the conversion of data to log CFU/cm^2 drumette skin can be calculated as 0.18 × log CFU/g for comparative purposes. No significant differences were observed in the reduction of *E. coli* on drumettes stored for 2 h following any of the 30 s dip treatments (Fig. 1). Regard-

FIGURE 2. Reduction of *E. coli* O157:H7 on chilled drumettes inoculated before antimicrobial treatment and held at 4°C for 2 h (a) and 24 h (b) following dipping for 1, 20, 40 or 60 min with trisodium phosphate (TSP), lactic acid (LA) or NaCl. Means at the same storage time with different letters are significantly ($P < 0.05$) different. *Negative values were obtained with NaCl.



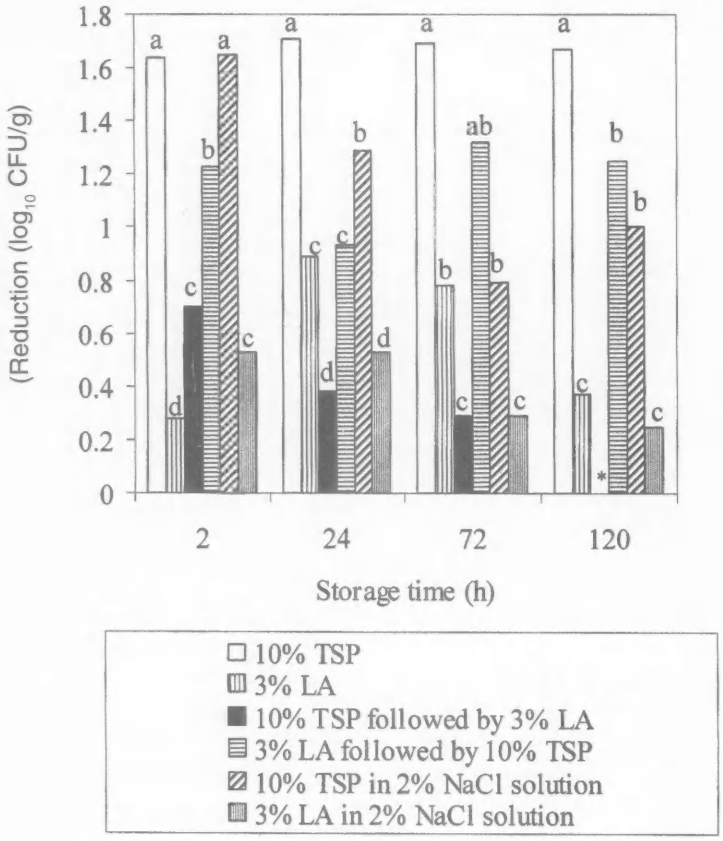
less of antimicrobial and application protocol, the maximum reduction was < 1 log CFU/g even when stored for 120 h at 4°C. Increasing the drumette dipping time from 1 to 20 min significantly reduced numbers of *E. coli* O157:H7 with use of either 10% TSP or 3% LA; further increases in contact time did not cause any additional reduction, regardless of treatment (Fig. 2). Among the treatments tested, 10% TSP was the most effective, causing a 1.6 log reduction in *E. coli* O157:H7 which was seen at 2 h and which was maintained throughout 120 h of storage (Fig. 3).

Drumettes treated with 10% TSP or 3% LA exhibited the highest and lowest pH, respectively, immediately after treatment. The pH of treated drumettes tended to return toward normal, which is ~ 6.4, *(5)* during the initial 24-h period and then remained relatively constant throughout the rest of the study period (Table 1). Alkaline treatments were approximately twice as effective as acidic treatments in causing bacterial reductions (Fig. 3). Skin softening and bleaching occurred with treatments of ≥ 30 s with LA alone, when TSP treatment was followed by LA, and when LA was dissolved in 2% NaCl. These effects were probably the result of the low pH (Table 1).

COMMERCIAL ANTIMICROBIAL TREATMENTS

The antimicrobial activity of most of the commercial agents also appeared related to their ability to raise or lower the pH. Sanova caused the largest initial decrease in skin pH after treatment, while TSP had the opposite effect (Table 2). Initial pH reductions caused by Safe$_2$O and Inspexx 100 were also significant but were relatively small. Cecure had little effect on pH. TSP caused the largest reduction in numbers of the three bacterial genera tested. Sanova was less effective than TSP, but reductions in numbers of bacteria were similar (slightly > 1 log CFU/g). While effective in causing ≥ 1 log CFU/g reductions in numbers of *Salmonella* spp. and *C. jejuni*, Safe$_2$O was not effective against *E. coli* O157:H7 (Table 3). Increasing (from 1 to 10 min) the exposure time to Sanova, Safe$_2$O, Cecure and Inspexx 100 solutions also increased the reductions of *Salmonella* strains (Figures 4 and 5). The largest increase in reduction resulting from the longer exposure occurred

FIGURE 3. Reduction of *E. coli* O157:H7 on chilled drumettes inoculated before antimicrobial treatment and held for up to 120 h at 4°C following the various treatments. Contact times were 20 min for trisodium phosphate (TSP) and 10 min for lactic acid (LA) treatments. Means at the same storage time with different letters are significantly ($P < 0.05$) different. * Negative values were obtained with NaCl.



with Sanova, with the total reduction reaching 3.5 log CFU/g.

Double treatments of antimicrobials applied before and after inoculation were significantly more effective in reducing salmonellae than application either before or after inoculation, and with Safe$_2$O, Sanova and 10% TSP reductions ranged from 2.0 to 2.5 log CFU/g (Fig. 4). Treatment of drumettes before inoculation rather than after also gave larger microbial reductions (Figures 4, 6, 7). Results with *C. jejuni* were similar to those with salmonellae, and while the extent of the reductions was smaller than with salmonellae, a double treatment with either Sanova or Safe$_2$O was the most effective, yielding about 2.5 log CFU/g reductions.

The effectiveness in reducing numbers of salmonellae by a combination of Cecure plus one other antimicrobial, (with bacterial inoculation taking place between the two antimicrobial treatments) is shown in Figure 8. Except with Sanova, use of Cecure as the second of the two antimicrobials yielded significantly greater reductions in *Salmonella* numbers. This effect was more pronounced in TSP treatments, in which differences in reductions reached 1.5 log CFU/g.

Psychrotrophs and shelf life

Exposure of drumettes to the antimicrobials prolonged the lag phase and reduced the maximum numbers of pseudomonads and psychrotophic bacteria reached within 5 days on drumettes stored at 7°C. The bacteria in control samples slowly increased from the first day of storage, while in samples treated with TSP their numbers were significantly reduced (≤ 2.5 log CFU/g) 2 h after treatment. Numbers of bacteria remained relatively constant up to 72h before substantial growth occurred (Fig. 9). Similar trends were found with Sanova and Safe$_2$O (data not shown). With Cecure and Inspexx 100, bacterial numbers were not significantly reduced initially, but they were reduced at 24 h, and thereafter numbers increased at about the same rate, as shown in Fig. 9. Shelf life, defined as time to reach 6 log CFU/g pseudomonads or psychrotropic bacteria, was 42–44 h for untreated controls and 112–123 h for treatments. TSP, Sanova and Safe$_2$O gave the greater reductions in numbers and consequent shelf-life extensions (Table 4).

Biopolymer films

Stabilizing TSP in 1% locust bean or guar gum, and Sanova in 1% pectin or carboxymethyl cellulose, when applied to drumettes reduced overall effectiveness of the antimicrobials, and reductions in *Salmonella* numbers were < 0.4 log CFU/g (Table 5). Increasing the concentration of polymers to 2% slightly enhanced *Salmonella* reduction to 0.70 log CFU/g, but greater reductions were obtained using the identical antimicrobials without polymer.

DISCUSSION

Antimicrobials differed in their effectiveness against bacterial strains inoculated on drumettes, with alkaline treatments being found more effective than acidic treatments. Skin surface pH was highest (>10) 2 h after treatment with TSP alone and then dropped to 8–9. Capita et al. *(5)* measured the surface pH of chicken skin following dipping in 10% TSP and holding for 15 min and found that the pH of the treated samples remained relatively constant, between 8 and 9, directly after the treatment and for up to 5 days. The buffering capacity of the skin and meat tissue are likely responsible for movement of the pH to ≤ 9 after 72 h of treatment. It has been suggested that, in addition to causing high pH, TSP may have other modes of action, since TSP and NaOH solutions with the same pH possessed different levels of antimicrobial effectiveness

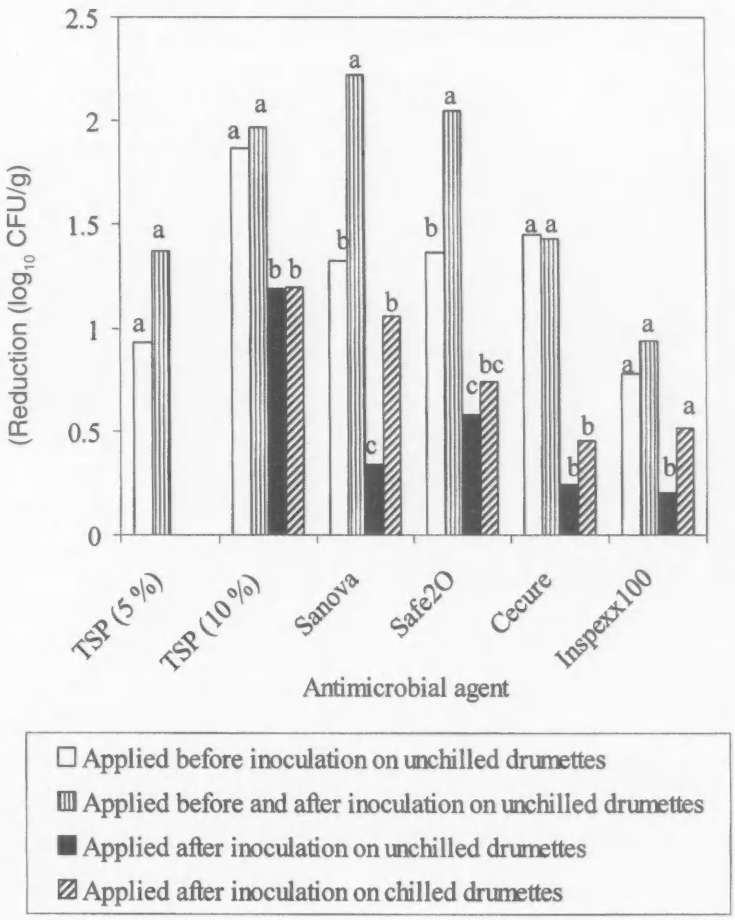
TABLE 4. Reductions[1] in numbers of pseudomonads and psychrotrophic bacteria present on unchilled drumettes treated[2] with commercial antimicrobials, then stored at 7°C for 5 days

Antimicrobial	Storage period (h)							
	2		24		72		120	
	pseudomonads	psychrotrophs	pseudomonads	psychrotrophs	pseudomonads	psychrotrophs	pseudomonads	psychrotrophs
TSP	2.60^{a2}	0.60^{c}	2.67^{a}	1.22^{a}	3.79^{ab}	2.94^{ab}	2.42^{b}	2.90^{b}
Sanova	2.52^{a}	0.97^{a}	2.93^{a}	1.25^{a}	3.16^{b}	3.20^{a}	2.73^{a}	3.09^{a}
Safe2O	1.64^{a}	0.78^{b}	2.04^{a}	1.37^{a}	3.80^{a}	2.59^{b}	2.67^{ab}	2.78^{b}
Cecure	0.26^{b}	0.05^{d}	1.60^{b}	-0.03^{b}	1.90^{c}	1.89^{c}	1.97^{c}	2.26^{c}
Inspexx100	0.05^{b}	0.22^{cd}	1.18^{b}	0.80^{b}	1.67^{c}	1.82^{c}	2.10^{c}	2.27^{c}

[1]Reduction = $\log_{10}$ CFU/g of control – $\log_{10}$ CFU/g treated sample

[2]Means within the same column with different letters are significantly ($P < 0.05$) different, n = 6

FIGURE 4. Reduction of *Salmonella* cocktail (*S.* Heidelberg plus two strains of *S.*Typhimurium) on unchilled or chilled drumettes treated 1 min and held at 4°C for 2 h. Means within the same antimicrobial treatment with different letters are significantly ($P < 0.05$) different.



(4, 5). The reductions in numbers of *Salmonella* and *Campylobacter* shown with TSP in the present study would contribute to a noticeable reduction in the frequency of carcasses contaminated by these pathogens *(18)*. TSP has been shown to be more effective against gram-negative than gram-positive bacteria on chicken *(4)*. This was believed related to its ability to dissolve the outer membrane of gram-negative bacteria and subsequently increase trans-membrane permeability. The strong antimicrobial activity of TSP found against gram negative spoilage and pathogenic bacteria is consistent with other work *(3, 4, 16, 22)*, but gram-positive bacteria are also susceptible *(6)*. It has been suggested that TSP is able to remove a thin layer of lipids from chicken skin and thus expose to the high pH any attached bacteria which may otherwise be protected in crevices and feather follicles. In contrast to TSP, the inhibitory activity of LA against *E. coli* O157:H7 and activities of Sanova and Safe$_2$O against *Salmonella* spp., *C. jejuni* and *E. coli* O157:H7 are all likely due to pH reduction. The antimicrobial activities of Cecure and Inspexx 100 were different from the activities of the other agents used. Neither caused substantial change in surface pH at the concentrations used. The activity of Inspexx 100 is largely oxidative, due to the presence of peroxyacetic acid and hydrogen peroxide. At the concentration used, Inspexx 100 was not strongly antimicrobial. In this study, we combined Cecure with acid or alkaline treatments to expose bacterial cells to two antimicrobials with different modes of action.

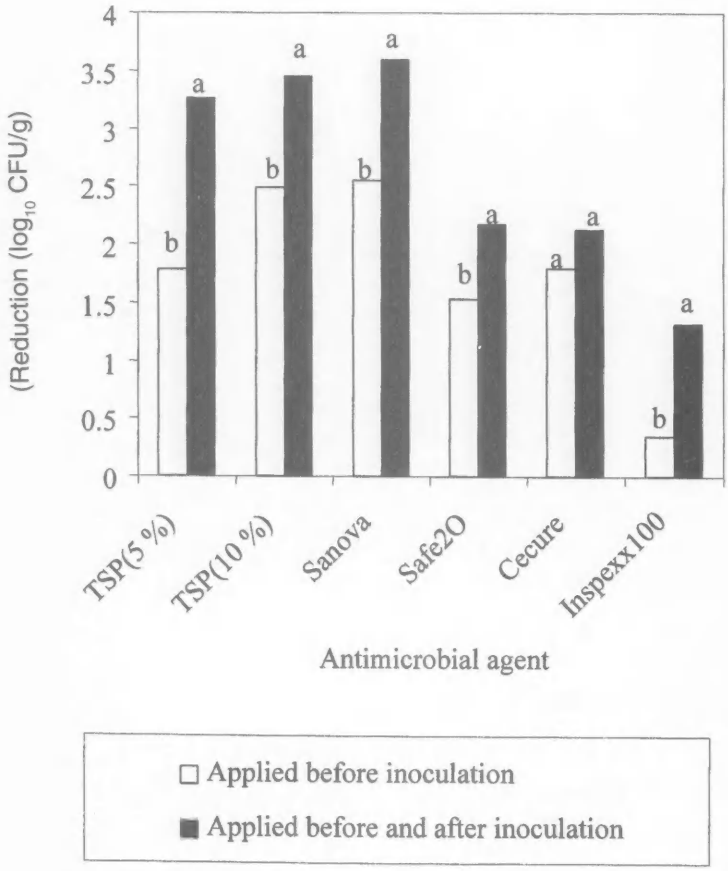
Cetylpyridinium chloride, the active component of Cecure, is a cationic surfactant which has a neutral pH. Its antimicrobial activity results from its interaction with acidic groups at the surface or

TABLE 5. Reductions[1] of a salmonellae cocktail inoculated on chicken drumettes then treated with TSP (10%) or Sanova (0.12%) stabilized within polymers and stored at 4°C

Storage period (h)	Polymer concentration (% (w/v)	Reduction (log_{10} CFU/g)					
		TSP stabilized with		Sanova stabilized with		10 % TSP[2] solution	0.12 % Sanova[3] solution
		guar gum	locust gum	pectin	CMC		
24	1	0.27	0.37	0.11	0.23	0.32	0.28
48	1	0.10	0.39	0.12	0.1	0.82	0.50
72	1	0.08	0.10	0.07	0.07	0.12	0.38
24	2	- 0.66	0.17	0.58	0.70	0.95	0.50
48	2	0.06	0.63	0.33	0.30	0.28	0.61
72	2	0.10	0.68	0.23	0.45	-0.01	0.35

[1]Reductions = log_{10} CFU/g of control – log_{10} CFU/g treated sample; dipping time for all samples < 15 sec, n = 6
[2,3]TSP or Sanova solutions without stabilizer

FIGURE 5. Reduction of *Salmonella* cocktail (as in Fig. 4) on unchilled drumettes treated 10 min and held at 4°C for 2 h. Means within the same antimicrobial treatment with different letters are significantly ($P < 0.05$) different.

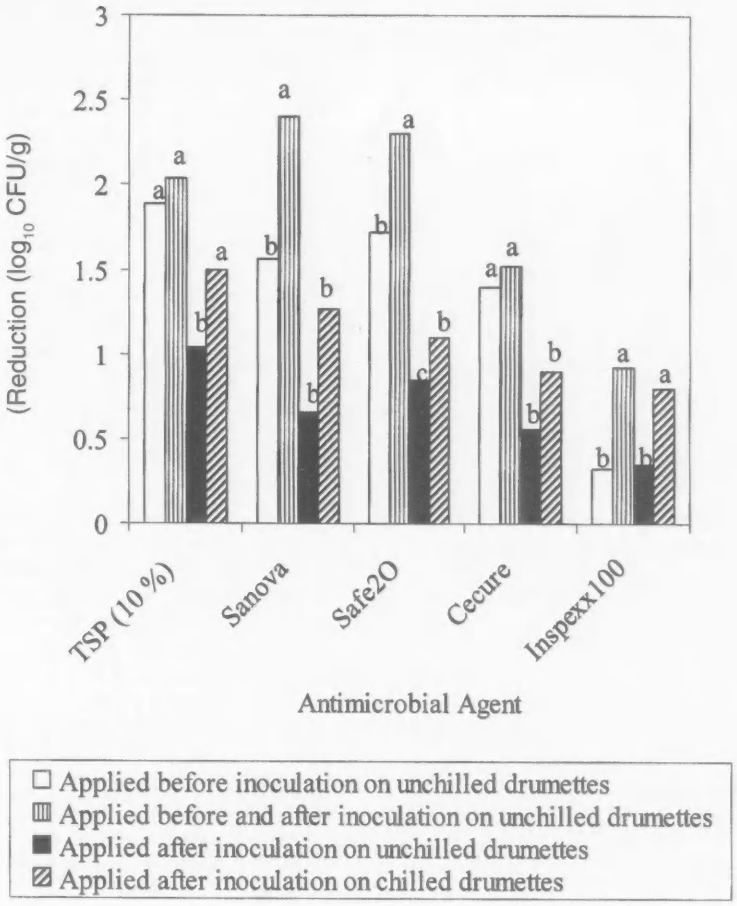


within bacteria to form weakly ionized compounds that inhibit bacterial metabolism *(15)*. The cumulative effect of the mixed treatments with Cecure was, however, not as effective as treatment with TSP. Reduction in *Salmonella* from combinations involving Inspexx 100 were significantly lower than reductions from other treatments.

Exposure time was another significant factor in determining antimicrobial effectiveness. Twenty min was more effective than 1 min in causing significant reductions in salmonellae on chicken skin. Dipping for > 20 min in the commercial antimicrobials did not cause any further reductions. Treatment of post-chill chicken carcasses with 10% TSP at 10 or 50°C for 15 s failed to cause significant reductions in *Salmonella* inoculated on carcasses *(16)*. Breen et al. *(2)* found that the reductions of *S.* Typhimurium inoculated on chicken skin were dependent on both the CPC concentration and treatment time. Increasing the treatment time > 3 min at 4 mg/ml CPC was enough to cause complete elimination of *S.* Typhimurium inoculated on chicken skin with initial numbers of 4 log CFU/cm^2.

Exposure of chicken skin to lower pH during acidic treatments caused skin discoloration, which may be controlled by limiting exposure times to < 30 s. Similar results were obtained by Kemp et al. *(13)*, who reported that exposure of chicken to acidified sodium chlorite at 1200 ppm for 5 s caused transient mild whitening of the skin. However, Schneider et al. *(21)* did not find changes in chicken skin color under similar conditions with

FIGURE 6. Reduction of *Campylobacter jejuni* on unchilled or chilled drumettes treated 1 min and held at 4°C for 2 h. Means within the same antimicrobial treatment with different letters are significantly ($P < 0.05$) different.



acidified sodium chlorite. In other work, concentrations of ≥2% of organic acids were enough to cause bleaching of the skin and off odor *(23)*.

Treatment of unchilled drumettes before inoculation was the most effective antimicrobial protocol. This approach may facilitate penetration of the antimicrobial into empty follicles and may change the availability of binding sites for the bacteria, reduce their ability to attach and increase sensitivity of any attached bacteria to subsequent treatments. When antimicrobial treatment and then inoculation was followed by a second antimicrobial treatment, increased reductions were obtained. When treatments after inoculation of unchilled and chilled drumettes were compared, the reductions were higher in chilled drumettes. During chilling, the skin pores and feather follicles may undergo reduction in size and reduce the capacity of follicles and crevices to adsorb antimicrobial solutions or harbor bacteria in the skin *(14)*, thus exposing more bacteria at the skin surface to the treatments *(16, 17, 24)*. While this may be important, in other work the effectiveness of antimicrobials was found to be influenced by poultry carcass sampling site, with reductions being significantly larger in the leg and dorsal areas. This was believed related to differences in feather follicle size in different areas of the chicken carcasses. Follicles are generally larger in the dorsal and leg areas *(6)* and have the potential to afford protection to bacteria present, but may also more easily "pick-up" antimicrobial solutions. Sizes of follicles in drumette skins do not appear in the literature; however, they are probably small, since primary (large) feathers are mainly located on the distal portion of the wing.

The antimicrobial activity of TSP against naturally present psychrotrophic bacteria was found similar to that reported by Capita et al. *(3)*, who found that the reductions of psychrotrophic bacteria were 0.92 and 1.94 log CFU/g immediately following 8 or 12% TSP treatment, respectively. These reductions increased to 2.79 and 4.09 log CFU/g, respectively, after 5 days of refrigerated storage. Our results did not generate such large reductions and showed that psychrotrophic bacteria were less sensitive than pseudomonads. It is well known that pseudomonads are very sensitive to conditions that are acidic or highly alkaline. Gram-positive psychrotrophs such as *Listeria monocytogenes* and *Brochothrix thermosphacta* could be a part of the psychrotrophic bacteria counted on drumettes. They are normally present on raw chicken and might be expected to be less sensitive to decontamination procedures used. A study involving the effect of these treatments on the proliferation of gram positive psychrotrophs on chicken should be done to clarify this matter.

Cecure was found to have lower antimicrobial activity than that shown by others *(2, 15, 26, 27, 28)*. In the present study, 5 mg/ml CPC was used and was less effective than 10% TSP or Sanova. None of the treatments reported here gave reductions as large as those reported by Breen *(2)*. Although this is unexplained, since concentrations used were similar, it is possible that the use of pressure during spray application and longer exposure time in other work may have influenced the outcome *(1, 2, 27, 28)*. In the present study, biopolymer application was performed by use of dip application. Spraying was tried but the high viscosity of solutions prevented even application of polymer. Further development of the system is under way, because the opportunity for sustained reduction of viable pathogens by use of this approach is apparent.

CONCLUSION

The antimicrobial effectiveness of TSP and LA against *E. coli* O157:H7 inoculated on drumettes was greatest (1.6 log CFU/g) when TSP exposures were 20 min. TSP activity was compared with activity of other commercial antimicrobial

FIGURE 7. Reduction of *E coli* O157:H7 on chilled or unchilled drumettes treated 1 min and held at 4°C for 2 h. Means within the same antimicrobial treatment with different letters are significantly ($P < 0.05$) different.

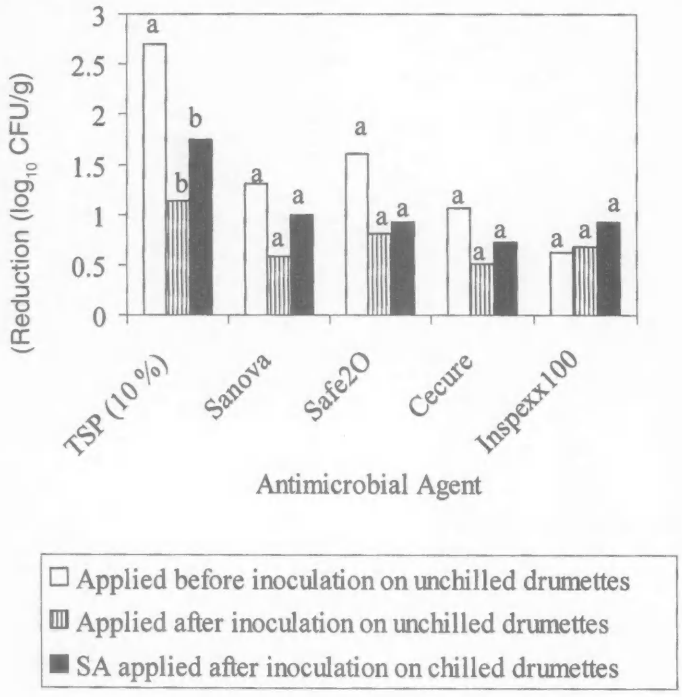
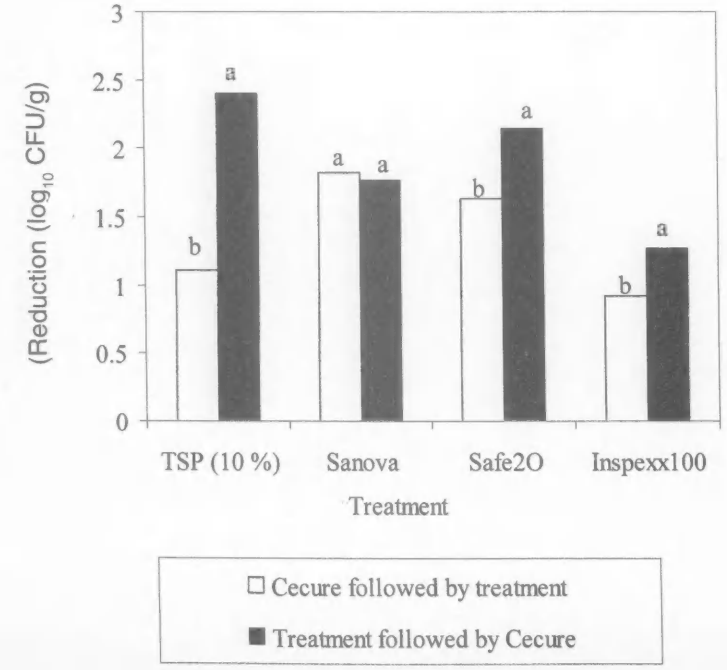


FIGURE 8. Reduction in viability of the *Salmonella* cocktail (as in Fig. 4) following dual 1 min treatments with Cecure (0.5%) and other commercial antimicrobials on unchilled drumettes (38–40°C) held at 4°C for 2 h. Inoculation was done between the two treatments. Means within the same treatment with different letters are significantly ($P < 0.05$) different.



agents that were either acidic (Sanova and Safe$_2$O) or of almost neutral pH (Cecure and Inspexx 100). Acidic treatments were less effective than TSP, and Inspexx 100 was least effective. A similar trend was found when the treatments were tested against salmonellae and *C. jejuni*. Applying a dual treatment, both before and after inoculation, was the most effective protocol against all the microorganisms tested. When a single treatment was used on unchilled drumettes, it was found that treatment before inoculation was more effective than treatment after bacterial addition. However, antimicrobial treatment after inoculation was more effective in some tests on chilled than on unchilled drumettes. All 5 treatments were effective against pseudomonads and psychrotrophic bacteria and increased the shelf life of drumettes stored at 7°C from 2 days to 5 days. TSP stabilized within guar or locust bean gums and Sanova in CMC or pectin failed to reduce salmonellae > 0.7 logs. Since results in general indicated that antimicrobial treatments generated greater reductions when applied before bacteria contaminated the skin surface, the application of treatments as soon after defeathering as possible is recommended to optimize antimicrobial effectiveness.

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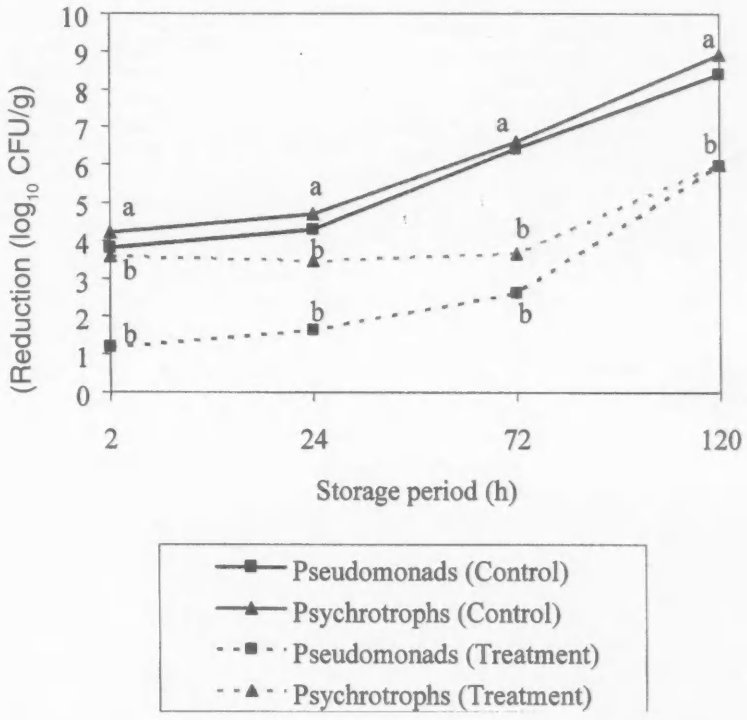
REFERENCES

1. Breen, P. J., C. M. Compadre, E. K. Fifer, H. Salari, D. C. Serbus, and D. L. Lattin. 1995. Quaternary ammonium compounds inhibit and reduce the attachment of viable *Salmonella* Typhimurium to poultry tissues. J. Food Sci. 60:1191–1196.

FIGURE 9. Growth of naturally present pseudomonads and psychrotrophs on unchilled drumettes (38–40°C) during storage at 7°C for up to 120 h following dipping in 10%TSP for 1 min. Means at the same incubation time with different letters are significantly ($P < 0.05$) different.



2. Breen, P. J., H. Salari, and C. M. Compadre. 1997. Elimination of *Salmonella* contamination from poultry tissues by cetylpyridinium chloride solutions. J. Food Prot. 60: 1019–1021.
3. Capita, R., C. Alonso-Calleja, M. C. Garcia-Fernandez, and B. Moreno. 2000. Effect of trisodium phosphate on mesophilic and psychrotrophic flora attached to skin of chicken carcasses during refrigerated storage. Food Sci. Tech Int. 6: 345–350.
4. Capita, R., C. Alonso-Calleja, M. C. Garcia-Fernandez, and B. Moreno. 2002. Review: Trisodium phosphate (TSP) treatment for decontamination of poultry. Food Sci. Tech. Int. 8:11–24.
5. Capita, R., C. Alonso-Calleja, M. del C. Garcia-Fernandez, and B. Moreno. 2002. Activity of trisodium phosphate compared with sodium hydroxide wash solutions against *Listeria monocytogenes* attached to chicken skin during refrigerated storage. Food Microbiol. 19:57–63.
6. Capita, R., C. Alonso-Calleja, R. Rodriguez-Perez, B. Moreno, and M. del C. Garcia-Fernandez. 2002. Influence of poultry carcass skin sample site on the effectiveness of trisodium phosphate against *Listeria monocytogenes*. J. Food Prot. 65:853–856.
7. Conner, D. E., and S. E. Bilgili. 1994. Skin attachment model for improved laboratory evaluation of potential carcass disinfectants for their efficacy against *Salmonella* attached to broiler skin. J. Food Prot. 57:684–688.
8. Coppen, P. G., Fenner, and G. Salvat. 1998. Antimicrobial efficiency of AvGard carcass wash under industrial processing conditions. Brit. Poult. Sci. 39:229–234.
9. Gallo, L., R. E. Schmitt, and W. Schmidt-Lorenz. 1988. Microbial spoilage of refrigerated fresh broilers. I. Bacterial flora and growth during storage. Lebensm.-Wiss. U.-Technol., 21:216–223.
10. Han, J. H. 2003. Antimicrobial food packaging, p. 50–70. *In* R. Ahvenainen (ed.), Novel Food Packaging Techniques. CRC Press, Washington, D.C.
11. Hwang, C., and L. R. Beuchat. 1995. Efficacy of selected chemicals for killing pathogenic and spoilage microorganisms on chicken skin. J. Food Prot. 58:19–23.
12. Jones, F. T., R. C. Axtell, D. V. Rives, S. E. Scheideler, F. R. Traver, Jr., R. L. Walker, and M. J. Wineland. 1991. A survey of *Campylobacter jejuni* contamination in modern production and processing systems. J. Food Prot. 54: 259–262.
13. Kemp, G. K., M. L. Aldrich, and A. L. Waldroup. 2000. Acidified sodium chlorite antimicrobial treatment of broiler carcasses. J. Food Prot. 63: 1087–1092.
14. Kemp, G. K., and K. R. Schneider. 2002. Reduction of *Campylobacter* contamination on broiler carcasses using acidified sodium chlorite. Dairy Food Environ. Sanit. 22:599–606.
15. Kim, J., and M. F. Slavik. 1996. Cetylpyridinium chloride (CPC) treatment on poultry skin to reduce attached *Salmonella*. J. Food Prot. 59:322–326.
16. Kim, J., M. F. Slavik, M. D. Pharr, D. P. Raben, C. M. Lobsinger, and S. Tsai. 1994. Reduction of *Salmonella* on post-chill chicken carcasses by trisodium phosphate (Na_3PO_4) treatment. J. Food Safety 14:9–17.
17. Lillard, H. S. 1986. Distribution of attached *Salmonella* Typhimurium cells between poultry skin and a surface film following water immersion. J. Food Prot. 49:449–454.
18. Mead, G. C. (ed). 2004. Poultry Meat Processing and Quality. Woodhead publishing/CRC Press LLC, Boca Raton FL. 388 pp.
19. Mullerat, J., N. Arlene Klapes and B. W. Sheldon. 1994. Efficacy of Salmide®, a sodium chlorite-based oxy-halogen disinfectant to inactivate bacterial pathogens and extend shelf life of broiler carcasses. J. Food Prot. 57:596–603.
20. Regez, P., L. Gallo, R. E. Schmitt, and W. Schmidt-Lorenz. 1988. Microbial spoilage of refrigerated fresh broilers. III. Effect of storage temperature on the microbial association of poultry carcasses. Lebensm.-Wiss. U.-Technol. 21:229–233.

21. Schneider, K.R., G. Kemp, and M. L. Aldrich. 2002. Antimicrobial treatment of air chilled broiler carcasses: Acidified sodium chlorite antimicrobial treatment of air chilled broiler carcasses. Dairy Food Environ. Sanit. 22:102–108.
22. Slavik, M.F., J. Kim, M. D. Pharr, D. P. Raben, S. Tsai, and C. M. Lobsinger. 1994. Effect of trisodium phosphate on *Campylobacter* attached to post-chill chicken carcasses. J. Food Prot. 57:324–326.
23. Tamblyn K. C., and D. E. Conner. 1997. Bactericidal activity of organic acids against *Salmonella* Typhimurium attached to broiler chicken skin. J. Food Prot. 60:629–633.
24. Thomas, C. J., and T. A. McMeekin. 1984. Effect of water uptake by poultry tissues on contamination by bacteria during immersion in bacterial suspensions. J. Food Prot. 47:398–402.
25. Waldroup, A. L. 1996. Contamination of raw poultry with pathogens. World's Poultry Sci. J. 52:7–25.
26. Wang, W., Y. Li, M. F. Slavik, and H. Xiong. 1997. Trisodium phosphate and cetylpyridinium chloride spraying on chicken to reduce attached *Salmonella* Typhimurium. J. Food Prot. 60: 992–994.
27. Xiong, H., Y. Li, M. F. Slavik, and J. T. Walker. 1998. Spraying chicken skin with selected chemicals to reduce attached *Salmonella* Typhimurium. J. Food Prot. 61:272–275.
28. Yang, Z., Y. Li, and M. Slavik. 1998. Use of antimicrobial spray applied with an inside-outside birdwasher to reduce bacterial contamination on prechilled carcasses. J. Food Prot. 61:829–832.

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Farm Food Safety Practices: A Survey of New England Growers

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SUMMARY

Fresh produce carries the risk of foodborne illness caused by microbial contamination during many aspects of its production, harvest, post-harvest handling, transportation, and marketing. The purpose of this study was to identify and measure the adoption of grower practices in New England related to safe food handling guidelines. Questionnaires were mailed to 602 farms in the six New England states, asking questions related to the adoption of food safety practices, including those involving water, manure and biosolids, worker hygiene, field sanitation, harvest and storage, packing and processing, pick-your-own operations and record keeping. The response rate for the survey was 49%.

Results show that, overall, adoption of good agricultural practices for reducing microbial contamination and growth is high among New England growers, but the study identifies areas where additional training is needed. These areas include water testing, record keeping, washing and sanitizing containers and food contact surfaces, and limiting bare hand contact.

INTRODUCTION

Americans have increased their consumption of fresh fruits and vegetables by 14% over the past decade, from 283 lbs per capita in 1991 to 322 lbs per capita in 2001 *(5)*. The consumption of fresh produce carries the risk of foodborne illness as a result of microbial contamination during food production, harvest, post-harvest handling, transportation, and marketing, as well as at home *(1)*. For many fresh fruits and vegetables, this risk is not mitigated through cooking or processing. Many consumers do not wash fresh produce such as melons, and almost half do not always wash their hands before handling fresh produce *(13)*. An estimated 76 million people contract foodborne illness each year *(15)*; outbreaks linked to fresh produce are reported regularly and are responsible for an estimated 12% of foodborne outbreak illnesses *(6)*. Examples include outbreaks due to *Escherichia coli* O157:H7 in unpasteurized apple juice *(3)* and sprouts *(2)*, and *Salmonella* in tomatoes *(23)*.

Microbial contamination of fruits and vegetables can occur at many access points from farm to table. The food handling practices of growers, harvesters, packers, shippers, and retailers may influence the microbial load of the fresh product. To reduce the risk of microbial contamination and growth, the US Food and Drug Administration (FDA) issued the "Guide to Minimize Microbial Hazards for Fresh Fruits and Vegetables" in 1998 *(8)*.

A peer-reviewed article

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TABLE 1. Drinking water and irrigation practices of New England growers

Question	Response	n	Percent adoption
What is the source of drinking water on the farm?	Well or spring	217	73
	Municipal	78	26
	Pond	2	1
How often is drinking water supply tested?	More than annually	15	8
	Annually	98	54
	Every other year	4	2
	Do not know	66	36
Are water wells equipped with backflow devices?	All	79	40
	Some	20	10
	No	98	50
What is the source of irrigation water?	Well	94	37
	Pond	96	38
	Spring	10	4
	Stream or river	42	17
	Municipal	9	4
Do livestock have access to irrigation water sources?	Yes	10	6
	No	155	93
	Do not know	1	1
When is irrigation water tested for coliform bacteria?	Near harvest	2	1
	Annually	34	18
	Not tested	134	73
	Other	14	8

This document contains guidelines for water, manure, worker health and hygiene, sanitary facilities, sanitation, and recordkeeping during growing, packing, harvesting, and transporting of produce. As a result of this food safety initiative, the scientific basis for the FDA recommendations were summarized in a report on the evaluation of preventive measures to control microbial hazards in fresh produce *(7)*. The guide has also been adapted as educational tools for growers by Cooperative Extension services in several states *(16, 19, 20)*. However, documentation of current grower practices in relation to these new guidelines is not available. This information is critical for establishing a baseline of grower practices, targeting educational efforts effectively, and monitoring changes in levels of good agricultural practices. Thus, the purpose of this study was to identify baseline grower practices in New England related to the guidelines outlined by the FDA and adapted by the Cooperative Extension services at Cornell University and Kansas State University *(19, 20)*.

METHODS AND MATERIALS

Sample population

Mailing lists of conventional and organic growers of fruits and vegetables were obtained from state departments of agriculture and Cooperative Extension services in the six New England states. A total of 2,553 farms were represented on the lists. From these lists 602 growers were randomly selected to receive questionnaires. The number of growers selected from each state was proportional to the number of state growers represented on the total mailing list.

Survey

The survey was conducted by use of the Total Design Method *(4, 21)*. Key elements of the method include developing a "social utility argument" to make the survey relevant and important to the potential respondent; showing appreciation and regard for the opinions of the respondent; maintaining strict confidentiality of individual responses; keeping the questionnaire interesting and brief; establishing trust by identifying with a legitimate or known organization or group; sending all mailings with first class postage; personalizing address and salutation; and placing original signatures on all cover letters.

A letter on stationery with the appropriate state extension letterhead was sent to each name to announce the survey. This was followed the next week by the questionnaire and a cover letter. A postcard reminder was sent the following week, and if no response had been received, an additional questionnaire was sent.

Questions were based on recommendations in the literature *(19, 20)*. Good agricultural practices related to food safety included those involving water, manure and biosolids, worker health and hygiene, field sanitation, harvest and storage, packing and processing, pick-your-own operations and record keeping. Questions were reviewed by Cooperative Extension nutrition and food safety specialists in all six New England states, and modified for content and clarity.

Analysis

Survey data were entered into Microsoft Excel (Office 2000), and frequencies were computed by use of SAS for windows (version 8.2, 2002, Cary, NC).

RESULTS

A total of 297 (49%) completed questionnaires were returned by farmers of fruits and vegetables, allowing a 95% confidence interval with a sample error between 5% and 10% of the mean response *(21)* when results are extrapolated to the approximately 25,000 farms in the New England region *(22)*. Not all questions were applicable to all farms (e.g., water testing is not applicable to farms using municipal water sources); thus the frequency of adoption of each good agricultural practice provided in the tables are based on the number of farms where the practice was applicable.

TABLE 2. Manure handling practices of New England growers

Question	Response	n	Percent adoption
Is manure used on the farm?	No	168	57
	Yes	127	43
Which of the following are applied to food crops during the growing season?	Chemical fertilizer	68	31
	Composted non-manure	24	11
	Composted manure	65	29
	Noncomposted organics	14	6
	Manure slurry	2	1
	Manure, aged, but not composed	48	22
	Biosolids	0	0
	Sewage sludge	0	0
How long is uncomposted manure stored before application to food crops?	< 6 months	27	36
	> 6 months	49	64
Is uncomposted manure soil-incorporated?	Yes	61	74
	No	21	26
How soon is uncomposted manure soil-incorporated after application?	Same day	28	39
	Within 1 week	35	49
	> more than 1 week	8	11
How often is equipment that contacts manure or compost cleaned prior to use in harvest or transport of fresh produce?	Always	28	76
	Usually	2	5
	Sometimes	3	8
	Never	4	11

Water

Wells are a primary source for both drinking and irrigation water on New England farms (Table 1). Drinking water is tested at least annually on most farms, but over one-third of the farmers appeared to be unaware of water testing. Backflow devices are used to prevent contamination of wells, but half the wells on farms are not equipped with them. Seventy-four percent of growers indicated that they use irrigation, primarily from wells and ponds. While more than 90% of farms keep livestock away from irrigation sources, 73% do not test their water for coliform bacteria.

Fertilizer and manure

Forty-three percent of farmers report using manure on food crops (Table 2); composted manure is used by 29%, but non-composted manure is used by 22%. One third of the growers using manure store it for less than six months before applying it to field crops. Three-quarters of growers report incorporating manure into the soil, usually within one week, often on the same day that the manure was applied. Three-quarters of the growers report that they always clean manure or compost from equipment that is used in handling fresh produce, but 19% responded "sometimes" or "never".

Employee hygiene and training

Toilet and hand-washing facilities are accessible for workers on 89% and 93% of farms, respectively, with most sites reporting recommended soap and towel availability (Table 3). Seventy-eight percent of respondents indicated an understanding that people with flu or colds should not handle produce. Half the farmers reported conducting a training program for employees on food safety; 53% of these were taught as one-on-one sessions.

Livestock

Growers are active (97%) in preventing livestock and poultry from entering orchards and fields (Table 4), and most discourage wildlife from foraging in fields.

Harvest

Harvest containers are washed at least "sometimes" by over 90% of growers, but 7% never wash containers before use (Table 5). Similarly, storage containers are washed at least "sometimes" by

TABLE 3. Employee hygiene and training practices of New England growers

Question	Response	n	Percent adoption
Are toilet facilities accessible for field workers?	Yes	243	89
	No	29	11
Are hand-washing facilities accessible for field workers?	Yes	255	93
	No	19	7
Which of the following are supplied for handwashing?	Liquid soap	128	50
	Antibacterial soap	95	37
	Liquid hand sanitizer	34	13
	Bar soap	145	57
	Disposable paper towels	171	67
	Electric hand-drier	2	1
	Cloth towels	79	31
What happens when an employee who normally handles produce is sick with a cold or flu?	Employee does not work that day	169	60
	Works, but does not contact food	51	18
	Works the usual job	44	16
	Other	19	7
Do you have a training program to help workers understand the importance of food safety and sanitation?	Yes	144	50
	No	146	50

TABLE 4. Livestock exclusion practices of New England growers

Question	Response	n	Percent adoption
Are poultry and livestock excluded from fields or orchards where crops are grown?	Always	241	91
	Usually	16	6
	Sometimes	3	1
	Never	4	2
Do you use practices to discourage wildlife from foraging in fields?	Yes	189	68
	No	91	33

over 90% of growers, but 8% report that containers are never washed.

Crop washing

Fifty-five percent of farms reported having crop washing operations. Sixty-nine percent of these operations reported that wash water meets EPA safe drinking water standards. Wash water is changed frequently in most farms (Table 6), but 91% of crop wash operations do not use sanitizers in wash water. Use of bare hands in packing washed produce is common: 50% of farms report that bare hands are always used and only 8% report that bare hands are never used.

Crop packing

Seventy-five percent of growers report that water used in cleaning packing equipment meets EPA safe drinking water standards (Table 7). Packing equipment is cleaned daily on 70% of farms: two-thirds of farms report sanitizing equipment at least "sometimes." Twenty-eight percent use bleach or a sanitizer to clean food processing surfaces, and 35% use soap, but 37% report using water alone. Where refrigeration is used, temperature is checked daily on 69% of farms. Produce waste is removed daily on 91% of farms.

Pick-your-own operations

Pets are always restricted from about half of the pick-your-own operations (Table 8). Toilet facilities are provided for customers at 72% of farms, but hand washing facilities are available on only 66% of pick-your-own farms. Almost all farms offer clean containers for customer use. Customer-picked produce is sold at least "sometimes" on 17% of farms.

Record-keeping

The most frequently kept farm records are of pesticide use (78%, Table 9), due in part to the legal requirements for many growers to keep these. Other frequently kept records include shipping dates (50%), picking records (51%), manure application (43%), and water testing results (41%). Approximately one-quarter to one-third of growers keep records on packing or processing dates, field of origin, and worker training. Few growers report maintaining records of refrigeration unit temperatures.

TABLE 5. Harvest and storage container practices of New England growers

Question	Response	n	Percent adoption
How often are harvest containers washed before use?	Always	88	38
	Usually	58	25
	Sometimes	70	30
	Never	16	7
How often are storage containers washed before use?	Always	81	42
	Usually	40	21
	Sometimes	58	30
	Never	16	8

TABLE 6. Crop washing practices of New England growers

Question	Response	n	Percent adoption
How often is crop wash water changed?	At least once/daily	137	96
	Less than once per day	5	4
Is a sanitizer used in the wash water?	Yes	14	9
	No	137	91
How often, if at all, is crop wash water tested for sanitizer level?	At least once/day	10	50
	Weekly or less	10	50
When packing washed product, how often do workers use bare hands?	Never	3	8
	Sometimes	7	19
	Usually	8	22
	Always	18	50

DISCUSSION

Overall, New England growers use good agricultural practices that minimize microbial contamination or growth, but there is room for improvement in all stages of production. Water for irrigation, cooling, washing, and processing is a potential source of pathogens *(20)*. Most growers in this survey did not test irrigation water, and one out of three did not know how often their drinking water supply is tested. Most growers did not use a sanitizer in the water for crop washing, and few who did tested the water for sanitizer level. Thus, more frequent water supply testing and sanitizer use are recommended to improve compliance with food safety recommendations.

Use of manure, while beneficial for soil and plant health, can also introduce pathogens to food products if the manure is untreated or improperly treated *(8)*. Almost one-fifth of growers in this survey used manure that was aged but not composted. However, the majority of farmers reported incorporating manure into the soil and regularly cleaning equipment that contacted manure, actions that are consistent with FDA recommendations *(8)*.

Microbial contamination and growth can also occur during harvesting, crop washing, and crop packing. Although few growers "never" washed harvest or storage containers, one-third washed them only "sometimes." A similar proportion reported infrequently cleaning packing equipment, never sanitizing packing equipment, and using only water for cleaning food processing surfaces. Efforts to improve cleaning and sanitizing during harvest and packing are thus needed.

Poor employee health/hygiene and hand contact are significant sources of foodborne illness from ready-to-eat foods *(10)*. As the majority of growers in this study used bare hands to pack washed produce, it is important to recommend reduction of contamination through hand washing and use of barriers such as gloves. Most field workers in this survey did have access to toilets and hand-washing facilities with liquid or antibacterial soap and disposable paper towels available. However, assessing the quality of hand-washing performed was beyond the scope of this study. Consumers generally do not wash hands adequately; in one study of middle and high school students, only half-washed hands after bathroom use, and only 8% of males used soap *(9)*. In pick-your-own operations, the consumer is also the food worker, but one-third of these operations do not have toilet or handwashing facilities for customer use.

Documentation is a key recommendation for maintaining good agricultural practices, allowing for monitoring, investigation, and trace-back *(8)*. Aside from pesticide use and shipping dates, most growers do not keep logs of important activities such as picking and processing dates and refrigeration unit temperatures. Thus, it is recommended that growers improve recordkeeping to help meet guidelines for microbial safety.

There are many approaches to improving grower practices relative to food safety. Education and worker training can be an important step toward this goal. Half of growers in our survey trained workers in food safety, leaving room for improvement. Several training manuals for growers have been developed based on FDA guidance *(8)*, including Cooperative Extension materials from Cornell University, Kansas State University, and the New England Extension Consortium *(16)*, as well as produce industry guidelines *(17, 18)*. Check lists and self-assessment materials are also available through the New England Extension Consortium *(16)* as well as the Ontario Tender Fruit and Greenhouse Vegetable producers *(17, 18)*. Use of a food safety checklist by Ontario tomato growers was reported to be effective as part of an overall program of microbiological testing, on-site visits, surveying, and educational communications *(14)*.

TABLE 7. Crop packing practices of New England growers

Question	Response	n	Percent adoption
Does water used for cleaning packing equipment meet EPA safe drinking water standards?	Yes	82	75
	No or don't know	27	25
When packing washed product, how often do workers use bare hands?	Always	50	50
	Usually	29	29
	Sometimes	11	11
	Never	10	10
How often do you clean packing equipment?	At least daily	79	70
	Weekly or less	34	30
How often do you sanitize packing equipment after cleaning?	Always	34	34
	Usually	17	17
	Sometimes	16	16
	Never	32	32
What is used to clean and/or sanitize food processing surfaces?	Water with bleach or sanitizer	35	28
	Water with soap	45	35
	Water alone	47	37
If refrigeration is used, how often is temperature checked?	At least daily	84	69
	Several times/week	22	18
	Weekly or less, or do not know	15	12
How often is produce waste removed from packing area?	Daily	129	91
	Weekly or less	12	9

TABLE 8. Good agricultural practices concerning pick-your-own operations in New England

Question	Response	n	Percent adoption
Are pets restricted from fields and orchards?	Always	61	48
	Usually	37	29
	Sometimes	10	8
	Never	20	16
Are toilet facilities provided for customers?	Yes	88	72
	No	34	28
Are handwashing facilities provided for customers?	Yes	80	66
	No	42	34
Are clean containers available for customer use and purchase?	Yes	116	97
	No	4	3
Is extra produce picked by a customer accepted for sale?	Never	101	83
	Sometimes	12	10
	Usually	2	2
	Always	6	5

The participatory assistance approach is also cited as a way to promote changed behaviors on farms *(12)*. In this approach, farmers are authentic participants in improving their particular farm systems by using basic management practices such as planning, implementation, and control. By involving the grower in identifying solutions to issues related to microbial growth and contamination, adoption of recommended practices can be enhanced. A similar approach, when used by food service workers, was shown to result in improved food inspection scores *(11)*. Using behavior change theories, the food service management company identified operational barriers to behavior change and assessed risks and benefits of changing policies or equipment. Process evaluation was used to modify the approach taken based on food worker feedback *(11)*. While cost is a potential barrier to grower adoption of good agricultural practices, many of the recommendations for practice change identified here, such as increasing worker training and record-keeping, improving washing and sanitizing, and avoiding bare-

TABLE 9. Record-keeping by New England growers

Question	Response	N	n[1]	Percent adoption[2]
Which of the following records are kept?	Manure application rates or dates	127	54	43
	Pesticide use	297	232	78
	Worker training	144	47	33
	Water testing results	179	73	41
	Field of origin	297	113	38
	Picking dates	297	152	51
	Packing dates	125	34	27
	Processing dates	125	33	26
	Shipping dates	125	63	50
	Refrigeration unit temperatures	121	16	13
	None of the above	297	18	6

[1]Number of farmers responding

[2] Percentage based on applicability, determined by responses to previous questions, as indicated by N

hand contact with ready-to-eat foods, carry very little costs.

In summary, overall adoption of good agricultural practices for reducing microbial contamination and growth is high among New England growers, but additional efforts in worker training, water testing, record-keeping, washing and sanitizing containers and food contact surfaces, and handwashing/hand barriers would be useful. Further research on effective approaches to enable growers to change practices is also necessary, along with monitoring of microbial growth and contamination on farms.

ACKNOWLEDGMENTS

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REFERENCES

1. Beuchat, L. R., and J-H. Ryu. 1997. Produce handling and processing practices. Emerging Infect. Dis. (serial online). Available at: wysiwyg://1.189/http://www.cdc.gov/ncidod/eid/vol3no4/beuchat.htm. Accessed 21 December 1999.
2. Buck, J.W., R. Walcott, and L. R. Beuchat. 2003. Recent trends in microbiological safety of fruits and vegetables. Plant Health Progress serial online doi:10.1094/PHP-2003-0121-01-RV.
3. Cody, S. H., M. K. Glynn, J. A. Farrar, K. L. Cairns, P. M. Griffin, J. Kobayashi, M. Fyfe, R. Hoffman, A. S. King, J. H. Lewis, B. Swaminathan, R. G. Bryant, and D. J. Vugia. 1999. An outbreak of *Escherichia coli* O157:H7 infection from unpasteurized commercial apple juice. Annals Internal Med. 130:202–209.
4. Dillman, D. A. 1978. Mail and telephone surveys: The total design method. J. Wiley & Sons. New York.
5. Economic Research Service. 2003. Food consumption (per capita) data system. Available at: http://www.ers.usda.gov/Data/foodconsumption. Accessed 23 October 2003.
6. Food and Drug Administration. 2004. Produce safety from production to consumption: A proposed action plan to minimize foodborne illness associated with fresh produce consumption. U.S. Department of Health and Human Services, Center for Food Safety and Applied Nutrition, Washington, D.C. Available at: http://www.foodsafety.gov/~dms/prodplan.html. Accessed 7 July 2004.
7. Food and Drug Administration. 2001. Analysis and evaluation of preventive control measures for the control and reduction/elimination of microbial hazards on fresh and fresh-cut produce. U.S. Department of Health and Human Services, Center for Food Safety and Applied Nutrition, Washington, D.C. Available at: http://www.cfsan.gov/~comm/ift3exec.html. Accessed 2 July 2002.
8. Food and Drug Administration. 1998. Guide to minimize microbial food safety hazards for fresh fruits and vegetables. U.S. Department of Health and Human Services, Center for Food Safety and Applied Nutrition, Washington, D.C.
9. Guinan, M. E., M. McGuckin-Guinan, and A. Sevareid. 1997. Who washes hands after using the bathroom? Am. J. Infect. Control 25:424–425.
10. Guzewich, J., and M. P. Ross. 1999. Evaluation of risks related to microbiological contamination of ready-to-eat food by food preparation workers and the effectiveness of interventions to minimize those risks. Available at: http://vm.cfsan.fda.gov/~ear. Accessed: 10 December 1999.
11. Jenkins-McLean, T., C. Skilton, and C. Sellers. 2004. Engaging food service workers in behavioral-change partnerships. J. Environ. Health 66(9):15–19.

12. Lanyon, L. E. 1994. Participatory assistance: An alternative to transfer of technology for promoting change on farms. Am. J. Alternative Ag. 9(3):136–142.
13. Li-Cohen, A. E.. and C. M. Bruhn. 2002. Safety of consumer handling of fresh produce from the time of purchase to the plate: A comprehensive consumer survey. J. Food Prot. 65:1287–1296.
14. Luedtke, A. N., B. Chapman, and D. A. Powell. 2003. Implementation and analysis of an on-farm food safety program for the production of greenhouse vegetables. J. Food Prot. 66(3):485–489.
15. Mead, P. S., L. Slutsker, V. Dietz, L. F. McCaig, J. S. Bresee, C. Shapiro, P. M. Griffin, and R. V. Tauxe. 1999. Food-related illness and death in the United States. Emerging Infect. Dis. 5(5):607–625.
16. New England Extension Food Safety Consortium. 2002. Using Good Agricultural Practices for Food Safety on Small Farms. Available at: http://www.hort.uconn.edu/IPM/foodsafety/toc.htm. Accessed 7 July 2004.
17. Ontario Greenhouse Vegetable Growers Association. 1999. On-farm food safety guidelines for greenhouse vegetables – manual. Available at: http://www.plant.uoguelph.ca/safefood/on-farm/ogvga/gp-guides.htm. Accessed 4 October 2001.
18. Ontario Tender Fruit Producers. 2003. Food Safety Guide. Available at: http://www.Ontariotenderfruit.ca/foodsafety/default.shtm. Accessed 23 October 2003.
19. Penner, K., S. Beyer, D. C. Cress, K. L. B. Gast, G. Godfrey, R. R. Janke, D. Nagengast, G. L. Stokka, D. H. Rogers, and J. Willingham. 2001. Kansas State Food A Syst. Kansas State University, Manhattan, KS.
20. Rangarajan, A., E. A. Bihn, R. B. Gravani, D. L. Scott, and M. P. Pritts. 2000. Food Safety Begins on the Farm: A Grower's Guide. Cornell University, Ithaca, NY.
21. Salant, P., and D. A. Dillman. 1994. How to conduct your own survey. J. Wiley and Sons, Inc. New York.
22. USDA. 1997. Farms and land in farms: final estimates 1993–97. National Agricultural Statistics Service. Statistical Bulletin no. 955.
23. Vugia, D., J. Hadler, D. Blythe, K. Smith, D. Morse, P. Cieslak, A. Conquist, D. Goldman, J. Guzewich, F. Angulo, and R. Tauxe. 2003. Preliminary FoodNet data on the incidence of foodborne illnesses – selected sites, United States, 2002. MMWR 52 (15):340–343.

NOTIFICATION OF PROPOSED AMENDMENTS TO THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION BYLAWS

Membership vote to take place at the IAFP 2005 Business Meeting on Tuesday, August 16 at 12:15 p.m. in Baltimore, Maryland

Proposed Change #1
SECTION I.
MEMBERSHIP AND DUES

B. Membership Qualifications and Entitlements

5. Sustaining Members

5.1 Sustaining members shall be companies, organizations or persons who are interested in the objectives of IAFP.

5.2 Sustaining members are entitled to special services as determined by the Executive Board of IAFP.

5.3 Sustaining members shall be entitled to one or more regular membership(s), depending on Sustaining Membership tier, in IAFP for their representative(s) at no additional cost.

5.3.1 The name(s) of the representative(s) must be submitted to the Executive Director of IAFP at the time of membership.

5.3.2 Other persons associated with the sustaining member's organization are not members of IAFP unless they have individual memberships.

Rational: To bring the Bylaws in line with the Tiered Level Sustaining Membership Program approved by the Executive Board.

Proposed Change #2
SECTION VI.
STANDING COMMITTEES, SPECIAL COMMITTEES, PROFESSIONAL DEVELOPMENT GROUPS and TASK FORCES

B. Special Committees

1. Special Committees provide support services to IAFP on a continuous basis. Special Committees of IAFP shall consist of the following: 3-A Committee on Sanitary Procedures, Audiovisual Library, Awards, Black Pearl Selection, Committee on Control of Foodborne Illness, Constitution and Bylaws, Developing Scientist Award, Fellows Selection, Foundation Fund, Membership, Nominating, Past Presidents', and Tellers. ~~Audiovisual Library, Awards, Black Pearl Award, Communicable Diseases Affecting Man, Constitution and Bylaws, Developing Scientist Award, Fellows, Foundation Fund, Nominating, Past Presidents, Sanitary Procedures, and Tellers.~~

Rational: To (1) re-order the list of Special Committees alphabetically, (2) add "Membership" to the Special Committee list, (3) change "Sanitary Procedures" to the "3-A Committee on Sanitary Procedures", (4) change "Communicable Diseases Affecting Man" to the "Committee on Control of Foodborne Illness", (5) reword "Black Pearl Award" to "Black Pearl Selection", and (6) reword "Fellows" to "Fellows Selection".

Proposed Change #3
SECTION VI.
STANDING COMMITTEES, SPECIAL COMMITTEES, PROFESSIONAL DEVELOPMENT GROUPS and TASK FORCES

B. Special Committees

1.1 3-A Committee on Sanitary Procedures
1.2~~1~~ Audiovisual Library Committee
1.3~~2~~ Awards Committee
1.4~~3~~ Black Pearl Selection Committee
1.5~~4~~ Committee on Control of Foodborne Illness ~~Communicable Diseases Affecting Man~~
1.6~~5~~ Constitution and Bylaws Committee
1.7~~6~~ Developing Scientist Awards Committee
1.8~~7~~ Fellows Selection Committee
1.9~~8~~ Foundation Fund Committee
1.10 Membership Committee
1.11~~9~~ Nominating Committee
1.12~~0~~ Past Presidents' Committee
~~1.11 3-A Committee on Sanitary Procedures~~
1.13~~2~~ Tellers Committee

Rational: To re-order and re-number the Special Committees alphabetically based on Proposed Change #2. All wording in sections 1.1 through 1.12 will remain the same unless proposed for change in Proposed Changes #4, #5, #6 and #7. Each subsection numbering under 1.1 through 1.13 will be changed accordingly.

Continued on pages 372 and 373

Proposed Change #4
SECTION VI.
STANDING COMMITTEES, SPECIAL COMMITTEES, PROFESSIONAL DEVELOPMENT GROUPS and TASK FORCES

B. Special Committees

1.~~3~~2 Awards Committee

The Awards Committee is under the jurisdiction of the Affiliate Council. The chairperson of the Awards Committee is the Immediate Past Affiliate Council Chairperson.

1.~~3~~2.1 IAFP Awards:

The Awards Committee is responsible for selecting recipients for IAFP awards, from nominations received by the Executive Director, unless otherwise designated by the Bylaws. Selection guidelines are established and approved by the Executive Board. The following awards are under the purview of the Awards Committee:

Educator
Food Safety Innovation
Harold Barnum Industry
Harry Haverland Citation
International Leadership
Maurice Weber Laboratorian
Sanitarian

~~Sanitarian~~
~~Educator~~
~~Harold Barnum Industry~~
~~Maurice Weber Laboratorian~~
~~International Leadership Award~~
~~Harry Haverland Citation~~

The Awards Committee consists of designated sub-committees responsible for selecting recipients of each of the above individual awards. Each award selection sub-committee consists of three members. ~~Each of the above individual award selection committees consists of three members.~~ The Awards Committee Chairperson (Immediate Past Affiliate Council Chairperson) will recommend members for 3-year appointments with staggered terms to be confirmed by the Executive Board. In their third year of service, a member is designated to serve as chairperson of the individual award selection committee.

1.~~3~~2.2 Affiliate Awards

C.B. Shogren Memorial

Other Affiliate Awards as designated by the Affiliate Council

Recipients of the C.B. Shogren Memorial and other Affiliate Awards are selected by a committee consisting of the Chairperson and Secretary of the Affiliate Council and the Immediate Past Affiliate Council Chairperson based on information submitted as part of the Affiliate Annual Reports.

Rational: To re-order the Award listing alphabetically and add a new Food Safety Innovation Award. To change wording of sub-committees responsible for selecting award recipients.

Proposed Change #5
SECTION VI.
STANDING COMMITTEES, SPECIAL COMMITTEES, PROFESSIONAL DEVELOPMENT GROUPS and TASK FORCES

B. Special Committees

1.~~5~~4 Committee on Control of Foodborne Illness ~~Communicable Diseases Affecting Man~~

The Committee on Control of Foodborne Illness ~~Communicable Diseases Affecting Man~~ shall consist of a chairperson and vice chairperson recommended by the President-Elect and confirmed by the Executive Board. The chairperson, subject to the Executive Board's review shall appoint other committee members. All appointments shall be for 2-year renewable terms. The Committee on Control of Foodborne Illness ~~Communicable Diseases Affecting Man~~ shall:

1.~~5~~4.1 Review information on epidemiology and control of communicable diseases that are of primary concern to food safety and related areas;

1.~~5~~4.2 Prepare manuals and articles addressing investigation and control of problems related to food safety.

Rational: To change the name of the Committee on Communicable Diseases Affecting Man to the Committee on Control of Foodborne Illness as requested by the Committee Members and approved by the Executive Board.

Proposed Change #6
SECTION VI.
STANDING COMMITTEES, SPECIAL COMMITTEES, PROFESSIONAL DEVELOPMENT GROUPS and TASK FORCES

B. Special Committees

1.~~9~~8 Foundation Fund Committee

The Foundation Fund Committee shall consist of the President, President-Elect and Vice President of IAFP and a chairperson and vice chairperson

recommended by the President-Elect for confirmation by the Executive Board. The chairperson and vice chairperson shall serve in those positions for no more than two consecutive terms. The Chairperson shall recommend other individuals to the President-Elect for confirmation by the Executive Board. Appointed membership (including the chairperson and vice chairperson) shall be balanced with equal representation from industry, government and education. All appointments shall be for 3-year ~~2-year~~ renewable terms. The Foundation Fund Committee shall:

1.98.1. Oversee IAFP Foundation monies;

1.98.2 Solicit gifts to the Foundation; and

1.98.3 Identify and fund programs which further the goals and objectives of the Foundation and IAFP.

Rational: To add specific term limits for the chairperson and vice chairperson of the Foundation Fund Committee and limit them to two consecutive terms and to increase the term for Foundation Fund Committee Members to 3-years from 2-years as recommended by Committee Members and approved by the Executive Board.

Proposed Change #7
SECTION VI.
STANDING COMMITTEES, SPECIAL COMMITTEES, PROFESSIONAL DEVELOPMENT GROUPS and TASK FORCES

B. Special Committees

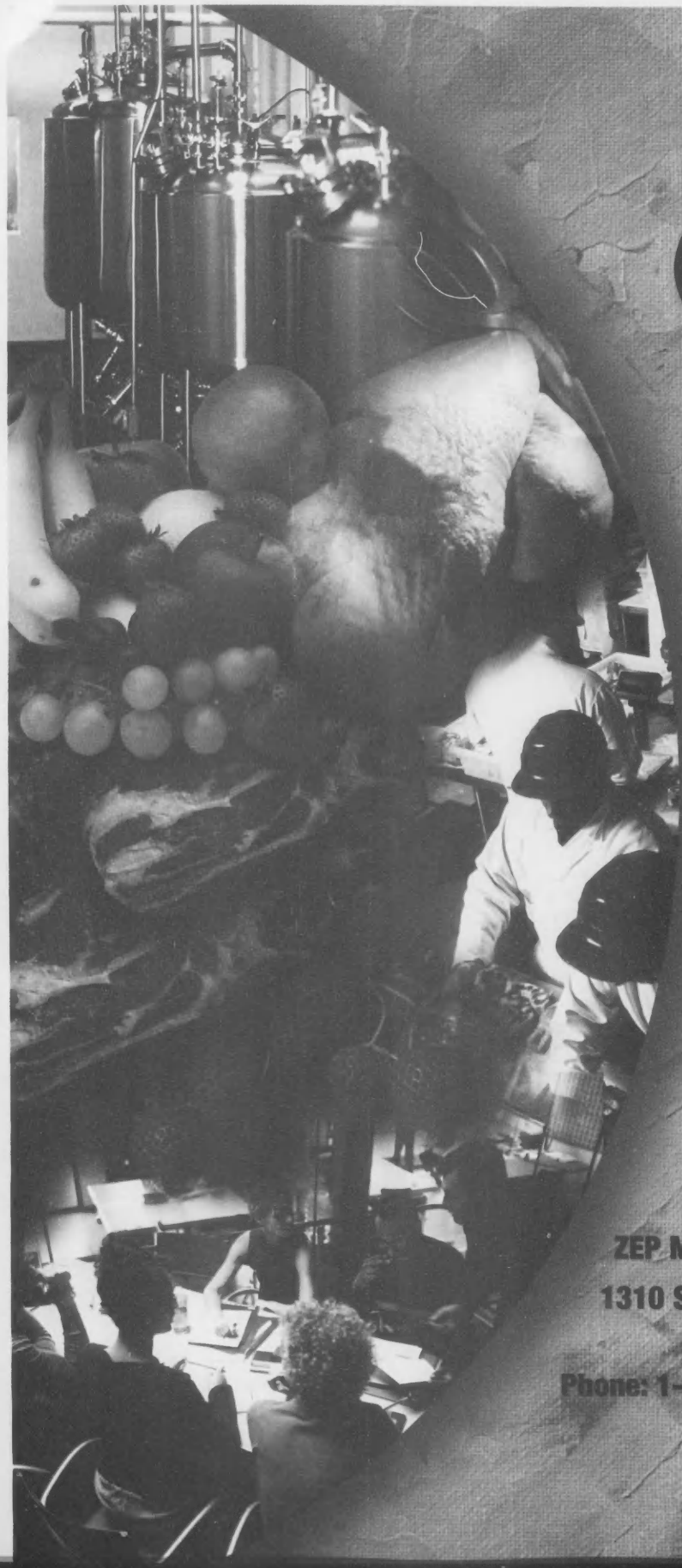
1.10 Membership Committee

The Membership Committee shall consist of a chairperson and vice chairperson recommended by the President-Elect and confirmed by the Executive Board. The chairperson, subject to the Executive Board's review, shall appoint other committee members. All appointments shall be for 2-year renewable terms. The Membership Committee shall:

1.10.1 Promote IAFP membership to potential new members; and

1.10.2 Assist in retaining current IAFP members.

Rational: To add language to establish a Membership Committee for IAFP.



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IAFP Sustaining Member

J. Stan Bailey Elected IAFP Secretary

The International Association for Food Protection welcomes J. Stan Bailey to the Executive Board as Secretary. Dr. Bailey will take office at the conclusion of the Awards Banquet at IAFP 2005, the Association's 92nd Annual Meeting in Baltimore, MD. By accepting this position, he made a five-year commitment to the Association and will begin his term as President in 2008.

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

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

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

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

Congratulations!

Call for Symposia

IAFP 2006

August 13-16

Calgary, Alberta, Canada

The Program Committee invites International Association for Food Protection Members and other interested individuals to submit a symposium proposal for presentation during IAFP 2006, August 13–16, 2006 in Calgary, Alberta, Canada.

WHAT IS A SYMPOSIUM?

A symposium is an organized, 3 1/2 hour session emphasizing a central theme relating to food safety and usually consists of six 30-minute presentations by each presenter and a 30-minute break. Short symposia with three or four 30-minute presentations are also possible. Innovative approaches such as roundtable question-and-answer sessions or open format concepts will also be considered.

Symposia may include a discussion emphasizing a scientific aspect of a common food safety and quality topic, issues of general interest relating to food safety and microbiological quality, a report of recent developments, an update of state-of-the-art methodologies, or a discussion of basic and applied research in a given area. The material covered should include current work and the newest findings. Symposia will be evaluated by the Program Committee for relevance to current science and to Association Members. Proposals may be prepared by individuals, committees, or professional development groups (PDGs).

SUBMISSION INSTRUCTIONS

To submit a symposium proposal, read all information on this page, pay close attention to the "Symposia Selection Procedure" on the next page, then complete the "Symposium Proposal" on page 378. Follow all instructions for making a submission. Your suggested presenters need not be confirmed at this stage, only identified.

SYMPOSIUM PROPOSAL DEADLINE

Proposals may be sent to the Association office no later than August 5, 2005 or be presented to the Program Committee at its meeting on Sunday, August 14, 2005 in Baltimore, Maryland.

The Program Committee will review submitted symposia at the conclusion of IAFP 2005 to decide which symposia will be selected for further development. Organizers will be notified as to the status of their proposal by September 30, 2005. Accepted symposia are required to be finalized and sent to the IAFP office by February 8, 2006. The Program Committee has the final decision whether symposia will be accepted for presentation at IAFP 2006. The organizer will be notified of the final results by March 31, 2006.

PRESENTERS WHO ARE NOT MEMBERS

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

ASSOCIATION FOUNDATION SPONSORSHIP

The International Association for Food Protection Foundation has limited funds for travel sponsorship of presenters. After final acceptance of the symposium (March 2006), symposia organizers may make requests in writing to the Program Committee Chairperson. Requests are reviewed on an individual and first-come-first-served basis. The maximum funding grant will be $500 per presenter ($750 if outside North America). Organizers are welcome to seek funding from other sources and the Association will provide recognition for these groups in our program materials. Organizers are asked to inform the Association if they obtain outside funding.

SYMPOSIA SELECTION PROCEDURE:

The primary focus of the symposia selection procedure is to provide a balanced educational program for attendees of the IAFP Annual Meeting. To achieve this goal, symposia may be combined or modified by the Program Committee, as appropriate, to prevent overlap of topics among competing symposia. During this process, the top symposia proposed by groups and individuals will be selected for further development.

Guidelines for tentative acceptance:

1. Proposed symposia must be pertinent to IAFP members and PDGs. Priority will be given to symposia that address one or more of the following program areas:
   - Safety and Microbial Quality of Foods (Dairy, Meat and Poultry, Seafood, Produce, Water)
   - Viruses and Parasites, Retail Food Safety, Epidemiology and Public Health
   - Non-Microbiology Food Safety Issues (food toxicology; allergens; chemical contaminants)
   - General-Applied (advances in sanitation, lab methods, quality assurance, food safety systems)
   - General-Food Protection for the Future (risk analysis; emerging pathogens; biotechnology; predictive models, etc.)
   - Other pertinent food protection topics may be considered if space is available
2. In addition to addressing pertinent program areas, symposia accepted for further development should:
   - Be new, emerging and/or address areas not covered in last 2 years
   - If covered in last 2 years, provide new information that warrant another symposium
3. Symposium submissions must include:
   - Titles that clearly convey the topics to be covered
   - Topics that are unique to prevent overlap of basic information among speakers
   - Names of suggested speakers from a variety of backgrounds, such as industry, regulatory, academic researchers, or consumer perspective (as appropriate)
   - Suggested speakers who are knowledgeable and good communicators
4. Special consideration will be given to symposium submissions that:
   - Are directly applicable or provide viable safety options for food manufacturers, including small to medium size manufacturers
   - Bring an international (outside of North America) focus or viewpoint to the meeting
   - Attract/involve students
   - Attract/involve local affiliate members who would not otherwise attend the annual meeting (e.g., regional specialties like shellfish issues for New Orleans)
   - Would attract members of a new PDG or program area that IAFP is trying to develop or encourage
5. Other considerations for selecting symposia for further development
   - Proposals must be submitted to the Program Committee by Sunday, August 14, 2005
   - The Program Committee reserves the right to limit the number of sessions devoted to a single program area to provide a balanced program
   - If relevant topics are proposed by more than one submission, the Program Committee will make the final decision to combine or modify symposia as appropriate to avoid overlap of topics among competing symposia
   - Due to space and time limitations, only the top proposals (as modified by the Program Committee) will be selected for further development as either full sessions (consisting typically of six 30-minute presentations or round table discussions) or short sessions (consisting typically of three or four 30-minute presentations or round table discussions)
   - Three sessions will be reserved for symposia sponsored by our partner, International Life Science Institute North America (ILSI, N.A.). The ILSI N.A. symposia address topics that are of general interest to IAFP meeting attendees, focus on emerging food safety issues and technologies, and provide a global perspective
   - Additional sessions may be added at the discretion of the Program Committee to accommodate emerging issues
6. Final decisions on symposia selection will be made at the February 2006 Program Committee Meeting.
   - Accepted symposia are required to be finalized with speakers confirmed and sent to the IAFP office by February 8, 2006. Only fully developed symposia will be considered.

WHO TO CONTACT:

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Fax: 515.276.8655
E-mail: bbrannen@foodprotection.org

Symposium Proposal

IAFP 2006

August 13-16

Calgary, Alberta, Canada

Title: _____

Organizer's Name: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

Topic — Suggested Presenter, Affiliation

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

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Suggested Convenors:

_____

_____

Description of Audience: _____

Signature of Organizer: _____

Submit by August 5, 2005 to:

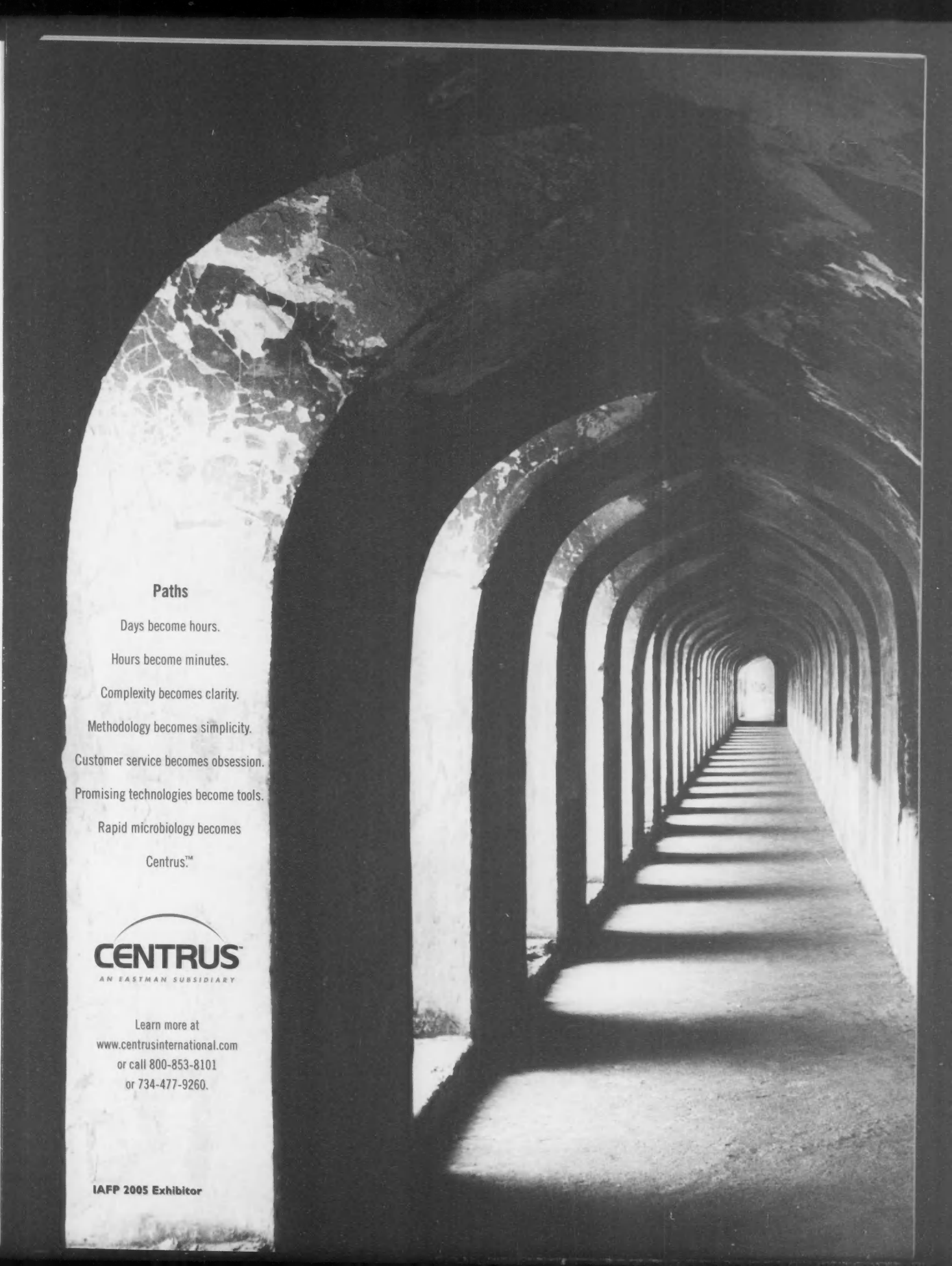
IAFP — Symposium Proposal
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA

Submit in person on August 14, 2006 to:

Program Committee — IAFP 2006
Baltimore, Maryland

or Contact:

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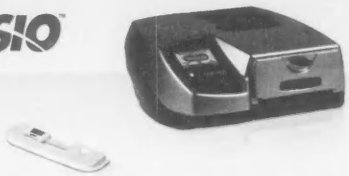

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SILVER SUSTAINING MEMBER

(The following company recently became a Silver Sustaining Member)

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Aerotech P&K Laboratories
Phoenix, AZ, USA

Frank Yiannas
Walt Disney World Company
Lake Buena Vista, FL, USA

UPDATES

Donna Garren Accepted Vice President Position at National Restaurant Association (NRA)

Dr. Donna Garren has accepted the position of vice president, health and safety regulatory affairs at the National Restaurant Association. She began working at NRA in mid-April.

For the past 6 years Dr. Garren worked at United Fresh Fruit and Vegetable Association as vice president of scientific and technical affairs.

Steven Lloyd Appointed Director of Sales for Multisorb Technologies

Multisorb Technologies, Inc., has appointed Steven M. Lloyd as director of sales. In this new capacity Lloyd will manage company sales efforts and customer service for Multisorb's global customer base. Regional business development leaders will report to Lloyd on account maintenance and sales growth. Multisorb's sorbent products service diverse industries including food, pharmaceutical, nutraceutical, diagnostics, electronics, and logistics.

Prior to Multisorb, Lloyd most recently spent six years working at ATTO Technology Inc. in Amherst, NY. Previously, Lloyd spent 18 years with Moore Business Forms and Systems as district sales manager, major accounts in Chicago, IL. Lloyd holds a bachelor of arts degree from Brown University.

Key Technology Appoints Craig Miller to the New Position of Vice President and General Manager

Senior vice president and general manager of the Aftermarket Business Unit Key Technology announces the appointment of Craig Miller to the new position of senior vice president and general manager of the Aftermarket Business Unit. Miller is responsible for providing leadership that supports the company's strategy to assure customers worldwide get the parts, upgrades and services they need to generate maximum long-term return on their capital investments.

Miller has an extensive background in international business. Most recently, he was the president and CEO of Solance Technologies, a software start-up company where he was one of the founders. Solance developed control and automation software for electronic instruments. Previously, Miller spent 16 years at Fluke Corporation, where he rose to the position of vice president of sales and marketing. He holds a BS degree from the University of Oregon and earned his MBA from Portland State University.

Mick Williams Joins Fristam Pumps

Fristam Pumps USA is pleased to announce Mick Williams has joined the company as purchasing manager.

Mick holds a BA in business administration from Marycrest International University, Davenport, IA and has a certificate in operations management from University of Wisconsin-Madison, executive education. Mick is a member of American Production and Inventory Control Society and is certified in production and inventory management.

As purchasing manager, Mick will be responsible for managing the supply chain, procuring key production materials, measuring supplier performance, and searching for cost and quality improvements.

Tong is 'New' Director of Cal Poly Dairy Products Technology Center

Cal Poly Dean of Agriculture Dave Wehner announced that Professor Phil Tong will once again serve as director of the Dairy Products Technology Center.

Tong helped create the DPTC in the 1980s and previously served as its director from 1989 to 1997.

Tong teaches both graduate and undergraduate courses in dairy science and organizes a full series of annual short courses and symposia for industry. He will continue those tasks along with taking charge of the center.

Tong was recently appointed to serve as the US representative on the Standing Committee on Dairy Science and Technology of the International Dairy Federation, which involves 50 countries.

The Steritech Group Inc. Announces New Vice President of Business Development, Philip Gentlesk, Jr.

Philip Gentlesk, Jr., a veteran food industry professional, has joined Steritech as the vice president of business development for the pest prevention division. A seasoned sales and marketing expert, Gentlesk will be responsible for coordinating national sales efforts and account management and play a pivotal role in training Steritech's Pest Prevention account executives.

In addition to Gentlesk's sales management role, he will also apply his work in customer relations and

oversee Steritech's Customer Service Center, a unit dedicated to the company's larger national accounts. He will also lend counsel to the division's strategic marketing campaigns.

Gentlesk comes to Steritech with 15 years of sales, marketing and customer service experience in the food industry, having served as director of Business-to-Business Marketing for Archer Daniels Midland Company (ADM) and a variety of positions in over a decade at Midlantic Sweeteners, a food ingredients distribution and brokerage company. He finished his tenure with that company in the position of vice president, a position he occupied for five years.

Gentlesk earned his MBA from The University of North Carolina at Charlotte and holds a BS in food marketing from St. Joseph's University (PA).

Kueneman Joins Steril-Aire as Food Industry Sales Manager

Steril-Aire, Inc., has appointed David C. Kueneman to the position of food industry sales manager.

Kueneman comes to Steril-Aire with more than 20 years of international management experience in the food processing industry. He served most recently as vice president of sales and marketing for C&S Equipment Co. LLC (Caldwell, Idaho), where he helped develop and market germicidal UVC equipment for food safety. Prior to that, he spent 15 years with the J. R. Simplot Company (Boise, ID).

In his new post at Steril-Aire, Kueneman will be involved in sales, marketing, product and application development, and other activities targeting the food industry. Steril-Aire UVC devices, which are used in food and beverage processing lines, air handling systems and other locations, have earned numerous awards and patents for their proven abilities to improve product quality and yield, extend shelf life, and reduce energy and maintenance costs.

In Memory of...

Virgil Dean Grace
Savannah, Georgia

Robert W. Wilson
Carlsbad, California

IAFP would like to extend our deepest sympathy to the families and friends of Virgil Dean Grace and Robert W. Wilson who both passed away in March 2005.

IAFP will always have sincere gratitude for their contributions to the Association and their profession.

Experiences of Seven Countries in Consolidating Their Food Safety Systems

In consolidating their food safety systems, the seven countries we examined — Canada, Denmark, Germany, Ireland, The Netherlands, New Zealand, and the United Kingdom — varied in their approaches and the extent to which they consolidated. However, the countries' approaches were similar in one respect — each established a single agency to lead food safety management or enforcement of food safety legislation. These countries had two primary reasons for consolidating their food safety systems — public concern about the safety of the food supply and the need to improve program effectiveness and efficiency. Countries faced challenges in deciding whether to place the agency within the existing health or agriculture ministry or establish it as a stand-alone agency while also determining what responsibilities the new agency would have and helping employees adjust to the new agency's culture and support its priorities. Although none of the countries has analyzed the results of its consolidation, government officials consistently stated that the net effect of their country's consolidation has been or will likely be beneficial. Officials in most countries stated their new food safety agencies incurred consolidation startup costs. However, in each country, government officials believe that consolidation costs have been or will likely be exceeded by the benefits. These officials and food industry and consumer stakeholders cited significant qualitative improvements in the effectiveness or efficiency of their food safety systems. These improvements include less overlap in inspections, greater clarity in responsibilities, and more consistent or timely enforcement of food safety laws and regulations. In addition to these qualitative benefits, officials from three countries, Canada, Denmark, and The Netherlands, identified areas where they believe financial savings may be achieved as a result of consolidation. For example, in the Netherlands officials said that reduced duplication in food safety inspections would likely result in decreased food safety spending and that they anticipate savings from an expected 25 percent reduction in administrative and management personnel. Although the seven countries we reviewed are much smaller than the United States, they are also high-income countries where consumers have very high expectations for food safety. Consequently, we believe that the countries' experiences in consolidating food safety systems can offer useful information to US policymakers.

The safety and quality of the US food supply are governed by a complex system that is administered by 15 agencies. The US Department of Agriculture (USDA) and the Food and Drug Administration (FDA), within the Department of Health and Human Services (HHS), have primary responsibility for food safety. Many legislative proposals have been made to consolidate the US food safety system, but to date no other action has been taken. Several countries have taken steps to streamline and consolidate their food safety systems. In 1999, we reported on the initial experiences of four of these countries —Canada, Denmark, Ireland, and the United Kingdom. Since then, additional countries, including Germany, The Netherlands, and New Zealand, have undertaken consolidations. This report describes the approaches and challenges these countries faced in consolidating food safety functions, including the benefits and costs cited by government officials and other stakeholders. In commenting on a draft of this report, HHS and USDA said that the countries' consolidation experiences have limited applicability to the US food safety system because the countries are much smaller than the United States. The two agencies believe that they are working together effectively to ensure the safety of the food supply.

The full report is available at: http://www.gao.gov/cgi-bin/getrpt?GAO-05-212.

Feeding the World Requires More Than a Spoonful of Safety

While the United States battles an obesity epidemic, millions around the world are starving or malnourished – a population already at increased risk of foodborne disease. Fighting hunger goes hand in hand with the fight against foodborne disease, urges a Michigan State University researcher.

When production of food goes up on a mass scale, something in the food system – even the smallest problem – can exacerbate on a large scale and a large amount of people can be affected by foodborne disease, says Ewen C.D. Todd, director of the National Food Safety & Toxicology Center at MSU.

Increased demand for food – and the whirlwind of trade to meet the demand for the export markets – carries an invisible price tag – in some cases, the loss of land to produce the food, and in other cases higher risk for food contamination for both local and exported foods.

"When we look at the question of feeding the world, we also have to take into account providing safe food," Todd says. Among the concerns that affect food safety: storage, transportation, production, worker hygiene, trade and food laws, new pathogens, antibiotic resistance, natural disasters, vendor/retail sanitation among others.

Todd spoke at the American Association for the Advancement of Science annual meeting in Washington, D.C., in a symposium entitled "Can We Feed the World Without Poisoning the Earth?"

Todd spoke alongside Nobel Peace Prize winner Norman Borlaug and Charles Benbrook, who was an invited speaker at the First World Congress on Organic Food, organized by the National Food Safety & Toxicology Center at MSU.

During his talk, Todd focused on microbial contamination of food in and from countries that face problems of hunger. Microbial hazards are not diminishing and food contamination is a problem in both developing and developed countries that needs more attention.

"We need new approaches to food control, particularly centralized food safety policies that each country understands and increased surveillance to track the source of the problems," Todd says. "The goal of fighting hunger and foodborne disease is achievable, but it will take planning and vision."

"Worldwide, approximately 1.5 billion episodes of diarrhea occur annually in children under the age of five, resulting in some 1.8 million deaths. Estimates are that up to 70 percent of diarrheal episodes may be caused by foodborne contaminants," Todd says.

There are examples of positive change, pointing to the food safety strategy of Ghana to control pathogens in fresh fruits and vegetables through the use of pre-cooling trucks to ship and store the food. Todd also points to the Codex Alimentarius Commission as a way of standardizing food safety standards through its international emphasis on encouraging fair international trade in food while promoting the health and economic interest of consumers. Todd is leading the only dedicated Food Safety Policy Center, which is examining US and international food safety policies and standards.

"One of the dilemmas facing food production is the increasing demand for stricter standards, which make it more difficult for developing countries to produce food for export. Food safety has become critical in international trade discussions following the establishment of the SPS (sanitary and phytosanitary) agreement in 1995. Since then, regulations in developed countries have become increasingly comprehensive and stringent, in some cases restricting trade or significantly increasing the costs of food exports from many developing countries," Todd says.

Education is a major tool in the fight against foodborne disease, Todd urges, and he supports the annual MSU International Short Course in Food Safety, a two-week course designed for working professionals in developing countries to learn how to apply food safety policies and technologies to their own countries from US. experts and from fellow students.

In addition, five conferences organized by the National Food Safety & Toxicology Center have yielded valuable education and policy tools in the form of conference proceedings. All information is available online at www.foodsafe.msu.edu.

FDA Assesses New Report on Acrylamide

The Food and Drug Administration (FDA) is reviewing a report released on March 2, from the Food and Agriculture Organization and World Health Organization Joint Expert Committee on Food Additives (JECFA) on acrylamide in food. Acrylamide is a natural byproduct that forms when certain carbohydrate-rich foods are fried, baked, or roasted at high temperatures. Acrylamide can cause cancer in laboratory animals at high doses, although it is not clear whether it causes cancer at the much lower levels in food.

"FDA has been at the forefront of developing the science needed to fully assess acrylamide," said Dr. Robert Brackett, FDA's director of the Center for Food Safety and Applied Nutrition. "We look forward to thoroughly assessing JECFA's latest findings on this issue, so that we can work together using sound science to assure the safety of our food supply."

Since the discovery of acrylamide in food in 2002, FDA has initiated a broad range of activities on acrylamide, including being at the forefront of new toxicology research on acrylamide. This FDA research includes the carcinogenicity and neurotoxicity studies and the toxicology modeling work cited in the JECFA recommendations. The results of these studies, expected in 2007, will be pivotal for future evaluations of acrylamide.

Experts from FDA participated in the meeting and recent FDA research on acrylamide levels in food and acrylamide toxicology were used for JECFA's evaluation. Although the report concludes that acrylamide may be a human health concern, JECFA also cautions that there are uncertainties in its conclusions because of limitations in the data used to evaluate acrylamide. JECFA also made the following recommendations that are consistent with the FDA's approach:

- Reevaluate acrylamide when ongoing carcinogenicity and long-term neurotoxicity studies are available;
- Continue work on acrylamide using toxicology modeling;
- Continue appropriate efforts to reduce acrylamide concentrations in food; and
- Encourage accumulation of scientific data on acrylamide in foods in developing countries.

At this time, FDA advises consumers to eat a balanced diet, choosing a variety of foods that are low in trans fat and saturated fat, and rich in high-fiber grains, fruits, and vegetables. FDA is also planning to release new data this spring on acrylamide levels in the US diet.

For further information about acrylamide, consumers can turn to the FDA's Center for Food Safety and Applied Nutrition Web site at http://www.cfsan.fda.gov/~lrd/pestadd.html#acrylamide.

Research Reveals Functions of Harmful Shellfish Pathogens

Providing safer shellfish is the goal of Agricultural Research Service (ARS) scientists who are studying the means by which pathogenic bacteria enter shellfish.

In the United States, two pathogenic bacteria from the genus *Vibrio* are of concern, *V. vulnificus* and *V. parahaemolyticus*. These bacteria are naturally found in shellfish and seawater, particularly when water temperatures are warm, and can lead to serious health concerns. ARS scientists at the Microbial Safety of Aquaculture Products Center of Excellence in Dover, DE, are studying these bacteria with the goal of keeping them out of shellfish. Gary P. Richards, a microbiologist and the center's lead scientist, wants to identify *Vibrio* enzymes that may help the organism enter shellfish — and, eventually, a human host. Richards, who leads a group of scientists from Delaware State University and the National Institutes of Health, recently discovered in *V. vulnificus* an enzyme called phosphoglucose isomerase. This enzyme could provide a way for *Vibrio* to spread more easily.

He also detected the enzyme in virtually all species of *Vibrio* tested, but not in non-*Vibrio* pathogens. The enzyme is capable of producing what are called vasoactive peptides, which could contribute to rapid spread of *V. vulnificus* in humans. A study of *V. vulnificus* in oysters suggests that strains virulent to humans may be more invasive to — and persistent in — oysters. The Dover Center, a field location of the ARS Eastern Regional Research Center in Wyndmoor, PA, also studies methods to detect norovirus and the hepatitis A virus in shellfish. It also develops high-pressure processing techniques to inactivate enteric viruses in contaminated shellfish. This research may provide better diagnostic capabilities and treatment strategies to further reduce shellfish-related illnesses. Read more about this research in the March issue of *Agricultural Research* magazine, available online at: http://www.ars.usda.gov/is/AR/archive/mar05/shellfish0305.htm.

New *Journal of Food Law and Policy*

The University of Arkansas School of Law is proud to announce the *Journal of Food Law and Policy*, the first student-edited law journal in the US devoted exclusively to the study of food law and policy. The publication of this journal coincides with the increasing worldwide attention given to food and food systems. Scholarly contributions to the journal will address timely food law topics, including food regulation, food safety, biotechnology, obesity litigation, labeling, food and dietary supplements, food security and bioterrorism, and international food trade. Special attention will be given to global food law developments, with each edition including an update on US and European food law and eventually other world regional updates.

Several prestigious authors have already committed to contribute to the debut issue, including Peter Barton Hutt, co-author of *Food and Drug Law: Cases and Materials*, former chief counsel for the Food and Drug Administration, and a lecturer on Law at Harvard Law School. The second edition will include a description and analysis of the newly formed European Food Safety Authority and its relevance to US food companies. The Journal is also pleased that the prominent Washington, D.C. law firm Arent Fox will sponsor an "Arent Fox/Dale Bumpers Excellence in Writing Award," which will be presented to the outstanding student paper published in the Journal each year. Former Senator Bumpers from Arkansas is of counsel to Arent Fox and was instrumental in the development of agricultural and food law

interest at the University of Arkansas School of Law.

Salt, Fat and Sugar in Top Five Food Concerns

People are increasingly concerned about their diet and health, according to the Agency's fifth Consumer Attitudes Survey published. Salt levels are the top food concern, with fat and sugar also appearing in the list of top five.

More people than ever before are checking food labels to find out how much salt, fat and sugar is in the food. Over the past five years, among people who check labels, the number of people who say they look for nutritional details has risen to 75% in 2004, from just over half in 2000.

Gill Fine, director of Consumer Choice and Dietary Health at the Food Standards Agency said, "Over the last five years the trend among consumers has been towards healthier eating and an increase in demand for reliable and practical information on all aspects of nutrition, food and health. People are more worried about levels of salt, fat and sugar in food and the accuracy of food labels, and less concerned about issues like BSE."

To meet the growing demand for information about nutrition and healthy eating, the Food Standards Agency has launched a new Web site – www.food.gov.uk/eatwell – dedicated to providing reliable and practical advice on all aspects of food, diet and health, as well as helpful tips on topics such as understanding food labels.

The level of concern about BSE has fallen by almost a quarter since 2000. Other five-year trends include the number of people claiming to have eaten five portions of fruit, and vegetables the previous day has risen from just over a quarter in 2000 to half of all consumers in 2004. Knowledge of the '5 a day' message of eating fruit and vegetables has increased from 43% in 2000, to 58% in 2004. Concern about the safety of raw beef has fallen dramatically, from over half of all consumers in 2000, to just over a third in 2004. Concern about the accuracy of food labelling has risen from 35% in 2000 to 44% in 2004.

Tracking Antimicrobial-resistant Organisms

Antibiotics have been used for years to fight bacterial infections, but some bacteria are developing resistance to these antimicrobial drugs. Agricultural Research Service (ARS) scientists in Athens, GA, are tracking antimicrobial resistance and seeking ways to minimize it.

ARS microbiologist Paula Fedorka-Cray, research leader of the agency's Bacterial Epidemiology and Antimicrobial Resistance Research Unit at Athens, leads a team that is testing for antimicrobial resistance in foodborne microbes.

In these studies, bacterial samples are taken from sick farm animals, healthy farm animals and animal slaughter facilities. The lab's scientists then isolate, test and characterize more than 17,000 bacterial samples a year. Patterns of resistance are difficult to discern because bacteria don't react predictably and uniformly to antibiotic treatment. For instance, there are many different types of *Campylobacter*, but each responds differently to antimicrobial drugs.

Another potentially harmful bacterium, *Salmonella*, has more than 2,400 different types, and each one appears to develop resistance to antibiotics at a different rate. Of all *Salmonella* types tested from 1997 to 2003, the rate of single-drug resistance has remained relatively stable at 9.5 percent of the samples. However, the number of *Salmonella* types that are resistant to more than five drugs rose from 11 percent to 20 percent. Those that are resistant to more than 10 drugs rose from a scant 0.8 percent to almost 6 percent. Fedorka-Cray's research group has developed the nation's largest descriptive database of resistant populations of bacteria recovered from animals over time. The data will be used to determine the probability that resistance will occur or be maintained if antibiotics are used. Changes in antibiotic use in food-animal production are being made in response to the development of resistance to the drugs.

Read more about the research in the March 2005 issue of *Agricultural Research* magazine, available online at: http://www.ars.usda.gov/is/AR/archive/mar05/organism0305.htm.

Cornell Joins USDA's $5 Million Food-safety Initiative

Acute gastroenteritis — commonly known as food poisoning — is one of the most common household illnesses in the United States, with an estimated 76 million food-related illnesses occurring each year.

To learn more about preventing the spread of food-related illness pathogens on the farm, researchers at Cornell University are joining a new US Department of Agriculture (USDA)-funded Food Safety Research and Response Network (FSRRN), led by North Carolina State University. FSRRN is a multi-

institutional, multidisciplinary team of more than 50 food safety experts from 18 colleges and universities who will investigate several of the most prevalent foodborne pathogens. It is funded by a $5 million grant from the USDA Cooperative State Research, Education and Extension Service.

"We will study pathogens, such as *E. coli*, *Salmonella* and *Campylo*bacter, which are among the most important foodborne pathogens in the United States, to determine where they thrive in the environment, how they infect herds, how they can be detected and what can be done to reduce their presence in livestock and their risk to human health," says Yrjo Grohn, one of the co-principal investigators on the project. He is a professor of epidemiology and chairman of Population Medicine and Diagnostic Sciences in the College of Veterinary Medicine at Cornell. The research, he says, will focus on preharvest food safety on farms.

The other Cornell researchers include Yung-Fu Chang, professor of population medicine and diagnostic sciences; Ynte Schukken, director, Quality Milk Promotion Services (QMPS), a research and service microbiology laboratory that handles some 200,000 samples annually, and professor of epidemiology and herd health; Lorin Warnick, associate professor of population medicine and diagnostic sciences; and Linda L. Garrison-Tikofsky, senior extension veterinarian at QMPS.

Newly Formed ARS Laboratory Will Focus on Egg Safety and Quality

Egg safety, quality and marketability are the focus of a new Agricultural Research Service (ARS) laboratory established this year in Athens, GA. The new Egg Safety and Quality Research Unit, based at the Richard B. Russell Research Center, will conduct research to protect both the health of consumers and the marketability of eggs. Scientists will develop improved technologies for egg production and processing that will reduce or eliminate microorganisms that can transmit disease to humans or cause spoilage. One of the unit's key research goals is to determine how microbial pathogens infect poultry and cause egg contamination, according to ARS microbiologist Richard Gast, the unit's research leader. Additionally, scientists will investigate how poultry production practices can influence such infections. Researchers will develop methods to prevent pathogens from infecting egg-laying poultry, and tests to detect infected flocks and contaminated eggs. Ultimately, the research may also help improve egg processing practices, which could reduce microbial contamination while enhancing egg quality. Researchers in the unit include Gast, veterinary medical officer Jean Guard Bouldin, microbiologist Peter Holt, physiologist Randy Moore, and food technologists Deana Jones and Mike Musgrove. In 2003, an estimated 87.2 billion eggs were produced in the United States, with about 85 percent of them destined for human consumption, according to figures from USDA's Economic Research Service. Per capita consumption of eggs and egg products in 2003 was the equivalent of 254 eggs, an increase of 19 eggs per person from 1990, ARS estimated.

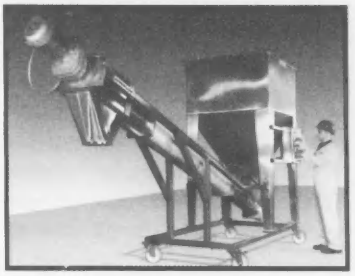
FSAS Publishes Safety Guide for Farmers' Markets

The Food Standards Agency Scotland has published a guide to help keep food safe in farmers markets. The Food Safety Guide for Farmers' Markets is designed to help market traders and organizers meet food safety requirements. The information in the guide would also apply to similar events, such as car boot sales, fêtes, agricultural shows and continental markets.

It provides specific information on compliance with the Food Safety (General Food Hygiene) Regulations 1995 and the Food Safety (Temperature Control) Regulations 1995 and has been developed with the help of local authorities, the Scottish Food Advisory Committee and the Scottish Association of Farmers' Markets.

The guide, which builds on existing good practice, will be revised next year to reflect the changes following the consolidation of the EU food hygiene regulations, which come into force in January 2006. Labelling guidance, currently being developed by the working group, will then be inserted into the guide.

INDUSTRY PRODUCTS



SpiroFlow Systems, Inc.

SpiroFlow Introduces Large Throughput Flexible Screw Conveyor

SpiroFlow Systems has expanded its line of conveyors with a new high capacity Flexible Screw Conveyor maximum output of over 44 tons per hour.

The SpiroFlow 834 Flexible Screw Conveyor (FSC) not only encompasses all the advantages of a standard FSC, but also provides the user with the needed throughput for larger applications. The flexible unit can convey at inclines up to 60°, while competitive rigid screw conveyors top out at 30° to 40° and only convey at 30% to 45%. Other advantages include 100% full capacity throughput, continuous mixing of product and variable speed drives for accurate metering.

The 834 Flexible Screw Conveyor is available in carbon or stainless steel models for differing applications. Major advantages include low maintenance and cleaning, mobile bases and small bag dump stations for easy handling of products.

SpiroFlow Systems, Inc.
704.291.9595
Charlotte, NC
www.spiroflowsystems.com

Labconco's Stainless Steel Cart Provides Easy Equipment Transfer from Countertop to Cart

The Stainless Steel Cart has two removable polished Type 304 stainless steel pans that hold a variety of laboratory equipment and miscellaneous containers. The pans are two inches deep on three sides with one open side for easy equipment transfer from countertop to cart.

The durable welded frame is one-inch square steel tubing with corrosion-resistant baked-on epoxy powder coating, glacier white in color. The four-inch hard rubber casters stabilize movement over rough, uneven floors and come with two toe locks. The cart withstands loads up to 400 pounds.

The Stainless Steel Cart from Labconco is delivered ready to roll with no assembly required. The quality workmanship is backed with a lifetime guarantee.

Labconco Corporation
816.333.8811
Kansas City, MO
www.labconco.com

New AutoCount™ Automated Counting Systems from Gainco

Gainco, Inc. introduces new AutoCount™ automated counting systems for faster and more accurate counting of a conveyorized stream of fresh or frozen poultry and meat items for boxing or bagging. Completely engineered and built in the USA, these systems provide better accuracy and reduce product giveaway, while at the same time dramatically reducing the labor force devoted to manual counting operations.

AutoCount™ automated counting systems feature patent-pending "double-count detect" technology that virtually eliminates the incidence of errors in product batching operations. Over- or under-counts are effectively eliminated by the tight count specifications this technology is capable of delivering. Moreover, this high level of accuracy is obtained at very high speeds of up to 160 ppm (pieces per minute), thereby improving throughput in the plant.

Gainco's AutoCount™ units are designed and constructed for rugged, dependable performance, counting accuracy, and user-friendly interfaces. Management information and report summaries can be generated instantly, allowing processors to track throughput and packaging counts in real-time. The system's battery-backed memory records all operating data and setup

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

parameters, while versatile controllers provide ease and flexibility in program setup and operation. If desired, a host PC can be connected to multiple AutoCount™ systems for centralized reporting, setup control, and yield analysis.

Gainco, Inc.
770.534.0703
Gainesville, GA
www.gainco.com

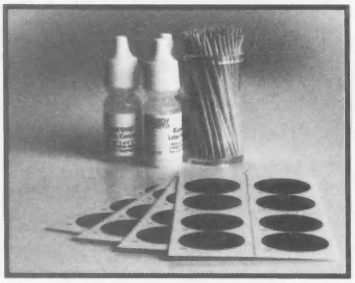
UniFirst Helps Eliminate Food Safety Threats

Commercial food processors throughout the US and Canada are focused more than ever on HACCP (Hazard Analysis Critical Control Points), a quality assurance program aimed at eliminating virtually all potential production hazards from their daily operations. Specifically, they are looking to eliminate all cross-contamination threats by their processes and handlers. Compliance involves everything from the food production itself, right down to the clothes employees wear on the job. That's why UniFirst Corporation now offers specialized, HACCP-conscious uniform programs to businesses concerned with keeping their food products safe from contamination.

UniFirst's HACCP line of work apparel includes various shirts, pants and smocks specifically designed for food processing environments — all without buttons or pockets which could add potential for contaminants. In addition, color-coded garments can help managers better identify workers who could be contaminating food products by being outside their designated work areas.

Thousands of UniFirst associates have been trained in the company's exacting HACCP work apparel cleaning procedures, which revolve around a six-step "Precision Wash Process." This process begins with clothing being separated by color and nature of soiling prior to being digitally weighed and automatically transported to wash-wheels so that precise microprocessor-controlled combinations of cleaning agents, water volume, and agitation can be used to ensure maximum cleanliness. All precision-washed garments, ultimately, undergo a 275°F vibra-steam conditioning process to ensure bacteria elimination, as well as 10-point quality inspection before being wrapped with protective plastic coverings for return to customers. Meanwhile, the entire process is documented, step-by-step, for compliance.

UniFirst Corporation
800.225.3364
Wilmington, MA
www.unifirst.com



Hardy Diagnostics

Hardy Diagnostics Introduces the E. coliPRO O157 Latex Agglutination Kit

E coliPRO O157 Latex Agglutination kit offers definitive identification of *E. coli* O157 from a single isolated colony. Rapid results are obtained in as little as two minutes at room temperature. E. coliPRO O157 is useful in eliminating the possibility of cross reactions with *Escherichia hermanii* and other sorbitol negative *Escherichia* species. The kits reagents are ready-to-use and remain in one-space saving workstation. E. coliPRO O157 is a complete kit which contains positive and negative controls, mixing sticks, and reaction cards. Finally, E. coliPRO O157 is stable, with a two-year shelf life from the date of manufacture. The EcoliPRO O157 kit contains large white carboxylated latex particles resulting in strong easy-to-read positive reactions. The white latex particles show up clearly on the black reaction card which contains eight reaction circles.

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

Onset Computer Corporation Introduces Piercing-Probe Data Logger for Food Temperature Tracking

New HOBO® U12 Stainless Temp Logger tracks food temperatures for HACCP compliance, features 5% piercing probe. Onset Computer Corporation has introduced the HOBO U12 Stainless 5% Probe Temp Logger, a high-accuracy, piercing-probe data logger designed to monitor temperatures of stored, frozen and prepared foods. Designed for use in ovens, smokers, autoclaves and other equipment, the logger features a -40° to 125°C temperature range, a 20-sec-

ond response time, and a food-grade 316L stainless steel housing. A direct USB interface enables high-speed offload of the collected data onto a PC.

To graph and analyze food temperature data, Onset offers HOBOware® 2.0 for Windows, a highly intuitive graphing and analysis software package. HOBOware provides a user-friendly graphical user interface and one-click conversion of data for easy upload into spreadsheets and other programs.

Onset Computer Corporation
800.564.4377
Bourne, MA
www.onsetcomp.com

Nilfisk-Advance America New Industrial Vacuum Cleaners Offer High-End Performance at a Low Cost

When selecting an industrial vacuum cleaner for general plant maintenance, manufacturers are often forced to choose between cost and performance. HEPA-filtered vacuums can help maintain high levels of plant cleanliness, but that benefit is offset by a higher price tag. On the other hand, inexpensive shop vacs may exhaust polluted air and threaten worker safety. Nilfisk-Advance America now eliminates the need to compromise with its low-cost, HEPA-filtered Eliminator I and II wet/dry vacuums.

The rugged Nilfisk Eliminator vacuums are designed to withstand long-term exposure and use in abusive industrial environments. With a high-performance motor that delivers maximum suction power, and a durable, thermoplastic housing that resists corrosion, the vacuums are well suited for general wet/dry maintenance cleaning in the metalworking, pharmaceutical/chemical, food manufacturing, and powder coating industries, as well as in the military sector. Wet pick-up capability is standard with the Eliminator II and optional on the Eliminator I.

Despite their tough exterior, the Eliminator vacuums are also ideal for sensitive applications where a HEPA filter is required, such as the collection of hazardous materials. The vacuum's three-stage HEPA filtration system ensures that collected materials are retained within the vacuum, rather than exhausted into the air where they may pose a threat to worker health and safety. The system captures 99.97% of dust and debris, down to and including 0.3 microns.

Additional, key features of the Eliminator I and II include:

- Fifty-foot yellow cord for assured safety
- Lightweight, easily emptied collection container
- On-board caddy for convenient tool storage
- Wheeled trolley and large, ergonomic handle for enhanced maneuverability
- Interchangeable filters, accessories, and hoses
- Rugged breakaway container clips for durability

Nilfisk-Advance America
877.215.8322
Malvern, PA
www.nilfisk-advance.com

High Pressure Cell for Rheological Studies from ATS RheoSystems

The New High Pressure Cell (HPC) from ATS RheoSystems/REOLOGICA Instruments is ideal for studying rheological properties of samples at pressurized conditions with full viscometry and limited oscillatory capabilities.

Applications include processes like drilling mud performance, polymer solution addition, gel formation, crude oil transport at low temperatures, and wax precipitation under varying solids content, temperature, and pressure.

Fields of interest also include food products that are sterilized or pumped at increased temperatures, the gelation of solvent-based products at ambient or increased temperature or the observation of polymerization reactions.

The High Pressure Cell is made of corrosion-resistant materials and allows studies at temperatures from -20°C to 300°C and maximum pressure up to 5,900 psig. The five universal ports provide for the possibility of flow through experiments.

ATS RheoSystems
609.298.2522
Bordentown, NJ
www.atsrheosystems.com

Advanced Instruments, Fluorophos Test System Exceeds New Pasteurization Testing Regs, Monitors System Performance and Quality

Advanced Instruments, new Fluorophos® Test System dramatically exceeds the US Food and Drug Administration's new pasteurization testing requirements and evaluates samples in 3 minutes.

As of March 1, 2005, dairy lab managers using the Scharer method of visual ALP colorimetric testing no longer comply with US Food and Drug Administration pasteurization testing

requirements. On that date, new ALP detection criteria of 350 mU (3 micrograms) per liter (0.075% raw milk equivalent) went into effect.

The new Fluorophos technology provides sensitivity to 0.003% raw milk and, unlike the colorimetric method, confirms the pasteurization of many different dairy products including bovine, sheep, and goat milk, flavored and cultured products, and cheeses. The cost per test is low and there is no need to run control samples with each test.

The Fluorophos test has been approved by the International Standards Organization, International Dairy Federation, Interstate Milk Shippers, and AOAC.

Fluorophos Testing Delivers Speed, Sensitivity, and Early Warning Foremost Farms, formerly Wisconsin Dairies adopted the Fluorophos ALP testing system because of its speed, sensitivity, and because it didn't require any hazardous chemicals that could endanger lab technicians.

Advanced Instruments
800.225.4034
Norwood, MA
www.aicompanies.com

GrayWolf Sensing Solutions

Gray Wolf Sensing Solutions' DirectSense TVOC Mobile PC-based PID Meter

GrayWolf Sensing Solutions introduces a new monitoring kit for measuring Total Volatile Organic Compounds (TVOCs), along with other Indoor Air Quality (IAQ) Parameters.

The DirectSense TVOC comes with a 10.6eV PID sensor for ppb range or ppm concentration range measurement of TVOCs. Relative humidity and temperature sensors are also included. Additionally mix or match up to 3 electrochemical gas sensors from a choice of Ozone (O_3), Ammonia (NH_3), Nitrogen Dioxide (NO_2), Nitric Oxide (NO), Sulfur Dioxide (SO_2), Hydrogen Sulfide (H_2S), Hydrogen Cyanide (HCN), Ethylene Oxide (EtO), Oxygen (O_2), Chlorine (Cl_2), Hydrogen Chloride (HCl), Hydrogen (H_2, Arsine (AsH_3), Carbon Monoxide (CO) and more. Added probes for Carbon Dioxide (Co_2), Particle Counts, Differential Pressure and other parameters may be simultaneously monitored by the system.

On-board sensor tips for all parameters include a detailed list of 100+ compounds ionized by the PID sensors, along with common potentially IAQ sources and correction factors for these compounds. Government and industry guidelines and report templates are also included. Meanwhile, end-users may add their own sensor tips, and can load their own Word, pdf, Excel or HTMLdocuments onto the Mobile PC for field access.

GrayWolf Sensing Solutions
203.416.0005
Trumbull, CT
www.WolfSense.com

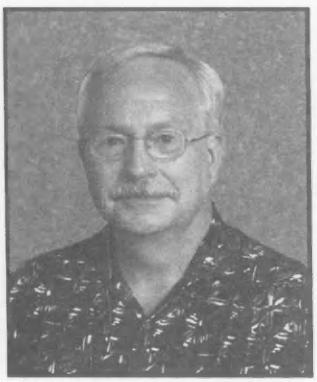
Ivan Parkin Lecture

Sunday, August 14
7:00 p.m. – 8:00 p.m.

Food Safety 2005: Facts Come Easy – Answers are Elusive

Presented by

Douglas L. Archer, Ph.D.
Professor and Past Chair
Food Science and Human Nutrition Department
University of Florida
Gainesville, Florida, USA



Dr. Douglas L. Archer will present "Food Safety 2005: Facts Come Easy – Answers are Elusive" as the Ivan Parkin Lecture on Sunday evening, August 14 at IAFP 2005.

Dr. Archer is a professor and Past Chair of the Food Science and Human Nutrition Department, Institute of Food and Agricultural Sciences at the University of Florida, Gainesville. He received a B.A. degree in Zoology in 1968, a M.S. degree in Bacteriology in 1970 from the University of Maine and a Ph.D. degree in Microbiology in 1973 from the University of Maryland.

Dr. Archer served as Deputy Director, Center for Food Safety and Applied Nutrition, US Food and Drug Administration (FDA) in charge of research, regulatory and policy activities of programs including foods, food additives and food labeling, dietary supplements, seafood, cosmetics and colors. He was a Commissioned Officer in the United States Public Health Service (USPHS) and was appointed Assistant Surgeon General in July 1990. He received numerous awards including five citations for excellence, three Meritorious Service Medals and the Distinguished Service Medal. Other awards included the 1988 Tanner Memorial Award from the Institute of Food Technologists and the J. C. Frazier Memorial Award from the University of Wisconsin in 1992. Dr. Archer retired from the USPHS on January 1, 1994.

Dr. Archer also served as Chairman of the FAO/WHO Codex Alimentarius Committee on Food Hygiene from 1984 to 1994. He is the past US Associate Editor for Food Control where he now serves on the Editorial Board, and since 1990 has been a member of the WHO Expert Advisory Panel on Food Safety.

Dr. Archer is a member of the International Association for Food Protection and the Institute of Food Technologists and also serves as an advisor to the FDA and the WHO. Dr. Archer has authored or co-authored more than 80 scientific publications and given hundreds of presentations to scientific organizations, trade organizations and consumer groups.

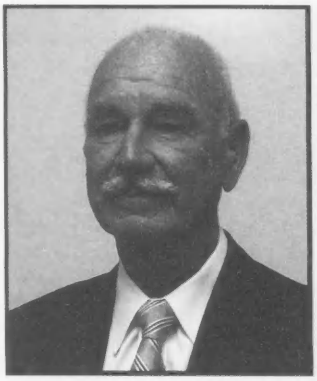
John H. Silliker Lecture

Wednesday, August 17
3:45 p.m. – 4:30 p.m.

Managing the Safety of Internationally Traded Food

Presented by

Michiel van Schothorst, Ph.D.
Retired Vice President, Food Safety Affairs
Nestlé
Vevey, Switzerland



Dr. Michiel van Schothorst will present "Managing the Safety of Internationally Traded Food" as the John H. Silliker Lecture on Wednesday, August 17 at IAFP 2005.

Dr. van Schothorst studied Veterinary Medicine and obtained his Ph.D. at the University of Utrecht (NL). He began his career as a food microbiologist at the National Institute of Public Health in The Netherlands where he became Head of the Laboratory for Zoonosis in 1975. From 1965 to 1980 Dr. van Schothorst was Secretary-Treasurer of the World Association of Veterinary Food Hygienists (WAVFH).

In 1980, Dr. van Schothorst continued his career at the Nestlé Head Office in Vevey, Switzerland where he was appointed Head of Quality Assurance in 1985. In 1992 he was nominated Vice President of Food Safety Affairs until he retired in 2002.

Dr. van Schothorst was elected to become the first professor and European Chair in Food Safety Microbiology at the University of Wageningen (NL) in 1997. In addition he has been active in developing Quality Assurance and Food Safety programs and promoting the HACCP concept through textbooks, publications, lecturing and training.

Dr. van Schothorst was a member of the Permanent Food Safety Advisory Panel of the World Health Organization from 1986-2002, participating in the Codex Food Hygiene Committee from 1968-2002. He was also a member of the International Commission on Microbiological Specifications for Foods (ICMSF) from 1973-2003 and Secretary from 1992-2003.

Dr. van Schothorst participated in many FAO/WHO expert meetings on Food Safety and Public Health, and plays an active role in the WHO/ICD Food Safety training programs such as "Food Safety for Nutritionists and other Health Workers," "HACCP" and "Microbiological Risk Assessment". He is author or co-author of more than 140 scientific publications or chapters in scientific books.

IAFP 2005 Preliminary Program

SUNDAY, AUGUST 14

Opening Session – 7:00 p.m.

- Ivan Parkin Lecture – Food Safety 2005: Facts Come Easy – Answers are Elusive, Douglas L. Archer, Ph.D.

MONDAY, AUGUST 15

Morning – 8:30 a.m. – 12:00 p.m.

Symposium Topics

- Laboratory Response to Food Bioterrorism: How Prepared are We?
- Microbiological Predictive Models: Development, Use and Misuse
- Food Allergens: Concerns for the Packaged Food and Food Service Industries
- Global Water Quality Concerns
- Recent Regulatory Changes and Issues Affecting Your Dairy Operation

Technical Session

- Produce

Poster Session

- Pathogens

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposium Topics

- Update on Foodborne Disease Outbreaks
- Safety Concerns of Food Chemical Contaminants
- Data for Decision Making
- Materials for Multi-Use Food Contact Surfaces: Characteristics, Fabrication, and Evaluation

Technical Session

- Foods of Animal Origin

Poster Session

- Risk Assessment and Antimicrobials

TUESDAY, AUGUST 16

Morning – 8:30 a.m. – 12:00 p.m.

Symposium Topics

- Foodborne Diseases: Discovery of Causes and Reduction Strategies
- Safety of Raw Milk Cheeses – A Global Perspective
- Yeast and Molds: When Fungi Go Bad, Who Do You Call?
- They Said What? – The Risky World of Risk Communication
- Pre-Harvest Issues Associated with the Transmission of Viruses and Parasitic Protozoa – The Problems and the Solutions

Technical Session

- Pathogens

Poster Session

- Produce and General Microbiology

Afternoon – 12:15 p.m. – 1:00 p.m.

- IAFP Business Meeting

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposium Topics

- Managing the Risk of *Listeria monocytogenes* at Retail and Restaurants
- Risk and Control of *Salmonella* in Raw Nuts
- Oceans and Human Health: Trends and Practical Tools for Seafood Safety
- Risk Ranking for Foodborne Pathogens
- Enrichment Media and Sample Preparation: What's New?

Technical Session

- Antimicrobials

Poster Session

- Miscellaneous Food Commodities

WEDNESDAY, AUGUST 17

Morning – 8:30 a.m. – 12:00 p.m.

Symposium Topics

- A Behavioral Approach to Performance-based Food Safety Management – Theory, Practice and Outcome for Successful Retail Food Safety Programs
- Produce Packinghouse Sanitation: Designing and Implementing Effective Food Safety Programs
- International Food Safety Opportunities and Challenges in the Developing World
- Recent Advances in Intervention Strategies for Pathogen Control

Technical Session

- Risk Assessment
- Education

Poster Session

- Method Development for Pathogen Testing

Afternoon – 1:30 p.m. – 3:30 p.m.

Symposium Topics

- Microarray Technology: An Emerging Tool in the Food Microbiologists' Toolbox
- Pathogen Survival in Dried Fermented Meat and Partially Cooked Products
- Food Safety Objectives – Now We Have Decided to Have Them, How Do We Think They Will be Used in Food Safety Management?
- Current Practices and Innovations in Cold Chain Management for Food Products

Technical Session

- General Microbiology

Afternoon – 3:45 p.m. – 4:30 p.m.

- John H. Silliker Lecture – Managing the Safety of Internationally Traded Food, Michiel van Schothorst, Ph.D.

Subject to change

IAFP 2005 Networking Opportunities

IAFP FUNCTIONS

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

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

AFFILIATE RECEPTION
Saturday, August 13, 2005 • 5:30 p.m. –7:00 p.m.
Sponsored in part by Weber Scientific, Inc.

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

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

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

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

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

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

Join us to kick off IAFP 2005 at the Opening Session. Listen to the prestigous Ivan Parkin Lecture delivered by Douglas L. Archer, Ph.D., Professor and Past Chair, Food Science and Human Nutrition Department, University of Florida, Gainesville, Florida. He will deliver a presentation titled "Food Safety 2005: Facts Come Easy – Answers are Elusive."

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

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

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

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

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

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

EXHIBIT HALL RECEPTION
Monday, August 15, 2005 • 5:00 p.m. –6:15 p.m.
Sponsored by DuPont Qualicon and REMEL, Inc.

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

BUSINESS MEETING
Tuesday, August 16, 2005 • 12:15 p.m. –1:00 p.m.
Sponsored by Fisher Scientific

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

PRESIDENT'S RECEPTION (By invitation)
Tuesday, August 16, 2005 • 5:30 p.m. – 6:30 p.m.

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

PAST PRESIDENTS' DINNER (By invitation)
Tuesday, August 16, 2005 • 6:30 p.m. – 9:00 p.m.

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

JOHN H. SILLIKER LECTURE
Wednesday, August 17, 2005 • 3:45 p.m. – 4:30 p.m.

Michiel van Schothorst, Ph.D., Retired Vice President, Food Safety Affairs, Nestlé, Vevey, Switzerland will deliver a presentation titled "Managing the Safety of Internationally Traded Food".

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

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

IAFP 2005 Event Information

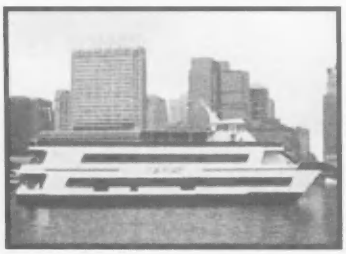
EVENING EVENTS

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

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

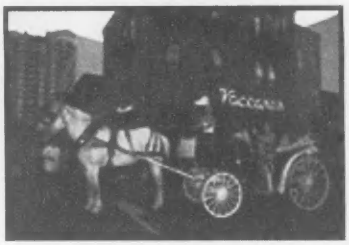
Oriole Park is state-of-the-art yet unique, traditional and intimate in design. It blends with the urban context of downtown Baltimore while taking its image from baseball parks built in the early 20th century. Ticket price includes admission to the game and transportation between the Baltimore Marriott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

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



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

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



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

GOLF TOURNAMENT

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

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

DAYTIME TOURS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A Taste of Baltimore from the Inside
Tuesday, August 16, 2005 • 10:30 a.m. – 3:30 p.m.

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

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

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

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

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

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

Each course will be served with Maryland wines – Cheers!

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

MEETING INFORMATION

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

Full Registration includes:

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

4 EASY WAYS TO REGISTER

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

Online: www.foodprotection.org

Fax: 515.276.8655

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

Phone: 800.369.6337; 515.276.3344

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

REFUND/CANCELLATION POLICY

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

STUDENT FUNDRAISER

Help support the students with their annual fund raiser. See page 411 to order T-shirts or polo shirts.

International Association for Food Protection®

EXHIBIT HOURS

Sunday, August 14, 2005	8:00 p.m. - 10:00 p.m.
Monday, August 15, 2005	8:00 a.m. - 11:00 a.m.
	1:00 p.m. - 6:15 p.m.
Tuesday, August 16, 2005	8:00 a.m. - 2:00 p.m.

DAYTIME TOURS – Lunch included

Saturday, August 13, 2005	9:00 a.m. - 5:00 p.m.
Welcome to Washington	
Sunday, August 14, 2005	10:00 a.m. - 2:00 p.m.
Baltimore City Tour by Land and by Sea	
Monday, August 15, 2005	9:00 a.m. - 2:00 p.m.
Annapolis Past and Present	
Tuesday, August 16, 2005	10:30 a.m. - 3:30 p.m.
A Taste of Baltimore from the Inside	
Wednesday, August 17, 2005	10:00 a.m. - 1:00 p.m.
Chesapeake Bay Cooking Class	

EVENING EVENTS

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

GOLF TOURNAMENT

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

HOTEL INFORMATION

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

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

Attendee Registration Form

Member Number: _____

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

Employer _____ Title _____

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

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

Telephone _____ Fax _____ E-mail _____

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

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

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

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

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

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

PAYMENT OPTIONS: ❒ VISA ❒ MasterCard ❒

❒ Check Enclosed

Credit Card # _____

Name on Card _____

Signature _____

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

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

Expiration Date _____

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

International Association for Food Protection®
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA
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Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

EXHIBITORS DO NOT USE THIS FORM

IAFP 2005 Workshops

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3
Friday, August 12 1:00 p.m. to 5:00 p.m.	**Friday, August 12** 1:00 p.m. to 5:00 p.m.	**Friday and Saturday** **August 12–13** 8:00 a.m. to 5:30 p.m.
Statistics as a Tool for the Microbial Evaluation of Foods	***Statistics as a Tool for the Microbial Evaluation of Foods***	***Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed***
Saturday, August 13 8:00 a.m. to 4:30 p.m.	**Saturday, August 13** 8:00 a.m. to 4:30 p.m.	
Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods	***Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data***	

Workshop 1 and Workshop 2

Day 1– Statistics as a Tool for the Microbial Evaluation of Foods

Basic statistical concepts including variance and errors, types of distributions, and their frequencies as well as basic approaches to sampling and testing, and the risks and uncertainties in sampling and distribution will be taught. The workshop will end with a session on practical application using HACCP validation and microbiological testing assurances of meat quality as examples.

Topics:

- Basic Statistical Concepts
- Uncertainty and Distribution (Basic approaches to sampling and testing)
- Practical Application – HACCP Validation and Microbiological Testing Assurances of Meat Quality

Instructors:

Colin Gill, Agriculture and Agri-Food Canada, Lacombe, Alberta, Canada
Don Schaffner, Rutgers University, New Brunswick, NJ
Richard C. Whiting, FDA-CFSAN, College Park, MD

Organizer: Ron Usborne, Guelph, Ontario Canada

Workshop 1

Day 2 – Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods

Selecting the analytical tools for microbiological analysis that best meets your needs is a critical task. This workshop will teach you about selecting a microbiological method that is "fit for purpose." Experience a first time release and the demonstration of an AOAC "online" learning center to understand the various international approaches to method validation schemes. Speakers will address

Workshop 2

Day 2 – Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data

This workshop will present principals for understanding and implementing microbial environmental testing in a food production facility and the subsequent value and importance of that data through trending analysis. You will learn, in an interactive environment, how to perform effective environmental sampling that can be implemented into your standard operating procedures and

Day 2 – Workshop 1 (continued)

practical considerations in method selection both for corporate and single manufacturing site labs; the concept of uncertainty of measurement as a key component of method verification; and the Canadian experience in expectations of accrediting authorities for methods verification.

Topics:

- Method Validation – The AOAC RI Learning Center Approach
- How to Choose a Method: Practical Consideration
- Is the Uncertainty of Measurement a European Conspiracy?
- Expectations of an Accrediting Body – A Canadian Perspective

Instructors:

Michael Brodsky, Brodsky Consultants, Thornhill, Ontario, Canada
Donna Christensen, Canadian Food Inspection Agency, Calgary, Alberta, Canada
Robin Kalinowski, National Center for Food Safety and Technology, Summit-Argo, IL
Deborah McKenzie, AOAC Research Institute, Gaithersburg, MD
Maria Nelson, AOAC Research Institute, Gaithersburg, MD

Organizers:

Christine Aleski, Centrus International Inc., Ann Arbor, MI
George Wilson, BD Diagnostics, Sparks, MD

Day 2 – Workshop 2 (continued)

provide powerful trending information. Workshop participants will review and discuss material from practical case studies and will discuss trend analysis and summation of the data in order to develop the tools needed for the implementation of practical and measurable corrective action.

Topics:

- How Microorganisms Evade HACCP Plans: Developing Effective Environmental Sampling
- Are You Ready to Trend? Authenticating Results for Accurate and Reliable Data
- Using Data Management and Trend Analysis to Drive Continuous Improvement
- Three Case Studies

Instructors:

Robert Behling, Kornacki Food Safety Associates, LLC, McFarland, WI
Jeff Kornacki, Kornacki Food Safety Associates, LLC, McFarland, WI
W. Payton Pruett, Jr., ConAgra Foods, Inc, Omaha NE
Patricia Rule, bioMérieux, Inc., Hazelwood, MO
Cindy Ryan, Nestlé USA, Dublin, OH

Organizers:

Jeff Kornacki, Kornacki Food Safety Associates, LLC, McFarland, WI
Patricia Rule, bioMérieux, Inc., Hazelwood, MO

Workshop 3

Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed

This course is aimed at microbiologists and personnel working in the food industry who wish to gain a better understanding of how foodborne disease is recognized and investigated, ranging from the local to the national and international level and including in-plant epidemiological investigations by USDA and FDA. The program will include lectures and exercises, including case studies and mock outbreak investigations.

Topics:

- The Science of Epidemiology: an Overview
- Local, State, Federal, and International Agencies Involved in Foodborne Illness Outbreak Investigations
- Epidemiology Applied to Foodborne Disease
- Surveillance: Laboratory Techniques, Application, and Analysis
- Mock Outbreak Investigations

Instructors:

Jack Guzewich, Food and Drug Administration, College Park, MD
Randy Huffman, American Meat Institute Foundation, Washington, D.C.
Marguerite Neill, Brown Medical School and Memorial Hospital of Rhode Island, Pawtucket, RI
Martin Wiedmann, Cornell University, Ithaca, NY

Organizer:

Catherine Nnoka, International Life Sciences Institute, North America

IAFP 2005
Workshop Registration Form

FRIDAY AND SATURDAY • AUGUST 12–13, 2005

❑ **Workshop 1**

Day 1 — ***Statistics as a Tool for the Microbial Evaluation of Foods***

Day 2 — ***Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods***

❑ **Workshop 2**

Day 1 — ***Statistics as a Tool for the Microbial Evaluation of Foods***

Day 2 — ***Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data***

❑ **Workshop 3 –** ***Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed***

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Last Name

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State/Province | Country | Postal Code/Zip +4

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❑ Check Enclosed ❑ VISA ❑ ❑ MasterCard

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• REGISTRATION •

Payment must be received by July 22, 2005 to avoid late registration rates.

WORKSHOP 1	Early Rate	Late Rate
IAFP Member	$400.00	$475.00
NonMember	$500.00	$575.00

WORKSHOP 2	Early Rate	Late Rate
IAFP Member	$420.00	$495.00
NonMember	$520.00	$595.00

WORKSHOP 3	Early Rate	Late Rate
IAFP Member	$350.00	$425.00
NonMember	$450.00	$525.00

GROUP DISCOUNT:
Register 3 or more people from your company and receive a 15% discount. Registrations must be received as a group.

Refund/Cancellation Policy

Registration fees, less a $50 administrative charge, will be refunded for written cancellations received by July 29, 2005. No refunds will be made after that date; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 22, 2005. The workshop may be cancelled if sufficient enrollment is not received by July 22, 2005.

For further information, please contact the Association office at 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@foodprotection.org.

• 4 Easy Ways to Register •

To register, complete the Workshop Registration Form and submit it to the International Association for Food Protection by:

Online: **www.foodprotection.org**

Phone: 800.369.6337; 515.276.3344

Fax: 515.276.8655

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

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

IAFP SPDG Shirt Order Form

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

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- Wine

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USDA – Food Safety and Inspection Service
VWR International
Warnex Diagnostics Inc.
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Zep Manufacturing Company

COMING EVENTS

JUNE

- **4–8, 109th AFDO Annual Conference,** The Westin Crown Center, Kansas City, MO. For more information, call 717.757.2888; E-mail: afdo@afdo.org.
- **6, HACCP for Online Supervisors,** GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **7–8, Sensory Evaluation, Part I,** GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **8, Texas Association for Food Protection Annual Meeting,** Omni Hotel, Austin, TX. For more information, contact Tom Supak at 979.836.7977; E-mail: tommy.supak@bluebell.com.
- **9–10, Sensory Evaluation, Part II,** GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **12–15, 4th IDF International Mastitis Conference,** Maastricht, The Netherlands. For more information, go to www.fil-idf.org/mastitis2005.
- **13–14, Brazil Association for Food Protection Annual Meeting,** Conselho Regional de Quimica do Estado de São Pāulo, São Pāulo, SP, Brazil. For more information, contact Maria Teresa Destro at 55.113.091.2199; E-mail: mtdestro@usp.br.
- **15–17, Advanced Meat Processing,** GFTC, Guelph, Ontario, Canada. For more information, call 519.821.1246; E-mail: gftc@gftc.ca.
- **16–24, XXV Quarter Century Gala International Workshop/Symposium on Rapid Methods and Automation in Microbiology,** Kansas State University, Manhattan, KS. For more information, contact Daniel Y. C. Fung at 785.532.5654; E-mail: dfung@oznet. ksu.edu.
- **20–21, Nano4Food 2005,** Wageningen University, Wageningen, The Netherlands. For more information, contact Remy Arroyo at 34.91.640.74.40; E-mail: remy.arroyo@cientifica.com.
- **20–July 1, 27th Annual Postharvest Technology Short Course,** Davis, CA. For more information, call 800.752.0881 or go to www.extension.ucdavis.edu/agriculture.
- **21–23, Sanitation Short Course,** Penn State Berks-Lehigh Valley College, Reading, PA. For more information, contact Dr. Hassan Gourama at 610.396.6121; E-mail: hxg7@psu.edu.
- **22–24, Microbiology and Engineering of Sterilization Processes,** North Bethesda, MD. Sponsored by the University of Minnesota. For more information, contact Ann Rath at 612.626.1278 or go to http://fscn.che.umn.edu/.
- **29–30, 4th European Young Cereal Scientists and Technologists Workshop,** Vienna, Austria. For more information, call 32.16204035 or go to www.boku.ac.at/dlwt.

JULY

- **12–14, HTST Pasteurization and Controls Seminar,** LaQuinta Inns & Suites, San Antonio, TX. For more information, call 210.628.1596; E-mail: mvk1030@aol.com.
- **16–20, IFT 2005,** Ernest N. Morial Convention Center, New Orleans, LA. For more information, contact James Klapthor at 312.782.8424 ext. 231 or go to www.am-fe.ift.org.
- **17–20, 7th Annual Foodborne Pathogen Analysis Conference and 42nd Annual Pesticide Residue Workshop,** TradeWinds Island Grand Resort, St. Pete Beach, FL. For more information, contact Patricia Baxter at 850.410.4797 or go to www.FLworkshop.com.
- **24–28, Milk Protein Interactions Focus of Special Symposia,** Cincinnati Convention Center, Cincinnati, OH. For more information, contact Jennifer Giambroni at 415.254.4549; E-mail: jgiambroni@sbcglobal.net.

AUGUST

- **12–13, IAFP 2005 Workshops,** Baltimore Marriott Waterfront Hotel, Baltimore, MD.

  Workshop 1, *Statistics as a Tool for the Microbial Evaluation of Foods* **and** *Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods*;

  Workshop 2, *Statistics as a Tool for the Microbial Evaluation of Foods* **and** *Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data*; and

  Workshop 3, *Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed.*

  For more information, see page 408 of this issue or contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org.
- **14–17, IAFP 2005, the Association's 92nd Annual Meeting,** Baltimore Marriott Waterfront Hotel, Baltimore, MD. For more information, see page 407 of this issue or contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org.
- **15–19, Culinology Arts for Food Technologists, A Culinology® Workshop,** The Culinary Institute of America, St. Helena, CA. For more information, contact Deb North at 404.252.3663; E-mail: dnorth@kellencompany.com.

SEPTEMBER

- **11–14, 4th International Whey Conference,** Chicago, IL. For more information, contact James Page at 630.530.8700 or go to www.IWC-2005.org.
- **20, Georgia Association for Food Protection Annual Fall Meeting,** Georgia Tech Food Processing Auditorium, Atlanta, GA. For more information, contact Louis Hughes at 912.267.3623; E-mail: lhughes@kpseafood.com.
- **20–22, New York State Association for Food Protection Annual Meeting,** Holiday Inn, Liverpool, NY. For more information, contact Janene Lucia at 607.255.2892; E-mail: jgg3@cornell.edu.
- **20–22, Washington Association for Food Protection Annual Conference,** Campbells Resort on Lake Chelan, Chelan, WA. For more infor-

COMING EVENTS

mation, contact Bill Brewer at 206. 363.5411; E-mail: billbrewer1@juno. com.

- **21–22, Wisconsin Association for Food Protection Joint Education Conference,** Stoney Creek Inn, Mosinee, WI. For more information, contact Randy Daggs at 608.837.2087; E-mail: rdaggs@juno.com.
- **23–27, The 7th International Exhibition on Food & Drink Industry,** International Exhibition & Convention Center, Hachiminh City, Vietnam. For more information, contact Nguyen Ba Vinh at 84.90340.6383; E-mail: vinhba @hn.vnn.vn.

OCTOBER

- **4–7, Better Process Control School,** University of Nebraska, Lincoln, NE. For more information, call 402.472.9751; E-mail: tkoeppe2@unl. edu.
- **11–13, HTST Pasteurization and Controls Seminar,** LaQuinta Inns & Suites, San Antonio, TX. For more information, call 210.628.1596; E-mail: mvk1030@aol.com.
- **11–13, North Dakota Environmental Health Association Annual Meeting,** Holiday Inn, Fargo, ND. For more information, contact Deb Larson at 701.328.1291; E-mail: djlarson@ state.nd.us.
- **15–19, Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology Symposium,** University of Wisconsin-River Falls, WI. For more information, contact Doreen Cegielski at 715.425.3704; E-mail: foodmicro@uwrf.edu.
- **18–20, Applied Extrusion Workshop,** University of Nebraska, Lincoln, NE. For more information, call 402. 472. 9751; E-mail: tkoeppe2@unl.edu.
- **25, Iowa Association for Food Protection Annual Fall Meeting,** Western Starlite Motel, Ames, IA. For more information, contact Phyllis Borer at 712.754.2511 ext. 33; E-mail: borerp@ ampi.com.

IAFP UPCOMING MEETINGS

AUGUST 14-17, 2005
Baltimore, Maryland

AUGUST 13-16, 2006
Calgary, Alberta, Canada

JULY 8-11, 2007
Lake Buena Vista, Florida

AUGUST 3-6, 2008
Columbus, Ohio

CAREER SERVICES SECTION

Senior Microbiology Specialist

Microbiologist serving as technical resource supporting infant formula and nutritional product manufacturing operations Mead Johnson Nutritionals, Evansville, IN with expertise in the microbiology of low acid canned foods and spray dried powders. Manage operations of three regional quality control laboratories microbiology, micro vitamin analysis, and an industrial forensic laboratory and ensure alignment with company and regulatory policies and procedures. Supervise a staff of 10 personnel. Maintain and diffuse knowledge of new analytical techniques, procedures and equipment within area of responsibility in order to expand technical capabilities, improve data quality and increase productivity. Technical resource with expertise in Hazard Analysis and Critical Control Points food safety systems. Update and develop procedures and work instructions. Drive investigation of out of specification laboratory and manufacturing results. Demonstrate ability to effectively and consistently conduct multiple routine and non routine tasks, procedures and operations concurrently. Prepare technical and status reports. Set and meet objectives for self and individual lab teams. Work in cross functional teams for key projects. Develop self and others to accept higher responsibilities in managing QC testing data and communication.

Position Requirements: BS or MS degree Microbiology or a related field. Advanced education MS with specialization in the microbiology of food or equivalent experience is preferred. Minimum 2 years of industrial food safety experience desired. Strong grasp of advanced microbiological techniques used in the quality control of food products. Knowledge of GMP, HACCP, OSHA including biosafety, and FDA regulations. Prior supervisory experience desired. Experience with a variety of microscopy techniques preferred. Strong computer skills, MS Office, Business Objects, Minitab or equivalent. Familiarity with use of statistics in process control and capabilities, including implementation. Strong interpersonal skills that will help to facilitate building strong work teams. Excellent communication skills, oral and written. Ability to develop new lab methodologies and new procedures. Ability to work with minimal supervision within a team environment.

Email resumes to:
christine.hachmeister@bms.com
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EOE

Extension Consumer Food Safety Specialist

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Department of Food Science and Human Nutrition, Washington State University, Pullman, Washington invites applications for an Extension Consumer Food Safety Specialist E2/E3, 100% Extension, tenure-track, 12-month position. For further details about this position contact Dr. Barry Swanson, search committee chair (509-335-3793 or swansonb@wsu.edu) or Ms. Carolee Armfield, administrative assistant (509-335-9103 or Armfield@wsu.edu). View departmental web site at http://fshn.wsu.edu/.

EEO/AA/ADA

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IT'S A FACT

The IAFP Membership Directory is Available Online.

www.foodprotection.org

All you need is your Member number and password (your last name).

If you have questions, E-mail Julie Cattanach at jcattanach@foodprotection.org

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Vol. 68 **April 2005** **No. 4**

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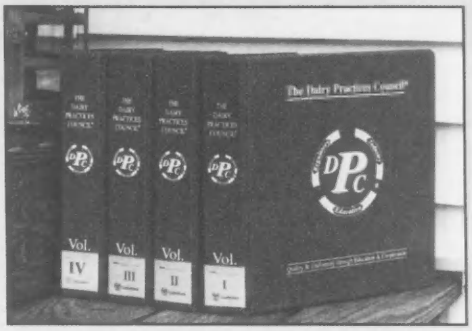

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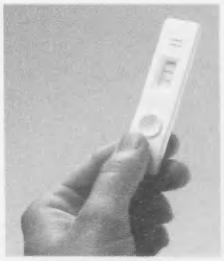

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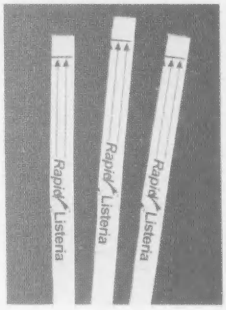

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