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

SEPTEMBER 2000

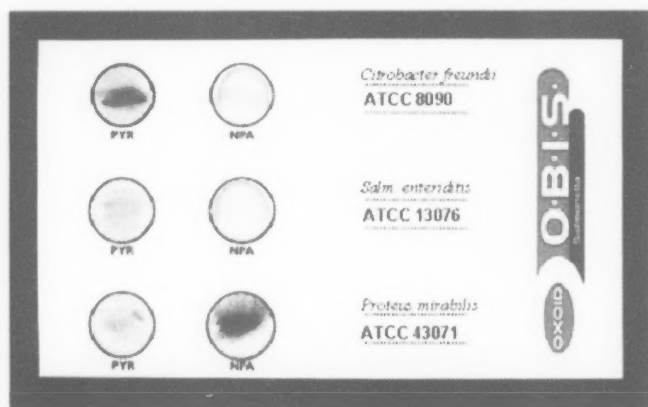
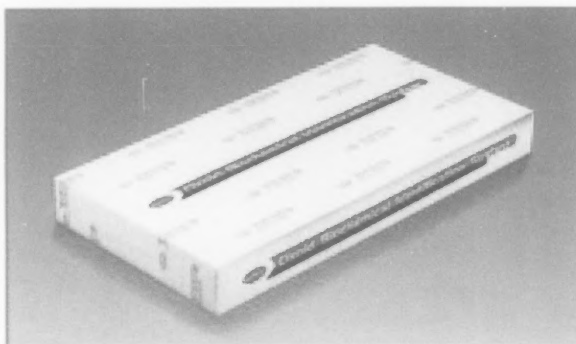
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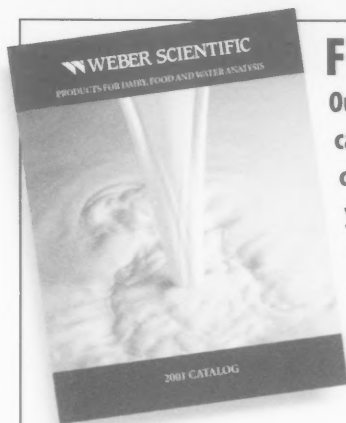
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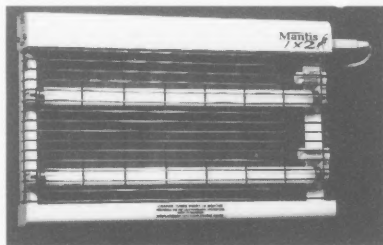
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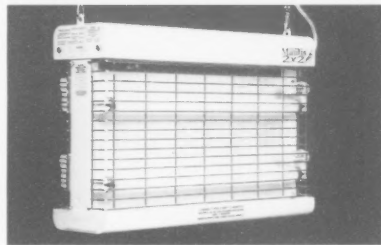
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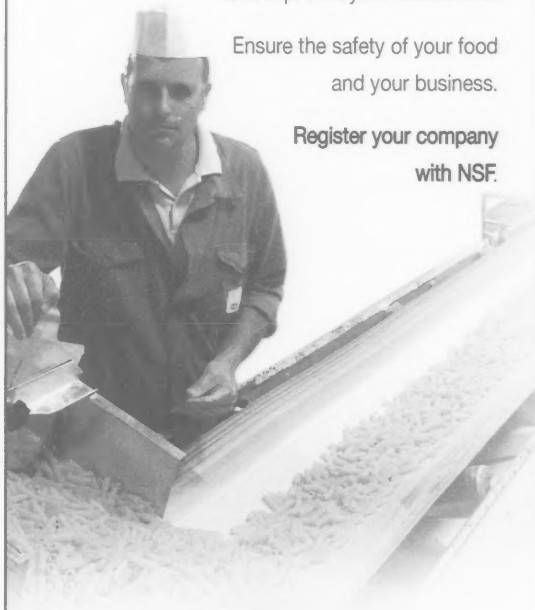
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My Perspective



By JENNY SCOTT
President

“It’s not too late, and it’s not too early”

It’s not too late (for the IAFP Foundation Fund) and it’s not too early (to start thinking about nominating someone for an IAFP Award). In my first column as President of IAFP I want to urge Members to consider contributing to your Association in one or both of these areas.

First, the Foundation Fund. The IAFP Foundation Fund was established in 1986 to help support some of the key activities of the Association. The Foundation supports the Ivan Parkin Lecture, our keynote speech at the Annual Meeting. It supports the Developing Scientist Oral and Poster Competition, which has served as a springboard for many of today’s food safety professionals. It pays for shipment of surplus volumes of the *Journal of Food Protection and Dairy, Food and Environmental Sanitation* to developing countries through the United Nations’ Food and Agriculture Organization in Rome. The Foundation funds IAFP’s co-sponsorship of the Crumline Award, given for excellence in food protection by a local health department. And the Fund has paid travel expenses for symposium speakers who otherwise would have been unable to attend our meeting. Need a video for training or for teaching? Want to preview a video before purchase? The Audiovisual Library, with more than 100 offerings, is available to Members, thanks to the Foundation Fund.

Where does revenue for the Fund come from? The Foundation Fund is supported primarily by a portion of the Membership dues

from Sustaining Members. In addition, the Fund accepts donations from individuals – since last year’s meeting over 100 have contributed. (For those US Members who itemize your taxes, the contribution is tax deductible – so your contribution to benefit IAFP can also benefit you.) The Foundation Fund also benefits from the Silent Auction at the Annual Meeting, which brought in over \$2,700 in 1999 alone. At the 84th Annual Meeting in Orlando in 1997, the Foundation Fund Committee, under the leadership of Harry Haverland, adopted the slogan “\$100,000 in 2000.” The plan was to raise the balance of the Foundation Fund from around \$70,000 at that time to \$100,000 by the year 2000. Only \$10 per Member would have gotten us there! In three years we have increased the Fund to over \$86,000 – a sizable increase, considering that the Foundation has continued to fund activities at the same or higher levels of funding than in past years, but far short of our goal.

In June of 1999 the California Association of Dairy & Milk Sanitarians (CADMS) pledged \$1,000 to the Foundation Fund and challenged other Affiliates and organizations to do the same. The challenge was renewed in 2000 when CADMS made its second \$1,000 donation. The Wisconsin Association of Milk and Food Sanitarians has risen to the challenge and made a contribution to the Fund. In addition, a number of Affiliates have provided items for the Silent

Auction: Alberta, California, Carolinas, Kentucky, Korea, Metropolitan, Missouri, Nebraska, Ohio, Ontario, Tennessee, and Texas. I encourage other Affiliates to also make a donation – even if you can't afford to match CADMS. I also encourage more individuals to make a donation. Contributions may be cash or items for the Silent Auction. ANY contribution, no matter how big or how small, will help build the fund and allow the Foundation to carry on its activities and build for the future. It's YOUR Foundation, working to benefit your Association. Won't you help? It's not too late to reach \$100,000 in 2000!

Second, Awards. It's true, the Annual Meeting has just ended, and if you attended the banquet you saw a lot of deserving people honored for their achievements and service. However, every year as the deadline approaches the Board worries about whether there will be nominees for many of the awards; in some years the award is not presented because no one

took the time to send in a nomination. Too many deserving people do not receive recognition, simply because no one took the time. We are all very busy – doing more with less is a way of life. Adding something else to our plate (such as putting together a nomination) does not have much appeal right now. We'll wait until we are less busy. But we're never less busy. Thus my suggestion to start now and take four to five months to complete a nomination. It's much more manageable. And it's not a difficult process. When submitting a nomination, more is not necessarily better. There is no need to document everything the nominee has done in his or her career. Remember, the judges are busy too. They appreciate receiving a concise, well-written summary or bulleted list describing how the nominee qualifies for the specific award. Get support for the nomination from others; this might be letters of support, or a compilation of statements from friends and colleagues of the nominee about

why the award is deserved. The letters or statements can be supplemented with a CV, a list of publications, copies of news releases, or other materials as appropriate. A nominee's secretary, boss or co-workers can be invaluable in providing material. IAFP can provide information on the nominee's recent involvement in the Association and on past awards received. One mistake that is often made is providing insufficient information to demonstrate that the nominee meets the requirements for the award. We assume that the candidate is well-known, as are his or her qualifications. Since the judges may come from different disciplines and not know the nominee well, assume you are trying to convince someone who does not know the candidate. Did you see someone at the Annual Meeting who deserves to be recognized by one of our awards? I challenge you to start now and put that nomination together for 2001. It's not too early!

September is Food Safety Month!

Be Smart.
Keep foods
apart.



DON'T CROSS-CONTAMINATE.

COMMENTARY

FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP, CAE
Executive Director

“We are truly fortunate to be recognized as the Meeting of choice for so many food safety professionals”

With completing the 87th Annual Meeting in August, this may be a good time to look back and express sincere thanks to the many people that work together to produce an outstanding educational event. From the time that planning starts until the final Awards Banquet, literally hundreds of people do their part to ensure a top quality experience for you. More than four years prior to the Meeting, we begin consideration of locations to hold the Annual Meeting. Many times, our Affiliate organizations prompt our interest by making an invitation to host the Meeting.

Once cities are identified, our staff begins a more detailed investigation to determine properties that meet the needs of our Meeting attendees. After identifying properties meeting our specifications, an analysis of cost factors takes place with a resulting report to the Executive Board. The Board reviews the report and gives guidance on property selection. Once we pass this step, negotiations begin in earnest with the property to secure the best possible package for the Association and our Meeting attendees. After a contract is signed, we publicize the Meeting dates and location. This completes a preliminary step in our Meeting-planning cycle.

Now that the location is firmed up, we begin working with the Local Affiliate who will

co-sponsor the Annual Meeting. This is where our Members and volunteers really shine. For instance, this year's Local Arrangements Committee was co-chaired by Judy Harrison, Pam Metheny and Ed Giera from the Georgia Association of Food and Environmental Sanitarians (GAFES). Two years ago, Judy, Pam and Ed met with our staff and began organizing GAFES members to help them plan for our 2000 Annual Meeting. They met many times over the years preceding the Meeting, each time adding more and more details to their plans. Chairpersons who took responsibility for various aspects of the Annual Meeting assisted them. By the results of this Annual Meeting, you could see their planning really paid off! Thank you to each GAFES member who helped during this year's Annual Meeting and thank you for all of your time and effort in planning for the event. A special thanks to Judy, Pam and Ed who gave countless hours to make sure this was the best run Annual Meeting ever.

Another group that begins their planning early is the Program Committee. A Call for Symposium is issued about 16 months in advance of the Annual Meeting. Preliminary proposals are received at the Annual Meeting one-year before the Meeting at which the symposium will be presented. The Program Committee reviews and decides

which symposia should be further developed prior to the Committee's January meeting. At the January meeting, the Committee reviews the completed symposium along with technical abstracts and constructs a preliminary program from all submissions. The program becomes final once presenters are confirmed. The Program Committee is made up of 12 Members who dedicate their effort to producing the quality program that you have come to expect at the IAFP Annual Meeting. David Golden served as Chairperson for this year's Program Committee. The Committee is owed a great debt of gratitude from the Annual Meeting Attendees and Association Members. Thank you David and Committee Members!

This year we saw a 15% increase in our Exhibit Hall participation with many new companies joining our effort of providing the latest information on protecting the food supply. We recognized companies who have exhibited with our Association for 10 years or longer and we also want to thank our new and valued, returning exhibitors. Exhibitors offer attendees a great reason to come to our Meeting to learn of their products and services. Sponsorship support in 2000 was just overwhelming! We increased sponsorship dollars by more than 50% over 1999. A huge thank you to the

companies and organizations that see the benefit of participating as a sponsor of the IAFP Annual Meeting. Your support helps gain recognition for your company and helps provide quality educational programming for not only your employees, but also all attendees.

More than 300 presentations took place in Atlanta at the 87th IAFP Annual Meeting. That is more than ever before! Tremendous support from industry, government and educational employers who allow their employees to travel to our Meeting, present their information and interact with other professionals is heartwarming. We are truly fortunate to be recognized as the Meeting of choice for so many food safety professionals. Thank you to everyone who gave presentations this year and thank you to your employers for allowing you to do so. We are indebted to you.

There is one group who I am especially proud of in the work they carry out on a daily basis. That is the group of employees in the IAFP office. We have 12 employees that have various responsibilities throughout the year and on top of these responsibilities, they carry out all details for the Annual Meeting. We begin planning for next year's Meeting the week after completion of the current Meeting. There is quite a system in place to ensure no detail is

overlooked. We know what this Meeting means to our Members and attendees. It is our goal to provide you with the atmosphere in which you can network, share information, meet new life-long resources, and make you feel like you are an integral part of the IAFP family. Our staff strives to accomplish this goal every day and goes to extraordinary lengths to prepare for the crown jewel, the IAFP Annual Meeting. As I said, I am so very proud of their work that is carried out to benefit you, our Members. Thank you Lisa, Donna, Julie, Lucia, Bev, Karla, Didi, Beth, Pam, Tanya, and Frank!

Finally, I want to recognize all attendees at this year's Annual Meeting. Thank you for your attendance in Atlanta. It is just incredible to think that we increased attendance by more than 10% over our previous record attendance in 1998! This is a true demonstration of the strength of the presentations at our Annual Meeting. We know that you are proud of the IAFP Annual Meeting and that you communicate with other potential attendees. Share your pride with others; share your Annual Meeting experiences with others and encourage their attendance next year in Minneapolis. Remember that there are hundreds of people working year-round to prepare for the next Annual Meeting! We hope to see you there!

The Effect of Different Thawing Methods on the Growth of Bacteria in Chicken

S. M. Jiménez,¹ M. E. Pirovani,¹ M. S. Salsi,¹ M. C. Tiburzi,¹ and O. P. Snyder²

SUMMARY

Frozen raw chickens were thawed by three different methods to study population changes of spoilage bacteria and of *Salmonella hadar* during thawing. It was shown that thawing chicken on the counter at ambient temperature (21°-22°C) within 14 hours or less, to an internal temperature of 4.4°C (3.5 cm within the breast), is a safe procedure, as evidenced by a decline in bacterial population; that thawing chicken in flowing water is a safe, rapid method, and that thawing chicken in a standard refrigeration unit (at a temperature of 3.5° to 7.2°C) is also a safe method. However, this experiment indicates that the longer time period required to thaw chicken at refrigeration temperatures to an internal temperature of 4.4°C (3.5 cm within the breast) permits growth of pseudomonas spoilage bacteria.

The population of *Salmonella hadar* inoculated onto the surface of chicken carcasses prior to freezing was shown to have decreased by the end of all thawing methods, when thawing was halted at 4.4°C.

Most regulatory agencies follow FDA recommendations, which do not allow food to be thawed at ambient temperature. The FDA retail food code recommends that food be thawed under refrigeration, or in flowing water, so that the temperature of the food does not exceed 5°/7.2°C (41°/45°F). The USDA has no restriction regarding how food is thawed, even when food is thawed at ambient temperature.

Because of small sample size, it is difficult to draw major conclusions. However, this study tends to confirm that controlled thawing at ambient temperatures, as permitted by the USDA, does not lead to increased hazards.

This article has been peer reviewed by two professionals.

INTRODUCTION

Raw poultry is contaminated with various spoilage and pathogenic bacteria (2). These bacteria do not multiply in frozen products and may actually decrease in population. However, when frozen raw poultry products are being thawed, surviving bacteria can begin to multiply when the temperature reaches their growth range. The USDA, using the research of Klose et al. (6), allows poultry to be thawed at room temperature. The FDA Food Code (3) recommends that food be thawed in the refrigerator or in flowing water, but provides no research to show that these methods of thawing are required to insure safety. Thawing large poultry carcasses in the refrigerator can be inefficient and time-consuming.

The purpose of this research was to study the population changes of spoilage bacteria in uninoculated frozen chicken carcasses (Experiment I), and of *Salmonella hadar* in inoculated frozen chicken carcasses (Experiment II), thawed on the counter at ambient temperature, in flowing water, or under refrigeration.

MATERIALS AND METHODS

Six chicken carcasses, approximately 3 kg each, were obtained from a local commercial poultry processing plant. After evisceration, the carcasses were cooled to 4.4°C (40°F) and were transported in a refrigerated truck to the research laboratory. Three chicken carcasses were used to study the growth of spoilage bacteria in uninoculated, frozen chicken during thawing, and the other 3 were used to study the growth of *Salmonella hadar* in inoculated frozen chicken during thawing.

Thermocouples were inserted into each carcass at 2 specific locations, after skin samples were taken, and prior to freezing. One thermocouple (T1) was located 3.5 cm inside the breast, and the other (T2) was located just under the skin of

the thigh. Each chicken carcass was bagged individually in an EVA bilayered Cryovac E bag supplied by Grace Argentina. The carcasses were then frozen to -20°C within 10 hours in an upright freezing unit that allows food to be stored at -20 to -25°C. At the start of freezing, the temperature in the breast (T1) was approximately 6.0°C, and the temperature just under the skin in the thigh (T2) was 17°C.

Carcasses were thawed on the counter at ambient temperature (22°C), in flowing water (21°C), or in the refrigerator (3.5° to 7.2°C). Thawing was halted when a temperature of 4.4°C was reached in the thermocouple located 3.5 cm inside the breast.

A Dual Log R[®] Thermocouple Thermometer Model N° 600-1050 (Barnantt, Chicago, IL USA) recorded freezing and thawing temperature data.

The pH of chicken skin samples was determined according to the method described by Grau (4). Measurement of pH of the samples was made with a Titriskop pH-meter E516, (Metrohm Herisau, Switzerland). The pH of carcass samples ranged from 5.4 to 5.85.

Experiment I. Uninoculated chicken

Three 10-g samples of skin from each of 3 chicken carcasses were excised aseptically before the chicken carcasses were frozen and after the carcasses were thawed. Each 10-g sample was a composite of skin from 6 areas of the carcass (breast, leg, thigh, back, neck, and wing). The samples were excised in the same manner so as to be most representative of the whole chicken carcass and to allow comparison between samples.

Each sample was placed in 90 ml of 0.1% peptone/water solution in a sterile stomacher bag. The samples were then homogenized with a Stomacher, Lab-Blender 400 (London, UK) for 3 minutes. From this homogenate, 5 decimal dilutions were prepared using the same peptone/water solution as used for microbiological determinations.

Total viable organisms (aerobic plate counts) were determined by the pour-plate method in plate count agar (PCA; Merck, Buenos Aires, Argentina) with incubation at 25°C for 2 days.

To determine total Enterobacteriaceae counts, 1 ml of appropriate dilutions was inoculated by the pour-plate method on violet red bile agar with added glucose (VRBD; Merck, Buenos Aires, Argentina) and overlaid with approximately 5 ml of the same growth medium. The plates were then allowed to solidify before being incubated at 35°C for 48 hours.

Pseudomonad counts were determined on cetrimide agar (Cetrimide, Merck, Buenos Aires, Argentina) by the spread plate method. Plates were incubated at 25°C for 48 hours.

Following incubation, a few of each of the colony types appearing on each countable plate were selected and subjected to confirmatory minimum tests. Gram stain and oxidase tests were carried out for both Enterobacteriaceae and pseudomonad groups. An attempt was also made to confirm and isolate salmonellae from all samples by use of the ICMSF official method (5).

Experiment II. Inoculated chicken

Three chicken carcasses were inoculated with *Salmonella hadar*, the predominant serotype isolated from chicken carcasses in the region of Argentina in which this study was conducted. The *Salmonella hadar* strain was maintained in tryptic soy agar (TSA; Difco) at 5°C (7). Cultures were activated at 37°C for 24 hours in tryptic soy broth (TSB; Difco) (8). Cultures were loop transferred at 24-h intervals for 3 successive transfers (10⁸ CFU/ml) and were diluted in 0.1 M potassium phosphate buffer (pH 7.0) to give a viable cell population of approximately 10⁷ CFU/ml.

By means of a sterile scalpel and a 100 cm² stainless-steel frame, the zone or area of the chicken to be

Figure 1. Chicken thawing on the counter
[at ambient temperature (22°C)]

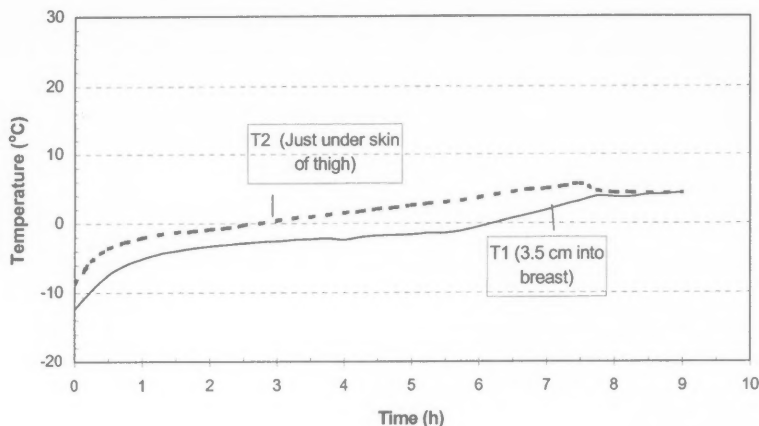


Figure 2. Chicken thawing in flowing potable water (21°C)

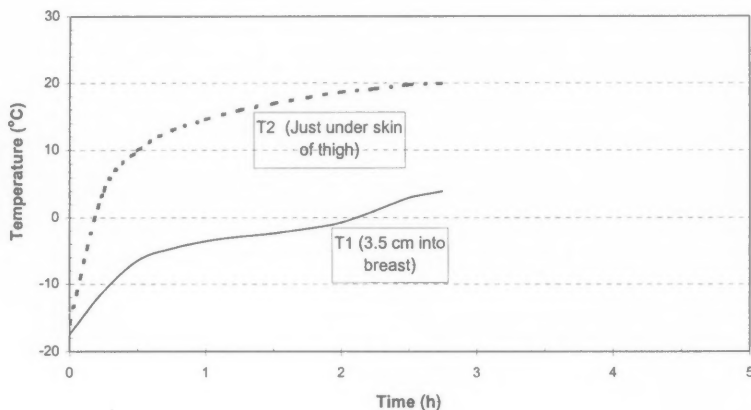
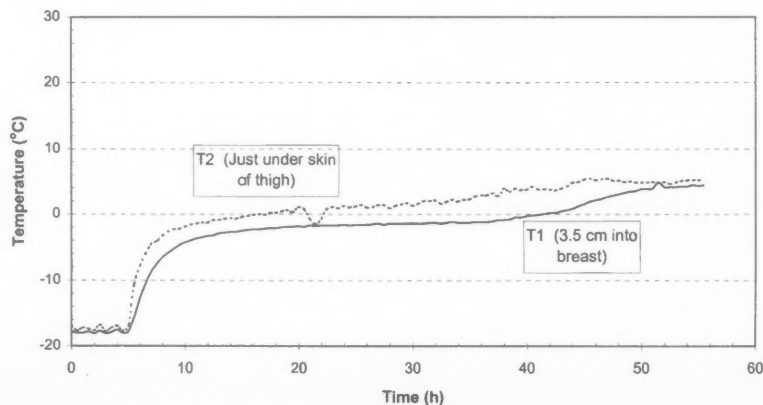


Figure 3. Chicken thawing in the refrigerator
(3.5 to 7.2°C)



inoculated was outlined. After each time the frame was used, it was flooded with alcohol and sterilized by flaming.

Salmonella hadar inoculum 0.1 ml was successively added and spread over the defined zone or area until 1 ml of the inoculum had been applied. This procedure allowed the inoculation solution to dry on the skin of the chicken within the defined analysis zone.

After inoculation, the chicken carcasses were placed in a laminar sterile air-flow chamber for 30 minutes to allow the microorganisms time for attachment.

Half of the inoculated chicken skin was removed from the defined zone for cell enumeration before freezing. The remaining half of the inoculated skin remained on the carcass for *Salmonella hadar* enumeration after thawing.

Each skin sample was placed in 90 ml of buffered 0.1% peptone water and shaken for 3 min. Decimal dilutions were performed serially. Aliquots of 0.1 ml were then plated onto Hektoen agar and XLD (xylose lysine deoxycholate) agar. In parallel, 1 ml aliquots were evaluated for *Salmonella* levels by use of a 3-tube MPN (most probable number) procedure. The MPN procedure was performed in both Rappaport Vassiliadis and selenite cystine broth, followed by plating onto Hektoen agar and XLD agar (1). Presumptive positive colonies were selected, streaked, and stabbed into lysine iron, triple sugar iron, and urea agar slants for serological confirmation.

Statistical differences in bacterial populations (after log transformation) were evaluated by a *t*-test analysis. Calculations were done using Microsoft Excel 97 Analysis ToolPak.

RESULTS

Experiment I. Uninoculated chicken — thawing

Results of thawing chicken on the counter at an ambient temperature of 22°C are shown in Figure 1. The time required for temperature

TABLE 1. Change in bacterial population as affected by thawing method
[Log CFU/g (after thawing* -before freezing*)]

Thawing Method	APC	Enterobacteriaceae	Pseudomonads
On counter	-0.254	-0.21	-0.403
Flowing, potable water	-0.207	0.003	-0.303
In the refrigerator	-0.146	-0.10	0.470

* Average of three samples.

Figure 4. Change in bacterial population in chicken as affected by thawing method
 [Log CFU/g (after thawing* -before freezing)]
 *average of three samples

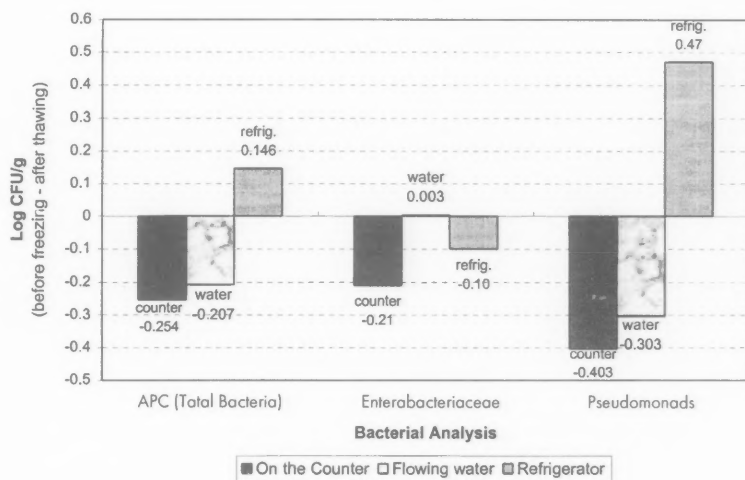
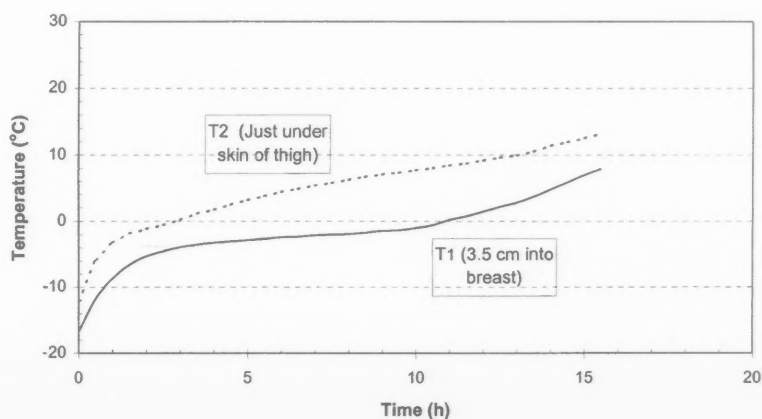


Figure 5. Chicken inoculated with *Salmonella hadar* thawing on counter [at ambient temperature (22°C)]



in the uninoculated chicken breast to reach 4.4°C was 9 hours.

Results of thawing chicken in flowing, potable water (21°C) are shown in Figure 2. The time required for the temperature in the uninoculated chicken breast to reach 4.4°C was 2.75 hours. The final temperature just under the skin of the thigh was about 20°C.

Results of thawing in a refrigerator at temperatures ranging from 3.5 to 7.2°C are shown in Figure 3. The time required for the temperature in the uninoculated chicken breast to reach 4.4°C was 55 hours.

Table 1 and Figure 4 show the changes in the bacterial population of uninoculated chickens. The population decrease that occurred during thawing on the counter at ambient temperature was shown to be statistically significant for Enterobacteriaceae ($P = 0.025$) and pseudomonads ($P = 0.043$).

When chicken was thawed in flowing potable water, there was no statistically significant change in aerobic plate count or Enterobacteriaceae numbers. However, the slight decrease in pseudomonad population was found to be statistically significant ($P \leq 0.025$).

The greatest population change was noted in the increase of pseudomonads that occurred when the chicken was thawed in the refrigerator. The pseudomonads grew by almost a half log when the chicken was thawed under refrigeration, while in the other two thawing methods, the cell population of pseudomonads decreased or changed

TABLE 2. Change in *Salmonella hadar* population as affected by thawing method
[Log CFU/g (after thawing -before freezing)]

Thawing Method	<i>Salmonella hadar</i>
On counter	-0.915
Flowing, potable water	-0.061
In the refrigerator	-0.979

Figure 6. Chicken inoculated with *Salmonella hadar* thawing in flowing, potable water (21°C)

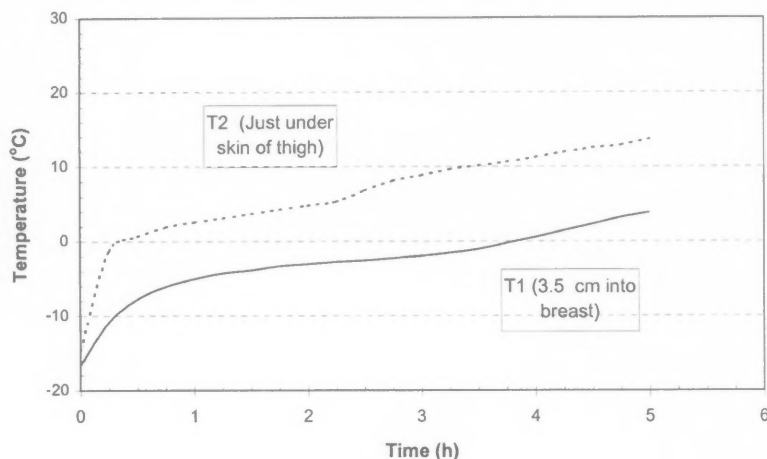
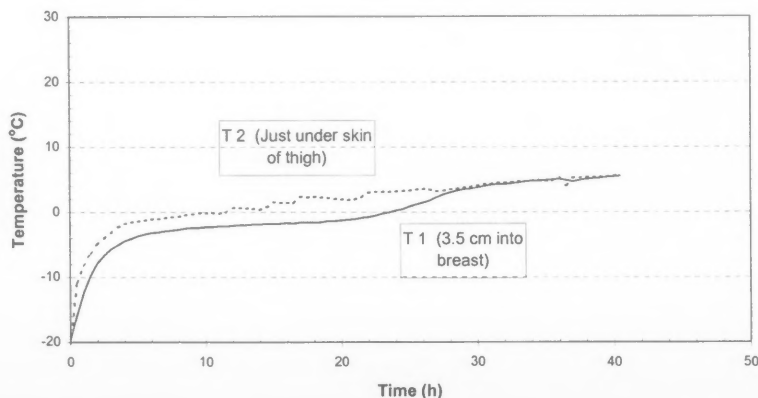


Figure 7. Chicken inoculated with *Salmonella hadar* thawing in the refrigerator (3.5 to 7.2°C)



only slightly. This increase of pseudomonads that occurred when the chicken was thawed in the refrigerator was shown to be significant ($P \leq 0.024$). The changes in the aerobic plate count and Enterobacteriaceae during thawing in the refrigerator were not statistically significant.

No salmonellae were detected in any of the uninoculated chicken samples before freezing or after any method of thawing.

Experiment II. Inoculated chicken

Results of thawing the chicken inoculated with *Salmonella hadar* on the counter at an ambient temperature of 22°C are shown in Figure 5. The time required for the temperature 3.5 cm inside the breast to reach 4.4°C was 13.75 hours.

When chickens inoculated with *Salmonella hadar* were thawed in flowing, potable water (21°C), the time required for the temperature 3.5 cm inside the breast to reach 4.4°C was 5 hours (Fig. 6).

When the chickens inoculated with *Salmonella hadar* were thawed in the refrigerator (3.5 to 7.2°C), the time required for the temperature 3.5 cm inside the breast to reach 4.4°C was 33 hours (Fig. 7).

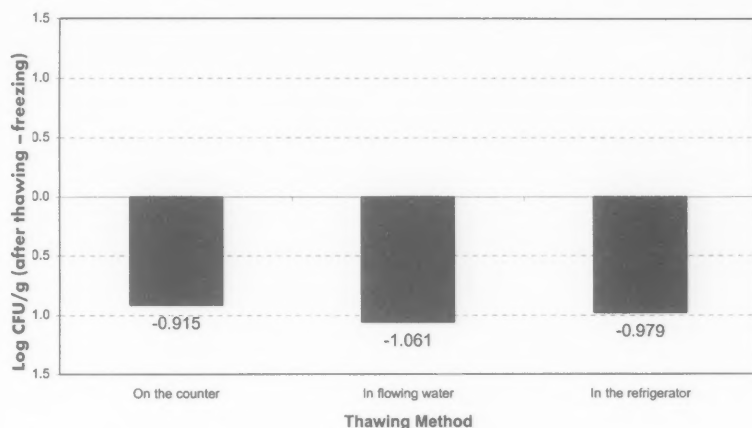
Table 2 and Figure 8 show the changes (population decrease) in *Salmonella hadar* that occurred in the chicken carcass skin after freezing and thawing. In all inoculated samples, there was a significant reduction in salmonellae ($P \leq 0.01$).

DISCUSSION

It is apparent from the results that, during freezing, there is a slight reduction of bacterial cells due to cell injury. During the extended period of time required to thaw the chicken in the refrigerator in Experiment I, pseudomonads (which multiply slowly at 0–2°C) increased slightly in number.

Salmonella spp. do not multiply at temperatures below 5°C, as shown by the results of thawing inoculated chickens (Experiment II).

Figure 8. Change in population of *Salmonella hadar* inoculated an chickens as affected by thawing method



Temperature and time were not sufficient to allow the growth of *Salmonella hadar* during any of these thawing procedures.

CONCLUSION

These experiments show that thawing chicken on the counter at room temperature (21-22°C) for 14 hours or less to an internal temperature of 4.4°C (3.5 cm within the breast) is a safe procedure. Thawing chicken in flowing water is a safe, rapid method. However, thawing poultry in a standard refrigeration unit at a temperature of 3.5 to 7.2°C requires a longer, variable thawing period, at temperatures that allow the growth of pseudomonas spoilage bacteria.

Most regulatory agencies follow FDA recommendations and do not allow food to be thawed at ambient

temperature. The FDA retail food code recommends that food be thawed under refrigeration, or in flowing water, so that the temperature of the food does not exceed 5°/7.2°C (41°/45°F). The USDA has no restriction regarding how food is thawed, even when food is thawed at ambient temperature. This is based on research of Klose et al. (6).

Because of small sample size, it is difficult to draw major conclusions. However, this study provides evidence that controlled thawing at ambient temperatures, as permitted by USDA, does not lead to increased hazards.

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REFERENCES

1. Andrews, W. H., V. R. Bruce, G. June, F. Satchell, and P. Sherrod. 1992. *Salmonella*. Ch. 5, p. 51-69. In *Bacteriological analytical manual*, 7th ed. Association of Official Analytical Chemists. Arlington, VA.
2. CAST (Council for Agricultural Science and Technology). 1994. *Foodborne pathogens: Risks and consequences*. Task Force Report No. 122. CAST, 4420 West Lincoln Way, Ames, IA.
3. FDA Food Code. 1999. U.S. Public Health Service, U.S. Dept. of Health and Human Services. Pub. No. PB99-115925. Washington, D.C.
4. Grau, F. H. 1980. Inhibition of the anaerobic growth of *Broxhorthrix themosphacta* by lactic acid. *Appl. Environ. Microbiol.* 40:433-436.
5. International commission of microbiological specifications for foods. 1978. *Microorganisms in foods 1. Their significance and methods of enumeration*, 2nd edition. p. 160-172. University of Toronto Press. Toronto.
6. Klose, A. A., H. Lineweaver, and H. H. Palmer. 1968. Thawing turkeys at ambient air temperature. *Food Tech.* 22:1310-1314.
7. Tessi, M. A., M. Bustos, R. Rafaghelli, and M. A. Moguilevsky. 1992. Supervivencia y antibiótico resistencia de *Salmonella* aisladas de canales de pollos descontaminadas por inmersión en ácidos orgánicos y conservadas al vacío. *La Industria Cárnica Latinoamericana* 90:19-25.
8. Zhuang, R. Y., L. R. Beuchat, and F. J. Angulo. 1995. Fate of *Salmonella montevideo* on and in raw tomatoes as affected by temperature and treatment with chlorine. *Appl. Environ. Microbiol.* 61:2127-2131.

Small Round Coliphages as Surrogates for Human Viruses in Process Assessment

Tadesse W. Mariam² and Dean O. Cliver¹

SUMMARY

Inactivation of hepatitis A virus (HAV) was compared with inactivation of the small round RNA (MS2) and DNA (ϕ X174) coliphages and, in some instances, poliovirus 1. The processes tested (heating in tap water and milk, air drying on a surface, and ClO_2 disinfection of water and strawberries) are applicable to food and water. The poliovirus, where tested, was always more labile than HAV. Inactivation of MS2 showed some similarity to that of HAV during heating in water and milk, especially at 72°C. HAV was considerably more resistant than either coliphage to drying and to ClO_2 disinfection. Even though the coliphages were usually less resistant, they might be useful surrogates for HAV in pilot-scale studies if reliable conversion factors could be established.

INTRODUCTION

Viruses are important causes of foodborne and waterborne disease in the United States, and probably throughout the world. Hepatitis A virus (HAV) is a picornavirus, comprising a single (+) strand of RNA with a protein coat of 60 copies of each of four polypeptides and a diameter of ~28 nm. The genus name was assigned in 1982, on the basis

of biophysical and biochemical characteristics (4, 7). HAV is an enteric virus that causes the most serious foodborne infections of viral etiology (3). HAV was the fourth-ranked cause of foodborne illnesses in the United States during 1988 to 1992 (2). Hepatitis A is a widespread infectious disease that is endemic in developing countries and also may account for up to 25% of all cases of hepatitis in the developed world.

Processes applied to food and water are typically evaluated for their antibacterial effectiveness; viruses are seldom included because of the high costs and hazards of working with them. The human viruses transmitted via food and water are spread by a fecal-oral route – the hardiest of these appears to be the hepatitis A virus. Studies with the cytopathic variant of hepatitis A virus seem to show that earlier model experiments with vaccine poliovirus have produced misleading results, in that the hepatitis virus withstands heat and drying to a greater extent than the polioviruses. Quantitative experiments with these agents involve plaque assay in primate cell cultures, which has a read-out time of 3 to 5 days for poliovirus and at least 14 to 16 days for hepatitis A virus. The difficulties associated with the slow growth rate, the minimal cytopathic effects of most strains of HAV on infected tissue culture cells, and the plaque assay's 14- to 16-day incubation period have discouraged testing. There is a need for a surrogate agent that can be used to determine the antiviral effects of food and water processes cheaply and in less time than is required for the plaque assay with human viruses.

Small round coliphages are viruses that infect specific strains of *Escherichia coli*; they are roughly spherical and slightly smaller than HAV and poliovirus. The ϕ X174-type coliphages contain single-stranded DNA and infect *E. coli* via somatic receptors, whereas F-specific RNA (FRNA) coliphages infect *E. coli* by attachment to F pili, which are produced only by certain strains of the species. Under optimal conditions, these phages produce plaques within 6 h.

Several processes applied to food and water, particularly heating and chlorination, are known to have antiviral effects. Often, the antiviral result of a treatment cannot be predicted accurately because technical and safety constraints result in very limited, bench-top determinations. Pilot-scale trials are rarely performed. Because the small round coliphages pose no threat to human health, they could be used as surrogates for HAV and other human agents in large-scale trials, if it could be shown that the process in question inactivates the coliphages to the same extent as it inactivates the human pathogenic virus. The objective of this study was to determine whether a small round RNA or DNA coliphage could serve as a surrogate when food or water processes are evaluated for their effect against HAV.

MATERIALS AND METHODS

Coliphages

Coliphages (MS2, ATCC #15597-B1, and ϕ X174, ATCC #13706-B1) and their respective specific bacterial host strains (*E. coli* ATCC #15597 and *E. coli* ATCC #13706) were obtained from the American Type Culture Collection (ATCC). Coliphage stocks were generated from the suspensions obtained from ATCC according to instructions in their catalog. Freeze-dried phage samples were rehydrated aseptically with 500 μ l Luria-Bertani (LB; Difco, Detroit, MI) broth, 100 μ l of which was used to generate a high titer phage stock, while the remainder of the rehydrated sample was stored at

-20°C. High titer stocks of MS2 and ϕ X174 were prepared by the soft agar method described (1). In our study, tryptic soy agar (TSA) (Difco, Detroit, MI) plates were overlaid with the specific host bacterial strains and sufficient phages to cause confluent plaque formation. After 16-18 h incubation at 37°C, the MS2 and ϕ X174 were harvested by adding 5 ml LB broth to each plate and scraping off the soft agar overlay. Several plates were pooled and extracted by adding LB broth and incubation for 30 min on ice. The soft agar was removed from the phage suspension by centrifugation, and the supernatant fluids were filter-sterilized through 0.45 μ m porosity filters (Supor Acrodisc cat. #4614, Gelman Sciences, Ann Arbor, MI) for storage. Titers were determined by the plaque assay method on TSA (1), and the phages were stored at -20°C in 1.8 ml Nunc CryoTubes (Nalge Nunc International, Denmark). For phage replication and plaque assays, LB broth was used as diluent and growth medium.

Human viruses

Hepatitis A virus: HAV strain HM-175/18f was obtained from Dr. S. M. Lemon, University of North Carolina, Chapel Hill, NC. HAV was propagated on the continuous line of fetal rhesus monkey kidney cells (FRhK-4) obtained from Dr. Theresa Cromeans, Centers for Disease Control and Prevention (CDC, Atlanta, GA). The HAV inoculum for the study was prepared from tissue culture fluid (TCF) collected from infected FRhK-4 cultures (5). TCF was frozen, thawed, sonicated in a bath sonicator, and centrifuged at 2000 \times g for 20 min to remove large particulate matter. The supernatant was filtered through a 0.45 μ m porosity filter (Supor) and frozen at -20°C until use.

Samples were assayed by the plaque technique in FRhK-4 cells as described by López-Sabater et al. (6). From each sample, 500 μ l was inoculated into a 25-cm² polystyrene tissue culture flask (Corning, Cambridge, MA) in duplicate. After

an adsorption period of 2 h while the flasks were rocked at 37°C, 10 ml of overlay medium containing 0.75% agarose Type II (Sigma Chemical, St. Louis, MO) was added and allowed to solidify at room temperature for 15 min; flasks were incubated cell-side-up at 37°C. Fifteen days later, cells were fixed with 5 ml formalin solution at room temperature for 2 h, overlay medium was removed by shaking, and flasks were rinsed with water and stained with crystal violet for 2 min at room temperature. The flasks were air dried at room temperature, plaques were counted, and the HAV concentration/titer was reported as plaque forming units per milliliter (PFU ml⁻¹).

Poliovirus type 1 (PO1), strain LSa, ATCC #VR-59 obtained from ATCC was propagated and assayed in FRhK-4 cell cultures. The plaque assay method for PO1 was similar to that for HAV, except that the volume of overlay medium was 5 ml and the incubation period was 5 days.

Thermal inactivation

Heat treatment was carried out in sterile Falcon tubes (cat. #2054, Becton Dickinson, Lincoln Park, NJ), first with Davis, CA, tap water and then with milk. The meniscus of the 980 μ l water or milk inside the test tube was lower than the external fluid in the heating block (Scientific Products Model H2025-5, American Hospital Supply, McGaw Park, IL). After the temperature reached 63°C or 72°C, 20 μ l of the HAV inoculum was mixed into the heated fluid. At the end of each treatment time, the contents of the test tube were rapidly cooled by tipping them into a bottle containing 1,000 μ l tissue culture growth medium standing on ice. All treated samples were stored on ice, and plaque assay was performed within an hour.

The milk used first as an experimental vehicle was purchased at retail as pasteurized, homogenized whole milk (Lucerne, Safeway, Pleasanton, CA). Subsequently, raw milk was obtained from the Univer-

TABLE 1. Thermal inactivation of viruses (HAV & PO1) and coliphages (MS2 & ϕ X174) in tap water

Virus ¹	Control ²	63°C		72°C	
		30 min	60 min	15 s	30 s
HAV	$6.9 \times 10^{3.3}$	15	10	2.3×10^2	3.5×10^1
PO1	5.7×10^3	<1	<1	10	<1
MS2	7.2×10^3	<1	<1	3.5×10^2	2.5×10^1
ϕ X174	5.2×10^3	<1	<1	8.3×10^1	10

¹HAV = hepatitis A virus; PO1 = poliovirus 1; MS2 = FRNA coliphage; ϕ X174 = ssDNA coliphage

²Water was not heat-treated

³Titers in PFU ml⁻¹

TABLE 2. Thermal inactivation of viruses (HAV & PO1) and coliphages (MS2 & ϕ X174) in homogenized, pasteurized whole milk

Virus ¹	Control ²	63°C		72°C	
		30 min	60 min	15 s	30 s
HAV	$3.9 \times 10^{3.3}$	10	10	1.3×10^2	3.1×10^1
PO1	6.3×10^3	<1	<1	<1	<1
MS2	5.0×10^3	<1	<1	2.9×10^2	2.0×10^1
ϕ X174	3.2×10^3	<1	<1	10	10

¹HAV = hepatitis A virus; PO1 = poliovirus 1; MS2 = FRNA coliphage; ϕ X174 = ssDNA coliphage

²Milk was not heat-treated

³Titers in PFU ml⁻¹

sity of California, Davis dairy facility and inoculated both as obtained and after the cream had been removed by centrifugation in the laboratory.

Drying inactivation

A cocktail of HAV and coliphages (MS2 and ϕ X174) was prepared in 0.01 M ammonium acetate ($\text{CH}_3\text{COONH}_4$, F.W. 77.08, Fisher) to the final concentration of $\sim 10^4$ PFU

ml⁻¹ each. Two ml of virus suspension was dispensed into cell culture petri dishes and placed in a laminar flow hood to dry. The dried virus suspension was resuspended in 2 ml of 0.01 M ammonium acetate and put on ice until the infectivity test was done. Sampling and infectivity testing were done at 2-day intervals. Plaque assays were done as described previously.

Chlorine dioxide (ClO₂) inactivation

Known titers of virus suspensions (10^5 PFU ml⁻¹ and 10^4 PFU ml⁻¹) in tap water, raw whole milk, and crushed strawberry suspension were exposed to ClO₂ solution at concentrations of 2, 4, and 6 ppm for 10 min. After the 10 min exposure time, the ClO₂ was neutralized with a 10% solution of sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$; Sigma St, Louis, MO).

TABLE 3. Inactivation of hepatitis A virus and coliphages MS2 and ϕ X174 in raw milk at 63°C

Virus	0 min		30 min		60 min	
	with fat	w/o fat	with fat	w/o fat	with fat	w/o fat
HAV	$5.2 \times 10^{4.1}$	5.2×10^4	3.1×10^3	1.7×10^4	7.4×10^2	2.9×10^2
MS2	5.1×10^4	5.3×10^4	8.3×10^2	3.4×10^2	3.0×10^1	1.0×10^1
ϕ X174	3.2×10^4	4.0×10^4	7.5×10^2	2.0×10^2	<3.3	<3.3

¹Titers in PFU ml⁻¹**TABLE 4. Inactivation of hepatitis A virus and coliphages MS2 and ϕ X174 in raw milk at 72°C**

Virus	0 s		15 s		1 min		2 min		3 min		4 min	
	with fat	w/o fat	with fat	w/o fat	with fat	w/o fat	with fat	w/o fat	with fat	w/o fat	with fat	w/o fat
HAV	$5.2 \times 10^{4.1}$	5.2×10^4	3.8×10^4	4.1×10^4	6.2×10^3	2.9×10^3	1.1×10^2	2.1×10^2	1.5×10^1	1.3×10^1	1.2×10^1	1.7×10^1
MS2	5.1×10^4	5.3×10^4	3.5×10^4	1.2×10^4	1.8×10^3	1.9×10^3	9.4×10^2	4.5×10^2	5.0×10^2	2.6×10^2	4.0×10^1	3.0×10^1
ϕ X174	3.2×10^4	4.0×10^4	6.1×10^3	3.8×10^3	5.0×10^2	2.4×10^2	1.0×10^2	6.0×10^1	7.0×10^1	<3.3	1.0×10^1	<3.3

²Titers in PFU ml⁻¹**TABLE 5. Inactivation of hepatitis A virus and coliphages MS2 and ϕ X174 by drying**

Virus	Day					
	0	2	4	8	16	32
HAV	$2.5 \times 10^{4.1}$	1.8×10^3	1.6×10^3	3.0×10^1	2.5×10^1	3.0×10^1
MS2	3.5×10^4	5.2×10^1	1.9×10^1	<1		
ϕ X174	6.1×10^4	5	<1	<1		

¹Titers in PFU ml⁻¹

Plaque assays were done as previously described.

RESULTS

Heat treatment of the viruses in tap water showed a fairly strong similarity between the inactivations of MS2 and HAV at 72°C, but not at 63°C (Table 1). PO1 and ϕ X174 were

less stable than HAV in water at both temperatures. Results when the viruses were heated in pasteurized milk were fairly similar to those obtained with water suspensions (Table 2). When raw milk, with and without fat, was substituted as the suspending medium, the order of stability at 63°C was HAV > MS2 > ϕ X174 (Table 3) and at

72°C, HAV ≈ MS2 > ϕ X174 (Table 4); PO1 was not included in these experiments. The presence of fat seemed to have little influence on the stabilities of HAV and MS2, but may have increased the heat resistance of ϕ X174 slightly.

Drying inactivation curves were steep for all three viruses during the first 2 days. Between the second and

TABLE 6. Inactivation of hepatitis A virus, poliovirus 1, and bacteriophages MS2 and ϕ X174 in tap water by chlorine dioxide (ClO₂) in 10 min

Virus ¹	ClO ₂ ppm			
	0	2	4	6
HAV	4.6 × 10 ^{5.2}	3.6 × 10 ⁵	1.8 × 10 ²	1.2 × 10 ²
PO1	6.5 × 10 ⁵	9.1 × 10 ¹	<1	<1
MS2	5.5 × 10 ⁵	2.6 × 10 ²	<1	<1
ϕ X174	4.9 × 10 ⁵	7.1 × 10 ²	<1	<1

¹HAV = hepatitis A virus; PO1 = poliovirus 1; MS2 = FRNA coliphage; ϕ X174 = ssDNA coliphage

²Titers in PFU ml⁻¹

TABLE 7. Inactivation of hepatitis A virus and coliphages MS2 and ϕ X174 in raw, whole milk by chlorine dioxide (ClO₂) in 10 min

Virus	ClO ₂ ppm			
	0	2	4	6
HAV	4.6 × 10 ^{5.1}	2.6 × 10 ⁵	1.8 × 10 ²	1.2 × 10 ²
MS2	7.5 × 10 ⁵	1.8 × 10 ²	<1	<1
ϕ X174	3.9 × 10 ⁵	8.1 × 10 ²	<1	<1

¹Titers in PFU ml⁻¹

fourth days of drying, there was no significant reduction of HAV, while both coliphages were significantly inactivated. By the 8th day, HAV was still detectable, but the coliphages were not (Table 5). HAV was not completely inactivated by the 32nd day of dry incubation and indeed showed little decline in titer after day 8.

HAV showed greater resistance to chlorine dioxide than any of the other viruses, whether in tap water (Table 6), milk (Table 7), or crushed strawberries (Table 8). Inactivation of HAV was slight at 2 ppm, whereas each of the other viruses was inacti-

vated by perhaps 3 to 4 log cycles; at 4 and 6 ppm, HAV was inactivated by 3 log cycles, and the others were no longer detectable.

DISCUSSION

In most countries, the two most common time-temperature combinations for milk pasteurization are 30 min at 63°C and 15 s at 72°C. HAV suspended in water or in milk, with fat or without fat, was not completely inactivated under either of these conditions, whereas PO1 was. According to Siegl et al. (8), poliovirus was not recovered after incuba-

tion at 60°C for 10 min, a reduction of more than 10⁶-fold in titer, while HAV was reduced in titer by a factor of only 10^{3.3}.

The results of the drying trials are relevant to drying of contaminants on foods and on food-contact surfaces, as well as to the persistence of HAV in foods that have a low enough water activity (*a_w*) to be stable at room temperature. Ammonium acetate was the salt used in these suspensions because it is volatile; this avoided possible confounding effects of hyperosmolarity during drying, in that the salt volatilizes completely, as ammonia and acetic

TABLE 8. Inactivation of hepatitis A virus and coliphages MS2 and ϕ X174 in crushed strawberry suspension by chlorine dioxide (ClO_2) in 10 min

Virus	ClO_2 ppm			
	0	2	4	6
HAV	$4.6 \times 10^{5.1}$	2.6×10^5	1.8×10^2	1.2×10^2
MS2	7.5×10^5	1.8×10^2	<1	<1
ϕ X174	3.9×10^5	8.1×10^2	<1	<1

¹Titers in PFU ml⁻¹

acid, as the water evaporates. Even with this precaution, HAV showed significant loss during the initial 2 days of drying. However, the HAV showed considerable stability in the dry state at room temperature, whereas the coliphages soon reached undetectable levels.

HAV was, clearly, less sensitive than the coliphages to ClO_2 disinfection in each of the suspending media. It might be possible to establish a predictable relationship between these relative sensitivities, whereby the desired endpoint for HAV inactivation could be accurately predicted on the basis of some greater degree of inactivation of one of the coliphages.

Although neither of the tested coliphages closely resembled HAV in inactivation properties under all of the conditions tested, MS2 showed some similarity to HAV during milk pasteurization. It may be reasonable to try to derive conversion factors for coliphage vs. HAV disinfection by oxidizing agents such as ClO_2 , but HAV is far more stable in the dry state than the proposed surrogates.

Further studies on thermal and chemical inactivation, to model other unit processes applied to food and water, seem appropriate.

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REFERENCES

- Adams, B. H. 1959. Methods of study of bacterial viruses, p. 443-522. In M. H. Adams (ed.), *Bacteriophages*. Interscience Publishers, New York.
- Bean, N. H., J. S. Goulding, C. Lao, and F. J. Angulo. 1996. Surveillance for foodborne disease outbreaks United States, 1988-1992. *CDC Surveillance Summaries, Morbid. Mortal. Weekly Rep.* 45(SS-5):1-66.
- Cliver, D. O. 1985. Vehicular transmission of hepatitis A. *Pub. Health Rev.* 13:235-292.
- Coulepis A. G., S. A. Locarinini, E. G. Westaway, G. A. Tannock, and I. D. Gust. 1982. Biophysical and biochemical characterization of hepatitis A virus. *Intervirology* 18:107-127.
- Flehmg, B. 1981. Hepatitis A virus in cell culture: II. Growth characteristics of hepatitis A virus in FRhK-4 cells. *Med. Microbiol. Immunol.* 170:73-81.
- Lopez-Sabater, E. I., M. Y. Deng, and D. O. Cliver. 1997. Magnetic immunoseparation PCR assay (MIPA) for detection of hepatitis A virus (HAV) in American oyster (*Crassostrea virginica*). *Lett. Appl. Microbiol.* 24:101-104.
- Palmenberg, A. 1986. Comparative organization and genome structure in picornaviruses (Abstract Q3). *J. Cell. Biochem. Suppl.* 10:166.
- Siegl, G., M. Weitz, and G. Kronauer. 1984. Stability of hepatitis A virus. *Intervirology* 22:218-226.

The National Restaurant Association Educational Foundation Urges Full Industry Participation During National Food Safety Education MonthSM 2000 in September

This year's theme is "Be Smart. Keep Foods Apart. Don't Cross-Contaminate."

The National Restaurant Association Educational Foundation's International Food Safety Council urges restaurant and foodservice professionals to plan now to participate in the sixth annual National Food Safety Education MonthSM in September. Created by the Foundation's Council and recognized by President Clinton's National Food Safety Initiative, this month-long observance focuses on the importance of food safety education for the restaurant and foodservice industry and raises awareness of the industry's commitment to food safety.

"Food safety education is essential to combat foodborne illness," said John Farquharson, FMP, president of the Foundation's International Food Safety Council. "By taking part in National Food Safety Education Month, restaurant and foodservice professionals can spread the word about their commitment to serving safe food to their customers, as well as disseminate best practices throughout the industry."

"I think this year's theme, 'Be Smart. Keep Foods Apart. Don't Cross-Contaminate,' is compelling and will provide the industry with a creative way to keep food safety top of mind," said Marcel Desaulniers, this year's chairman of National Food Safety Education Month. "Keeping foods apart is one of the most effective ways to prevent foodborne illness. That's why I'm so pleased that this year's theme highlights the dangers of cross-contamination."

Mr. Desaulniers is the executive chef and owner of The Trellis Restaurant in Williamsburg, Va. He is also the co-host of the new PBS series "The Grilling

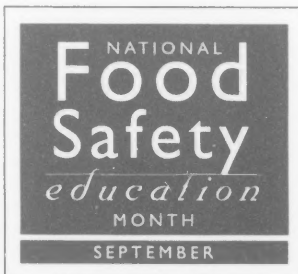
Maestros," has received numerous national awards and is the author of seven cookbooks.

"'Be Smart. Keep Foods Apart ... Don't Cross-Contaminate,' was derived from one of the four most important food safety steps that restaurant and foodservice professionals perform each day—cleaning, separating, cooking and chilling," said A. Reed Hayes, president and chief operating officer of the National Restaurant Association Educational Foundation. "Avoiding cross contamination is one of the most efficient means of controlling the growth of microorganisms, which cause foodborne illness."

Industry participation and increased awareness is essential to the success of the initiative. That is why the Foundation's Council is offering an *Industry Training & Promotion Guide* for industry professionals to use to aid them in their participation. It is an easy how-to guide that provides

ideas on how to get involved in National Food Safety Education Month 2000 activities.

Restaurant operators, state restaurant associations, extension services, and other industry groups get involved in this food safety effort every year. To find out more about how to participate or to obtain an *Industry Training & Promotion Guide*, restaurant and foodservice professionals can log on to the Council's Web site at www.foodsafetycouncil.org.



TM

Book reviewed by: William LaGrange, Ph.D., Extension Food Scientist, Iowa State University,
Ames, IA 50011

Book Review



INTERNATIONAL FOOD SAFETY HANDBOOK – Science, International Regulations, and Control

Edited by: Kees van der Heijden, Maged Younes, Lawrence Fishbein, and Sanford Miller

International Food Safety Handbook is the 95th publication by the editorial board of Food Science and Technology. This 811-page book includes 46 separate sections on the many aspects of food safety written by experts from throughout the world. While food safety continues to be a major issue for food producers, processors, servers, regulatory and public health agencies, and consumers, a great deal of progress has been made in most all aspects of this public health concern. But many questions and problems still need to be investigated and solved. This book reviews the progress and current knowledge about micro-

bial food problems, including water and other liquid drinks. Chemical contaminants from pesticides, medicines, natural toxins, and packaging materials are also presented. Environmental concerns, analytical methods, emerging problems such as food sensitivities, and new processing methods are sections included within this book. Food regulations and consumer concerns about food safety including an international perspective also are reviewed.

This book is an excellent reference on food safety issues. It also would serve as a text for a course on food safety issues at both the undergraduate and graduate level in food science and technology related curricula.

For copies of *International Food Safety Handbook – Science, International Regulations, and Control*, Mail requests to: Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016-0602; Phone: 212.696.9000; Fax: 212.685.4540.



International Association for Food Protection

Award Nominations

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

IAFP
6200 Aurora Ave., Suite 200W
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Fax: 515.276.8655
Web site: www.foodprotection.org
E-mail: info@foodprotection.org

Nominations deadline is February 19, 2001. You may make multiple nominations. All nominations must be received at the IAFP office by February 19, 2001.

- ◆ Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be a company employing current IAFP Members. NFPA Food Safety Award nominees do not have to be IAFP Members.
- ◆ Previous award winners are not eligible for the same award.
- ◆ Executive Board Members and Awards Committee Members are not eligible for nomination.
- ◆ Presentation of awards will be during the Awards Banquet at the IAFP Annual Meeting in Minneapolis, Minnesota on August 8, 2001.



Nominations will be accepted for the following Awards:

Black Pearl Award – Award Showcasing the Black Pearl

Presented in recognition of a company's outstanding achievement in corporate excellence in food safety and quality.

Sponsored by Wilbur Feagan and F&H Food Equipment Company.

Honorary Life Membership Award – Plaque and Lifetime Membership in IAFP

Presented to Member(s) for their devotion to the high ideals and objectives of IAFP and for their service to the Association.

Harry Haverland Citation Award – Plaque and \$1,000 Honorarium

Presented to an individual for years of devotion to the ideals and objectives of IAFP.

Sponsored by DiverseyLever/U.S. Food Group.

Harold Barnum Industry Award – Plaque and \$1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the food industry.

Sponsored by NASCO International, Inc.

Educator Award – Plaque and \$1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the arena of education in food safety and food protection.

Sponsored by Nelson-Jameson, Inc.

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Presented to an individual for outstanding service to the public, IAFP and the profession of the Sanitarian.

Sponsored by Ecolab, Inc., Food and Beverage Division.

Maurice Weber Laboratorian Award – Plaque and \$1,000 Honorarium

Presented to an individual for outstanding contributions in the laboratory, recognizing a commitment to the development of innovative and practical analytical approaches in support of food safety.

Sponsored by Weber Scientific

NFPA Food Safety Award – Plaque and \$3,000 Honorarium

Presented to an individual, group, or organization in recognition of a long history of outstanding contribution to food safety research and education.

Sponsored by National Food Processors Association.





International Association for
Food Protection

Call for Nominations **2001 Secretary**

A representative from education will be elected in the spring of 2001 to serve as IAFP Secretary for the year 2001-2002.

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

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College of Agriculture
Animal and Food Science Department
410 S. 3rd Street
River Falls, WI 54022-5001
Phone: 715.425.3150
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E-mail: purnendu.c.vasavada@uwrf.edu

The Secretary-Elect is determined by a majority of votes cast through a mail vote taken in the spring of 2001. Official Secretary duties begin at the conclusion of the 2001 Annual Meeting. The elected Secretary serves as a Member of the Executive Board for a total of five years succeeding to President, then serving as Past President.

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

Nominations close November 1, 2000.



Call for Abstracts

IAFP
88th Annual Meeting — August 5-8, 2001
Minneapolis, Minnesota

Instructions for Preparing Abstracts

Procedure

- ◆ Abstracts should be typed in the space provided or on a separate sheet of paper. Abstracts must be double-spaced using a 12-point font size, and a maximum of 250 words.
- ◆ The first letter in each word in the title and proper nouns should be capitalized.
- ◆ List the names of authors and institution(s). Capitalize first letters and initials.
- ◆ Give the full name, title, mailing address, E-mail address, and the office telephone number of the author who will present the paper.
- ◆ Check the box to indicate if the paper is to be presented by a student entered in the Developing Scientist Awards Competition and have the form signed by your major professor or department head. (For more information on the Developing Scientist Awards Competitions, see the following pages.)
- ◆ Submit your abstract to the IAFP office. Abstracts must be received no later than January 8, 2001. Return the completed abstract form through one of the following methods:
 1. Mail one printed copy and an electronic version on a 3½ inch disk (saved as a word document) of the abstract to:
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 3. Internet submission will be available in November 2000.

Acknowledgment of receipt of abstract will be sent via mail or E-mail. Authors will be notified of acceptance or rejection by March 1, 2001.

***NOTE: Your abstract must be received by the IAFP office no later than January 8, 2001. Photocopies of the abstract form may be used.**

Abstract General Information

Content of the Abstract

The abstract should briefly describe the purpose of the research and objectives; methodology; essential results; and conclusions or implications.

Presentation Format

Papers may be presented by oral or poster format at the discretion of the IAFP Program Committee. Oral presentations will be scheduled with a maximum of 15 minutes, including a two to four minute discussion. LCD and 35-mm projectors will be available. Overhead projectors are not to be used. Other equipment may be used at speaker's expense. Prior authorization must be obtained.

Subject Matter for Papers

Papers should report the results of applied research on: food, dairy and environmental sanitation; foodborne pathogens; food and dairy microbiology; food and dairy engineering; food and dairy chemistry; food additives and residues; food and dairy technology; food service and food administration; quality assurance and control; mastitis; environmental health; waste management and water quality. Papers may also report subject matter of an educational and/or nontechnical nature.

Criteria for Acceptance of Abstracts

1. Abstract must accurately and briefly describe:
 - (a) the problem studied and objectives
 - (b) methodology
 - (c) essential results
 - (d) conclusions or implications
2. Abstract must report the results of original research pertinent to the subject matter described in "Subject Matter for Papers" section.
3. Research must be based on accepted scientific practices.

4. Research should not have been previously presented nor intended for presentation at another scientific meeting; paper should not appear in print prior to the IAFP Annual Meeting.
5. Results should be summarized. Do not use tables or graphs.

Typical Reasons for Rejection of Abstracts

1. Abstract was not prepared according to "Instructions for Preparing Abstracts." (page 695)
2. Abstract does not contain essential elements described in "Criteria for Acceptance of Abstracts."
3. Abstract reports inappropriate or unacceptable subject matter, is not based on accepted scientific practices, or the quality of the research or scientific approach is inadequate.
4. Work reported appears to be incomplete.
5. The abstract was poorly written or prepared including spelling and grammatical errors.
6. Results have been presented/published previously.
7. The abstract was received after the deadline for submission.
8. Abstract contains information that is in violation of the IAFP Policy on Commercialism.

Additional Abstract Forms

Photocopies of the abstract form may be used.

Membership in IAFP

Membership in IAFP is not a requirement for presenting a paper at the IAFP Annual Meeting.

IAFP Abstract Form

DEADLINE: Must be Received by January 8, 2001

Title of Paper _____

Authors _____

Full Name and Title of Presenter _____

Institution and Address of Presenter _____

Phone Number: _____

Fax Number: _____

E-mail: _____

NOTE: Selected presentations may be recorded (audio or visual). The final decision on presentation format will be made by the Program Committee.

Format preferred: Oral Poster No Preference

Developing Scientist Awards Competitions Yes

Major Professor/Department Head approval (signature and date) _____

TYPE abstract, DOUBLE-SPACED, in the space provided or on a separate sheet of paper using a 12-point font size. No more than 250 words.

Call for Entrants in the Developing Scientist Awards Competitions

Supported by the IAFP Foundation

IAFP is pleased to announce the continuation of its program to encourage and recognize the work of students and recent graduates in the field of food safety research. Qualified individuals may enter either the Developing Scientist Oral Competition or the Developing Scientist Poster Competition.

Purpose:

1. To encourage students and recent graduates to present their original research at the IAFP Annual Meeting.
2. To foster professionalism in students and recent graduates through contact with peers and professional Members of IAFP.
3. To encourage participation by students and recent graduates in IAFP and its Annual Meeting.

DEVELOPING SCIENTIST ORAL AWARDS COMPETITION:

The Developing Scientist Oral Awards Competition is open only to graduate students enrolled in M.S. or Ph.D. programs or recent M.S. or Ph.D. graduates in programs at accredited universities or colleges where research deals with environmental, food or dairy sanitation, protection or safety. Competition entrants cannot have graduated more than one year prior to the deadline for submitting abstracts.

Prior to the Annual Meeting, up to ten finalists will be selected for competition. Awards will be presented at the IAFP Annual Meeting Awards Banquet to the top three presenters (first, second and third places). Presentations are limited to fifteen minutes which includes two to four minutes for discussion.

Awards: First Place, \$500 and an engraved plaque; Second Place, \$300 and a framed certificate; Third Place, \$100 and a framed certificate. Award winners will also receive a complimentary, one-year IAFP membership including both *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection*.

DEVELOPING SCIENTIST POSTER AWARDS COMPETITION:

The Developing Scientist Poster Awards Competition is open to enrolled undergraduate and graduate students or recent graduates from undergraduate or

graduate programs at accredited universities or colleges where research deals with environmental, food or dairy sanitation, protection or safety. Competition entrants cannot have graduated more than one year prior to the deadline for submitting abstracts.

Prior to the Annual Meeting, up to ten finalists will be selected for competition and awards will be presented at the IAFP Annual Meeting Awards Banquet to the top three presenters (first, second and third places). Specific requirements for presentations will be provided at a later date. The presenter must be present for the specified time (approximately two hours) during the assigned session.

Awards: First Place, \$500 and an engraved plaque; Second Place, \$300 and a framed certificate; Third Place, \$100 and a framed certificate. Award winners will also receive a complimentary, one-year IAFP membership including both *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection*.

INSTRUCTIONS FOR DEVELOPING SCIENTIST AWARDS ORAL AND POSTER COMPETITION ENTRANTS:

1. Abstracts must be received by the IAFP office no later than January 8, 2001.
2. In addition to adhering to the general procedures for abstract preparation and submission required of all individuals submitting abstracts, competition entrants must submit one copy of their abstract. Competition entrants must also mark the appropriate box on the abstract form to indicate their intention to participate in the Developing Scientist Awards Competition and to designate whether it is "oral" or "poster."
3. Both the competition entrant and his or her presentation must be recommended and approved for the Competition by his or her major professor or department head, who must sign the abstract form.
4. The work must represent original research done by the competition entrant and must be presented by the competition entrant.
5. Competition entrants may enter only one paper in either the Oral or the Poster Competition.

ADDITIONAL INFORMATION:

1. All competition entrants are required to pay the registration fee (i.e., student member rate, Member rate, or nonmember rate) for the IAFP Annual Meeting. Nonmembers may join IAFP and receive the Member rate.
2. Acceptance of papers by IAFP for presentation at the Annual Meeting is independent of acceptance as a Competition finalist. Competition entrants who are chosen as finalists will be notified of their status by the competition chairperson by June 1, 2001.
3. All competition entrants with accepted abstracts will receive a complimentary, one-year IAFP membership which includes their choice of *Dairy, Food and Environmental Sanitation* or *Journal of Food Protection*.
4. All competition finalists will receive a complimentary Awards Banquet ticket and are expected to be present at the banquet where the award winners will be announced and recognized.

JUDGING THE DEVELOPING SCIENTIST AWARDS COMPETITION:

Abstracts and presentations will be evaluated by an independent panel of judges. Selection of up to ten finalists for the Developing Scientist Oral Awards Competition and up to ten finalists for the Developing

Scientist Poster Awards Competition will be based on evaluations of the abstracts and the scientific quality of the work (see judging criteria below). All competition entrants will be advised of the judges' decisions by June 1, 2001.

Only competition finalists will be judged at the Annual Meeting and will be eligible for the awards. All other competition entrants with abstracts accepted by the IAFP Program Committee will be expected to present their papers or posters as part of the regular Annual Meeting. The presentations will not be judged and they will not be eligible for the awards.

JUDGING CRITERIA FOR THE DEVELOPING SCIENTIST AWARDS COMPETITION:

ABSTRACT:

Clarity; comprehensiveness; conciseness.

SCIENTIFIC QUALITY:

Adequacy of experimental design; extent to which objectives were met; difficulty and thoroughness of research; validity of conclusions based upon data; technical merit; contribution to science.

PRESENTATION:

Organization (clarity of introduction, objectives, methods, results and conclusions); quality of visuals; quality and poise of presentation and in answering questions.

***NOTE: Your abstract must be received by the IAFP office no later than January 8, 2001. Photocopies of the abstract form may be used.**

IAFP Policy on Commercialism

1. INTRODUCTION

No printed media, technical sessions, symposia, posters, seminars, short courses, and/or all related type forums and discussions offered under the auspices of the International Association for Food Protection (hereafter referred to as Association forums) are to be used as platforms for commercial sales or presentations by authors and/or presenters (hereafter referred to as authors) without the expressed permission of the staff or Executive Board. The Association enforces this policy in order to restrict commercialism in technical manuscripts, graphics, oral presentations, poster presentations, panel discussions, symposia papers, and all other type submissions and presentations (hereafter referred to as submissions and presentations), so that scientific merit is not diluted by proprietary secrecy.

Excessive use of brand names, product names or logos, failure to substantiate performance claims, and failure to objectively discuss alternative methods, processes, and equipment are indicators of sales pitches. Restricting commercialism benefits both the authors and recipients of submissions and presentations.

This policy has been written to serve as the basis for identifying commercialism in submissions and presentations prepared for the Association forums.

2. TECHNICAL CONTENT OF SUBMISSIONS AND PRESENTATIONS

2.1 Original Work

The presentation of new technical information is to be encouraged. In addition to the commercialism evaluation, all submissions and presentations will be individually evaluated by the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff on the basis of originality before inclusion in the program.

2.2 Substantiating Data

Submissions and presentations should present technical conclusions derived from technical data. If products or services are described, all reported

capabilities, features or benefits, and performance parameters must be substantiated by data or by an acceptable explanation as to why the data are unavailable (e.g., incomplete, not collected, etc.) and, if it will become available, when. The explanation for unavailable data will be considered by the Program Committee chairperson and/or technical reviewers selected by the Program Committee chairperson in order to ascertain if the presentation is acceptable without the data. Serious consideration should be given to withholding submissions and presentations until the data are available as only those conclusions that might be reasonably drawn from the data may be presented. Claims of benefit and/or technical conclusions not supported by the presented data are prohibited.

2.3 Trade Names

Excessive use of brand names, product names, trade names, and/or trademarks is forbidden. A general guideline is to use proprietary names once and thereafter to use generic descriptors or neutral designations. Where this would make the submission or presentation significantly more difficult to understand, the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff will judge whether the use of trade names, etc., is necessary and acceptable.

2.4 "Industry Practice" Statements

It may be useful to report the extent of application of technologies, products, or services, however, such statements should review the extent of application of all generically similar technologies, products, or services in the field. Specific commercial installations may be cited to the extent that their data are discussed in the submission or presentation.

2.5 Ranking

Although general comparisons of products and services are prohibited, specific generic comparisons that are substantiated by the reported data are allowed.

2.6 Proprietary Information (See also 2.2.)

Some information about products or services may be proprietary to the author's agency or company, or to the user and may not be publishable. However, their scientific principles and validation of performance parameters must be described. Conclusions and/or comparisons may only be made on the basis of reported data.

2.7 Capabilities

Discussion of corporate capabilities or experiences are prohibited unless they pertain to the specific presented data.

3. GRAPHICS

3.1 Purpose

Slides, photographs, videos, illustrations, art work, and any other type visual aids appearing with the printed text in submissions or used in presentations (hereafter referred to as graphics) should be included only to clarify technical points. Graphics which primarily promote a product or service will not be allowed. (See also 4.6.)

3.2 Source

Graphics should relate specifically to the technical presentation. General graphics regularly shown in, or intended for, sales presentations cannot be used.

3.3 Company Identification

Names or logos of agencies or companies supplying the goods or services must not appear on the graphics, except on the first slide of the presentation. Slides showing products may not include predominant nameplates. Graphics with commercial names or logos added as background borders or corners are specifically forbidden.

3.4 Copies

Graphics that are not included in the preprint may be shown during the presentation only if they have been reviewed in advance by the Program Committee chairperson, session convener, and/or staff, and have been determined to comply with this policy. Copies of these additional graphics must be available from the author on request by individual attendees. It is the responsibility of the session convener to verify that all graphics to be shown have been cleared by Program Committee chairperson, session convener, staff, or other reviewers designated by the Program Committee chairperson.

4. INTERPRETATION AND ENFORCEMENT

4.1 Distribution

This policy will be sent to all authors of submissions and presentations in the Association forums.

4.2 Assessment Process

Reviewers of submissions and presentations will accept only those that comply with this policy. Drafts of submissions and presentations will be reviewed for commercialism concurrently by both staff and technical reviewers selected by the Program Committee Chairperson. All reviewer comments shall be sent to and coordinated by either the Program Committee Chairperson or the designated staff. If any submissions are found to violate this policy, authors will be informed and invited to resubmit their materials in revised form before the designated deadline.

4.3 Author Awareness

In addition to receiving a printed copy of this policy, all authors presenting in a forum will be reminded of this policy by the Program Committee chairperson, their session convener, or the staff, whichever is appropriate.

4.4 Monitoring

Session convenors are responsible for ensuring that presentations comply with this policy. If it is determined by the session convener that a violation or violations have occurred or are occurring, he or she will publically request that the author immediately discontinue any and all presentations (oral, visual, audio, etc.), and will notify the Program Committee chairperson and staff of the action taken.

4.5 Enforcement

While both technical reviewers, session convenors, and/or staff may check submissions and presentations for commercialism, ultimately it is the responsibility of the Program Committee chairperson to enforce this policy through the session convenors and staff.

4.6 Penalties

If the author of a submission or presentation violates this policy, the Program Committee chairperson will notify the author and the authors' agency or company of the violation in writing. If an additional violation or violations occur after a written warning has been issued to an author and his agency or company, the Association reserves the right to ban the author and the authors' agency or company from making presentations in the Association forums for a period of up to two (2) years following the violation or violations.

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For information on joining the Fight BAC!™ campaign, contact:
 The Partnership for Food Safety Education, Phone: 202.452.8444; Fax: 202.422.0873;
 Web site: www.fightbac.org.



Members of the Wyoming Governor's Food Safety Council and others involved with drafting the "Wyoming Food, Drug and Cosmetic Safety Act" surround Wyoming Governor Geringer as he signs the bill into law.

Wyoming Signs New Food Safety Law: "Wyoming Food, Drug and Cosmetic Safety Act"

The Wyoming 2000 legislative session was noteworthy in that it signed into law a bill governing the food safety of Wyoming. The new law, called the "Wyoming Food, Drug and Cosmetic Safety Act" allows the Department of Agriculture to draw up new food rules that will encompass all areas of food. Also, included in the law is the ability of the department to charge license fees.

This law is the culmination of two years of meetings by the Governors Food Safety Council in developing the new food safety bill. The work was not done though after the council completed their work. The real work began for Laurie Leis, CHS Program Manager and Deputy Director, Jim Schwartz, when they had to present the bill to the Joint Agricultural Committee and subsequently the rest of the legislature. They did an excellent job because the bill passed the legislature in its first presentation.

Congratulations to everyone involved in the development of this law.



NEWS

Undercooked Meat is Chief Cause of Parasite Infection in Pregnancy

Eating undercooked, raw or cured meat during pregnancy is the main risk factor for the common parasite infection — toxoplasmosis, which can lead to brain damage in the unborn child, according to a study in the *British Medical Journal*.

Researchers interviewed over 1,000 pregnant women, with and without toxoplasma infection, across six European cities about their occupations, lifestyles and eating habits. Their knowledge about sources of infection was also assessed. The authors found that eating raw, undercooked or cured meat contributed to between 30% and 63% of infections. Contact with soil contributed to up to 17% of infections and travel outside Europe or the United States and Canada was also a significant risk factor. Weaker associations were also seen in women who reported tasting raw meat during preparation of meals, drinking unpasteurized milk and working with animals. Contact with cats was not a risk factor for infection.

Interestingly, say the authors, women listed contact with cats, eating raw meat and eating raw or unwashed fruit or vegetables as the main sources of infection. Few women mentioned contact with soil. Despite some limitations of the study, the need for preventative strategies is clear, conclude the authors. They call for improved quality and consistency of information available to pregnant women, better labelling of meat according to farming and processing methods and improved farm hygiene to reduce infection in animals.

In an accompanying commentary, Richard Holliman of St. George's Hospital and Medical School in London reinforces the need for preventative strategies "to reduce the infectivity of meat products." He believes that current health education may benefit from focus and refinement, concentrating on the principal risk factors at the expense of less important issues and concludes the health implications of consuming raw, undercooked or cured meats in pregnancy require careful consideration.

Devices Detect Salmonella, E. coli, and Other Bacteria

More than 75 million people per year become ill from food poisoning in the United States, 325,000 are hospitalized, and 5,000 of them die from pathogens like *Salmonella* and *E. coli*. But detection of these pathogens is getting easier, thanks to several new biosensors developed by researchers at the University of Rhode Island.

Ten years in development, the biosensors use fiber optic technology to quickly and accurately detect and quantify bacteria levels in meats, poultry and other foods.

"There are about 6,000 meat and poultry processing plants in the US, and they all are required by law to test their products for food pathogens," said A. Garth Rand, professor emeritus of food science at URI. "Most of these plants don't have their own labs, so they've got to send their samples out to commercial labs. Instead of waiting several days to get results, they can use our biosensor and have results in an hour."

Rand teamed up with Stephen Letcher, professor of physics, and Christopher Brown, professor of chemistry, to establish the URI Fiber Optic & Biosensor Research Group to tackle the difficult problem of developing a fast and sensitive food pathogen sensor.

This research group is part of the University's Sensors and Surface Technology Partnership. The US Department of Agriculture has funded the research for the last eight years. "We are one of a very small number of research groups working on food safety biosensors. Our combination of disciplines is unique. The only way to solve this kind of problem is with an interdisciplinary approach" said Rand.

Focusing first on detecting *Salmonella*, one of the most common food pathogens, the group developed several sensors that use vibrating quartz crystals or fiber optic probes along with *Salmonella* antibodies that bind the pathogen cells to the sensor. The latest version also uses microscopic magnetic beads called microspheres.

"The surface of the beads are covered with antibodies that collect the pathogen and are then labeled with a fluorescent dye," explained Rand.

"Then the beads are magnetically focused in front of optical fibers and a laser signal reports the pathogen concentration."

The binding of the pathogen cells to the antibodies takes about 60 minutes, while the process of determining the pathogen concentration takes just 60-90 seconds.

Although the sensor needs further refinement before it is complete, the researchers are working with Pierson Scientific Associates of Andover, MA, to develop portable prototypes of the device. The partnership was awarded a Small Business Technology Transfer grant from the National Science Foundation in 1998.

"While we've been primarily studying *Salmonella*, the system works for most other food pathogens, too. In fact, we believe it works even better for *E. coli*," Rand said.

The URI researchers have also been working on biosensors for the US Army Natick Labs, which prepares Defense Department meals that are often stored for years in remote locations. The Army has funded Rand's research into developing sensors to detect pathogens in Army rations.

"They are especially concerned with detecting pathogens that grow in low-moisture dried foods," explained Rand. "They needed a quick way to see if pathogens are growing in the food they have stored around the world." For this project, Rand's team developed a membrane biosensor. When the membrane is coated with antibodies and enzymes, the bacteria gets caught on the membrane while the rest of the solution being tested passes through it. Next up for the URI researchers is the creation of a hand-held surface scanning system – similar to a supermarket check-out scanner – that uses video to detect the pathogens, and another that detects pathogens in seafoods.

"These sensors will significantly enhance the safety of the food supply and protect human health," concluded Rand.

Outbreak of *Escherichia coli* O157:H7 Leading to the Recall of Retail Ground Beef

An outbreak of diarrheal illness caused by *Escherichia coli* O157:H7 occurred in a small community north of Winnipeg, Manitoba, following a family barbeque on 8 May 1999 at which hamburgers were served. The outbreak resulted in three of the nine people present seeking medical attention, two of whom were children < 5 years of age.

Public health officials investigated the food histories and clinical symptoms of those present at the barbeque. Those who sought medical attention had stool samples collected for culture.

Stool and beef (from one frozen sample of the same batch of raw ground beef served at the barbeque) were cultured on MacConkey agar with added sorbitol, and any cultures positive for *E. coli* O157:H7 underwent phage typing and pulsed-field gel electrophoresis (PFGE) using the standard CDC methodology.

Seven of the nine people present at the barbeque developed diarrhea with abdominal cramps between 3 to 10 days following the barbeque. Two had bloody diarrhea. The two children with bloody diarrhea (an 11-month-old male and a 15-year-old female) and one with non-bloody diarrhea (a 4-year-old female) sought medical attention. There was sufficient stool from two of these children (the 11-month-old male and the 4-year-old female) and both were positive for *E. coli* O157:H7, phage type 14.

Six of the seven ill people ate hamburger, but the 4-year-old female (culture positive) did not. All cases recovered fully.

The hamburger patties were well cooked, but were then placed on a plate that had been used for raw hamburgers. The 4-year-old

old female ate wieners that were warmed on the same barbecue grill as the hamburger patties and then placed on the same plate that had been used for the raw hamburgers.

The ground beef sample obtained was positive for *E. coli* O157:H7, phage type 14. All three isolates had the same PFGE pattern when both XbaI and BlnI were used.

The investigation and culture results suggest that *E. coli* O157:H7 contaminated ground beef caused this outbreak of diarrheal illness. The outbreak was small and self-contained, and linked to improper food handling techniques, specifically cross-contamination when cooked hamburgers and hot dogs were placed on the same plate used to carry raw ground beef.

Seven Academies of Science Urge Action to Promote Use of Biotech in Alleviating World Hunger, Poverty

Seven academies of science from around the world, including five from developing nations, issued a white paper spelling out the promise of agricultural biotechnology to alleviate hunger and poverty in the Third World. The paper urges governments to base their decisions regarding biotechnology on sound science, and strongly encourages private corporations and research institutions to share their technology with scientists and farmers in developing countries who desperately need it.

"It is essential that we improve food production and distribution in order to feed and free from hunger a growing world population, while reducing environmental impacts and providing productive employment in low-income

areas," the paper says. Key to moving forward is responsible research, development, and implementation of genetic modification (GM) technology for widespread agricultural use.

The white paper was prepared by a working group of members from the Royal Society of London, the national academies of science of Brazil, China, India, Mexico, and the United States, and the Third World Academy of Sciences. Because agricultural biotechnology has come under fire in recent months, the working group endeavored to produce a brief report that clearly lays out the potential for GM technology to assist developing countries, as well as the obstacles that stand in the way of its widespread use. "The obvious concern is that the recent backlash against GM technology will completely overshadow all the promise that the technology offers," said Bruce Alberts, president of the US National Academy of Sciences and member of the working group. "Our group concluded that the revolution in molecular biology provides the developing world with some important new tools for feeding and caring for its people. It will be critical to use the best science to make wise choices with respect to the application of these technologies."

The working group pointed out the need for concerted, organized efforts on a global scale to quickly identify potential health and environmental risks from GM crops. To that end, "public health regulatory systems need to be put in place in every country to identify and monitor any potential adverse human health effects of transgenic plants, as for any other new variety," it said. Likewise, environmental concerns must be addressed systematically and assessed against the agricultural technologies currently in use that

cause environmental problems, such as pesticides.

Procedures that most nations already have in place to approve the use of new crop plants could serve as the model for a more formal risk-assessment process. This process would be used to investigate the potential environmental impact of new varieties, including those that have been developed using GM techniques, the working group said. Most GM technology has not been developed with Third World needs in mind. In fact, these techniques were developed primarily for large-scale agriculture in the industrialized world – to make a small number of major crops more resistant to certain insects or viruses. The working group urged invigorated research and development to address the special needs of developing countries and to enhance the yield of lesser-known crops that serve as the basis for their incomes and their food supply; to modify crops so that they confer greater nutritional benefits to the consumer; to reduce the environmental impacts of agriculture; and to increase access to pharmaceuticals and vaccines by producing them in foods. For example, using molecular techniques, researchers have produced vaccines in potatoes and bananas that have the potential to prevent certain infectious diseases in humans. Additionally, GM technology has the potential to increase the yields of certain medicinal substances naturally found in plants. But much of the funding for agricultural research in general and GM technology in particular has shifted from the public sector to private corporations in recent years, with an eye toward creating profitable products. At the same time, public and noncommercial research efforts have, waned, a trend "that needs to be reversed," the working group said.

Public-sector funding for GM research is critical for meeting specific needs – those of small-scale farmers, for instance, where profits for big agricultural corporations are unlikely to be forthcoming. Governments, international organizations, and aid agencies should encourage plant genomics research as an important area for public funding, and the results of such research should be placed in the public domain. “Care should be taken that research is not inhibited by over-protective intellectual property regimes,” the paper says.

In fact, when it comes to the needs of Third World farmers, the issue of intellectual property rights deserves special consideration, the working group said. Today, private companies can obtain plant varieties free from farmers and from noncommercial organizations, add a new gene, and then sell these seeds back to farmers with legal protections against copying or reuse. “This heavily concentrates advances in research within companies whose legitimate search for profit naturally fails to focus their research on poverty and long-term sustainability issues,” the paper says. Poor farmers in developing countries must be allowed to save seed for future use if they wish to do so. Moreover, an international advisory committee should be created to assess the interests of private companies and developing countries with respect to transgenic plants that can benefit the poor – not only to help resolve intellectual property disputes, but also to identify areas of common interest and opportunities for public-private partnerships.

The white paper, *Transgenic Plants and World Agriculture*, is posted on the National Academy Press Web site at www.books.nap.edu/html/transgenic.

Illnesses Associated with Use of Automatic Insecticide Dispenser Units – Selected States and United States, 1986-1999

To control indoor flying insects, restaurants and other businesses commonly use pyrethrin and pyrethroid insecticides sprayed from automatic dispensing units. Usually placed near entrances, these units are designed to kill flying insects in food service or work areas. On May 18, 1999, the Florida Department of Health (FDH) was notified by the Florida Department of Business and Professional Regulation (DBPR) that during May 12-17, three persons developed pesticide-related illnesses associated with improperly placed automatic insecticide dispensers. After FDH conducted a follow-up investigation and notified CDCU's National Institute for Occupational Safety and Health (NIOSH) of this event, surveillance data were reviewed to identify additional cases of pesticide-related illnesses associated with automatic insecticide dispensers. Data were provided by the Toxic Exposure Surveillance System (TESS), the California Department of Pesticide Regulation (CDPR), the Montana Department of Agriculture (MDA), the National Pesticide Telecommunications Network (NPTN), and the Washington State Department of Health (WSDH). This report describes cases, summarizes surveillance data for pesticide-related illnesses associated with automatic insecticide dispensers, and provides recommendations for safe dispenser use.

Cases 1-3. A 42-year-old cook working at a Florida restaurant developed a sore throat, dyspnea, headache, and dizziness on May 12, 1999, after a several-hour exposure to mist released from

insecticide dispensers in the food preparation area. The insecticide dispensers had been installed on May 10, but it is unknown on what day the cook was first exposed. The cook removed the dispensers on May 12 and noted relief of his symptoms.

However, the restaurant management reinstalled the dispensers on May 14, and on May 15, a 40-year-old male customer developed headache and shortness of breath within 1 hour of entering the restaurant. These symptoms lasted approximately 4 hours. On May 17, approximately 45 minutes after leaving this restaurant, a 47-year-old male customer experienced a sharp burning sensation in his left eye and noted swelling, redness, and irritation of the eyelid that persisted approximately 24 hours. The implicated pesticide dispenser was within 6 feet of the booth where this customer had been sitting, and it faced his left eye. This person reported his symptoms to DBPR on May 18. None of the three persons sought medical attention for their symptoms. The active ingredients released by these dispensers were pyrethrin and piperonyl butoxide.

Case 4. On August 20, 1995, a 17-year-old male restaurant employee in California was changing the cartridge of an automatic insecticide dispenser. When he closed the dispenser panel, the firing mechanism was activated and discharged a pyrethrin-containing mist into his right eye. The employee immediately experienced burning in the eye and promptly sought medical attention at the emergency department of a local hospital. He was diagnosed with chemical conjunctivitis and treated symptomatically.

TESS is maintained by the American Association of Poison Control Centers and collects poisoning reports submitted by approximately 85% of US poison control centers. A review of TESS data from 1993 through 1996, the

most recent years for which data are available, identified 54 cases of pesticide-related illnesses associated with automatic insecticide dispensers; suicides and intentional misuse/abuse were excluded. Among the 42 cases for which specific age information was available, the median age was 22.5 years (range: 3-73 years). Among the 53 cases for which sex was known, 27 (50%) were male. Twenty (37%) cases were work-related. In all cases, pyrethrin/piperonyl butoxide was the responsible insecticide.

During 1986-1999, 43 cases of acute pesticide-related illnesses associated with automatic insecticide dispensers were reported to CDPR (32 cases), MDA (four cases), FDH (three cases), NPTN (two cases), and WSDH (two cases). Age, sex, and state of occurrence for these cases were

compared with those from the TESS database, and no overlap with TESS data was found. Thirty-five (81%) of these cases were in persons exposed while at work, including seven whose exposure occurred during dispenser cartridge replacement or attempts to service faulty dispensers. Seven (16%) cases were in persons exposed while they were customers in restaurants, and one was a movie theater customer. For the 27 with age data available, the median age was 40 years (range: 17-68 years); for the 38 with information on sex, 23 (61%) were women.

Resmethrin, a pyrethroid insecticide, was implicated in three cases; the remaining 40 were exposed to pyrethrin/piperonyl butoxide. Most insecticide dispenser-related illnesses identified in the non-TESS data occurred when the dispensers were improv-

erly placed too close (i.e., <12 feet) to food handling, dining, or work areas; were placed where ventilation currents entrained the mist to such areas; and/or were serviced by persons unfamiliar with proper maintenance of these units.

Among the 94 pyrethrin/piperonyl butoxide-exposed cases in the combined surveillance data, signs and symptoms for 36 (38%) involved the eye; 34 (36%), the neurologic system; 26 (28%), the respiratory system; 23 (24%), the gastrointestinal system; 20 (21%), the nose and throat; 10 (11%), the skin; and eight (9%), the cardiovascular system. Some persons experienced signs and symptoms in more than one system. Among the three resmethrin-exposed cases, reported signs and symptoms included pruritus, throat irritation, nausea, vomiting, diarrhea, headache, burning sensation in the lungs, and cough.

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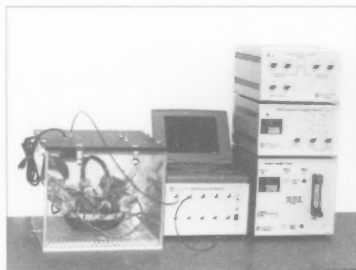
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for a new container size takes only a few minutes. A unique recirculating design and an internal purging device ensure that a precise, accurate dose of LN_2 will be delivered every time a container is detected regardless of the time elapsed between containers. Temporary line stoppages do not affect the performance of this equipment. The LCI-400 can accommodate line speeds up to 400 containers per minute. Doses can be set anywhere from 0.01 g per second to 20 g per second, and the LCI-400's advanced electronics allow the operator to fine tune dosing parameters with just a touch of a button.

VBS evacuates and seals the LCI-400 at the factory. Vacuum insulation eliminates all moisture condensation, minimizing the risk of any product contamination. No on-site vacuum pump is needed for the LCI-400 system, reducing preventive maintenance requirements and associated downtime. The LCI-400 system can deliver 2 million doses before the first scheduled preventive maintenance, and has only minimal utility requirements including a LN_2 source such as a dewar or a plant piping system, a standard electrical source, and regulated compressed air.

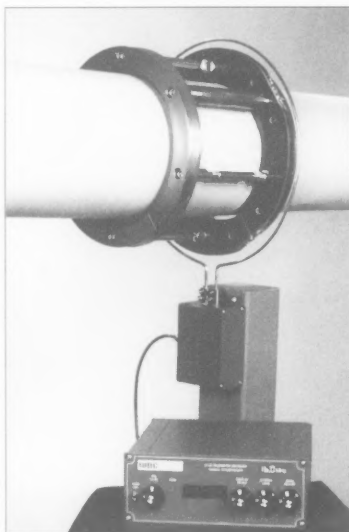
"The LCI's pressurizing capabilities are revolutionizing the packaging industry," says Cheryl Thierfelder, marketing manager of VBS Industries. "Container pressurization has long been used to increase aluminum can rigidity and strength for warehouse stacking purposes. By pressurizing thin-walled plastic containers, the LCI-400 opens a new door to alternative cost-effective packaging solutions."

LN_2 pressurization is also used to prevent paneling of plastic containers in hot-fill applications. A dose of LN_2 will add enough

pressure to counteract the vacuum and subsequent paneling effects created when a hot product cools in a sealed container. Hot-filled ($185^\circ F/85^\circ D$) tomato sauce, edible oils, dessert syrups and coffee concentrates have all been successfully packaged in plastic PET containers using the LCI-400.

VBS Industries, Campbell, CA

Reader Service No. 297



Wireless Doto Corporation

Wireless Sensor System

The Model 2100 from Wireless Data Corporation collects up to 10 distinct channels of wireless data from sensors mounted on rotating shaft installations. There are no physical connections between the transmitter and receiver and no need to cut or modify the rotating device. This means quick, easy installation and extremely high reliability. The Model 2100 measurement system delivers stable, wide bandwidth data from dc to 1000 Hz, with high sensitivity for low strain gage outputs. The system uses an 8 pole filter to insure clean data.

The miniature transmitters of the Model 2100 System are designed for shafts up to 42" in diameter, rotating up to 12,000 RPM. The system is rugged enough for high vibration environments and performs in temperatures as high as $125^\circ C$. A patented CAT (Calibrate Any Time) technology completes the package for the reliable wireless data system.

Wireless Data Corporation, Columbus, OH

Reader Service No. 298

Detex™ System MC-18 for *E. coli* O157 Including H7 Test Kit Granted Performance Tested MethodsSM Status

The AOAC Research Institute granted Performance Tested MethodsSM status to the Detex™ System MC-18 for *E. coli* O157 including H7 test kit. Independent testing under the direction of the AOAC Research Institute verified performance claims of 98% sensitivity, 90% specificity, and 96% accuracy. The overall method agreement between the Detex™ assay and the USDA Food Safety and Inspection Service (FSIS) method was 96%. These data indicate that the Detex™ method is comparable to the USDA/FSIS method for detection of *E. coli* O157 in raw, ground beef and raw, ground poultry.

The Detex™ system combines a unique signaling procedure with a modern immunoassay capture technique to distinguish the presence or absence of food pathogens in enriched samples. The MC-18 system is designed to simultaneously assay up to 27 samples at a time, and allows the analyst to test for multiple pathogens at the same time (only the *E. coli* O157 including H7 system was reviewed and approved by the

AOAC Research Institute). Approximately 4 hours is required to analyze properly incubated, enriched samples. Except for an enrichment step, the process is fully automated within the MC-18 machine and results are objective, requiring no user interpretation. The system is also self-cleaning since the cartridges are self-contained within the MC-18 system.

Wallace Andrews (Division of Microbiological Studies, US FDA, Washington, D.C., USA); Ann Draughon (University of Tennessee, Food Science and Technology, Knoxville, TN, USA); and Richard Wilson (formerly Penn State University, University Park, PA, USA) served as expert reviewers for the evaluation of the Detex™ MC-18 system for *E. coli* O157 including H7. The Silliker Laboratories Corporate Research Laboratory in South Holland, Chicago, IL USA participated as the independent laboratory.

AOAC Research Institute,
Gaithersburg, MD

Reader Service No. 299

Axioplan 2 Imaging from Carl Zeiss

Carl Zeiss introduces the Axioplan 2 Imaging research microscope optimized for FISH and M-FISH examinations in genetics, and for multi-channel fluorescence applications with the various mutants of GFP in developmental and cell biology.

A completely new fluorescence system allows eight different fluorescence images to be recorded manually or automatically controlled by computer. New, patented "Light Trap" system that captures stray light markedly improves contrast and increases detection sensitivity in fluorescence microscopy. An 8-position filter turret with an unrestricted field of 25 mm saves time during

sample screening. The push-and-click filter changer makes a filter selection quick and easy, and without any tools. The filter sequence can be matched to the appropriate sequence of the experiment within seconds.

A new reflected light fluorescence beam path provides improved light transmission. An achromatically corrected collector ensures homogeneous illumination of the specimen in multi-fluorescence. There is no need to refocus even after a filter change.

Axioplan 2 Imaging is extremely easy to use. The AxioVisionControl software controls all microscope functions. Microscope settings can be activated at the push of a button.

Axioplan 2 Imaging is offered together with the AxioVision software making it a complete digital microscopy system. The AxioVision software enables easy digital image acquisition through a variety of cameras, from standard video cameras to high-resolution integrated digital cameras. The digital images can be optimized in contrast, brightness and color. Text and graphics can be added as required. The images and all of the microscope parameters are managed in an image archive and are always available for further processing or communication through modern media. For more complex applications, a variety of software packages are offered such as 3D Deconvolution, Multi-channel Imaging, and Time Lapse. Special software, such as for FISH and M-FISH techniques, is available from partner companies also controls all microscope functions.

Additional benefits of the Axioplan 2 Imaging include a height-adjustable mechanical stage control in an improved ergonomic design, the zoom intermediate tube for continuous magnification change, the DIC slider for the Plan-Apo 10X and Plan-Apo 20X

objectives, and the Atto Arc II transformer with variable light intensity.

Carl Zeiss, Inc., Thornwood, NY

Reader Service No. 300



Nuclear Associates

Nuclear Associates' New Multipurpose 3-in-1 MiniMonitor III Survey Meter System

Nuclear Associates, well known throughout the industry for its fine quality assurance products brings its all new MiniMonitor III, the latest in survey meter systems. Its 3-in-1 capability allows it to do the work of 2 to 3 units.

The MiniMonitor III is: an X-Ray/Gamma Ray Survey Meter, *small, lightweight, rugged, *wide energy response (50 keV - 6 MeV) *portable, easy-to-use, *versatile-ideal for a wide range of nuclear medicine and radiology applications.

MiniMonitor III, with its internal GM tube is the ideal survey meter for detecting radiation levels from radioactive sources, radiation areas, Tc-99m generators and x-ray machines. Its wide-energy response offers

versatility for use in a multitude of nuclear medicine and radiology applications.

An I-125 "Seed Finder" Survey Meter: this compact, sensitive instrument is excellent for locating I-125 seeds that may drop or be misplaced during a procedure. It also can be used as a general reponse survey meter for radiation detection in the lab. An optional external Pancake Detector is required when using the Mini-Monitor III as a "seed finder." It is designed to detect Alpha, Beta and Gamma radioactive contaminations as low as 0.002 μ Ci.

A Contamination Survey Meter, *versatile, *easy-to-use and *sensitive, *compact, *can be used as a general purpose lab monitor.

Its optional large area GM Pancake Detector with a thin window permits direct contact measurements on surfaces, as well as on hands, clothing, shoes, etc. Its wide-energy reponse (50 keV to 6 Mev), offers versatility for use in a multitude of applications. Detects contamination levels as low as 0.002 μ Ci.

The MiniMonitor III operates on four standard "AA" cells. All controls are located on the face of the instrument. A flashing yellow LED will indicate changes in the field strength in proportion to the radiation level. In addition, it signals that the instrument is "ON." The indicator flashes for each detector pulse. A no-overload circuit assures indicator operation in radiation fields greater than 500 R/h when the detector ceases to operate in pulse mode.

Nuclear Associates, Carle Place, NY

Reader Service No. 301

Whatman® Balston® Gas Generators Designed to Produce Ultra Dry, Purified CO₂-Free Purge Gas for FT-IR Spectrometers

Dangerous and hazardous cylinders of gas used to purge FT-IR instruments can now be replaced with a Whatman Balston

FT-IR Purge Gas Generator now available from Watman Inc.

Whatman Balston FT-IR Purge Gas Generators are specifically designed for use with FT-IR Spectrometers to provide a purified purge gas and air bearing gas utilizing standard compressed air. Impurities such as water vapor and carbon dioxide are effectively removed to -100°F pressure dew point and less than 1 ppm respectively. The Generators completely eliminate the hazards, inconvenience and high costs of nitrogen Dewars and cylinders, and significantly reduces the costs of operating FT-IR instruments. Typical payback is less than one year! Models are available with flow capacities ranging from 3.1 lpm to 102 lpm. The compact wall-mountable design of the Generators allow users to free-up valuable laboratory floor space.

Whatman Inc., Tewksbury, MA

Reader Service No. 302

In Memory of...

*Ned Rice
Brandywine, Maryland*

IAFP would like to extend our deepest sympathy to the family and friends of Ned Rice who recently passed away.

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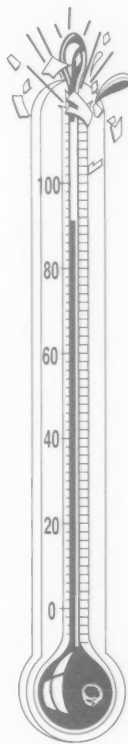
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The above list represents individual contributors to the Association Foundation Fund during the period June 1, 1999 through June 30, 2000. In addition, a portion of the Sustaining Member dues are allocated to support this Fund. Your contribution is welcome. Call the Association office at 800.369.6337 or 515.276.3344 for more information on how you can support the Foundation.

estimated 13,000 people were infected, and the Ogose, Japan 1996 outbreak in which around 9,000 cases occurred. The presence of parasitic protozoa poses a major problem for the water industry, since they are resistant to standard disinfection procedures (Smith et al., 1995). Chlorination is not very effective against *Giardia*, and completely ineffective against *Cryptosporidium*. Filtration is of most use, although breakthrough may occur if the filter becomes clogged. Ultraviolet light has proven to be effective, but its use is not yet widespread. Legislation is in force in several countries which imposes stringent limitations on the number of parasitic protozoa which may be present in water distributed for consumption, and this should encourage the development of more effective disinfection procedures.

There have been many recorded foodborne outbreaks of giardiasis, cryptosporidiosis and cyclosporiasis (Rose and Slifko, 1999). The foods most commonly implicated are those which are minimally processed before consumption, such as fresh fruit and vegetables. *Cyclospora cayetanensis* has been the cause of several prominent outbreaks of infection in recent years in North America. In 1996 and 1997 more than 2,000 cases of cyclosporiasis were recorded in the US and Canada, in which imported, Guatemalan raspberries were implicated as the source. In spring of 1998, the US Food and Drug Administration temporarily banned importation of fresh Guatemalan raspberries. Canada did not halt importation, and linked outbreaks occurred in May 1998 affecting about 200 people; a ban has recently been enforced. The crisis has forced Guatemalan growers to close more than 30 farms, with many job losses.

Prevention of parasitic disease outbreaks will be aided by monitoring water and foodstuffs for the presence of the agents (Jaykus, 1997). However, detecting them is not straightforward. Parasitic protozoa do not visibly manifest their presence by growth in, or spoilage of, water or foods. They do

not form colonies on artificial growth media, and can not be multiplied within a sample by the addition of such media. They may be present in low numbers within contaminated food or water, and considerable concentration of a sample must be performed before any cysts or oocysts it contains can be delivered to detection systems, which normally operate on low sample volumes. Currently, detection mainly involves microscopy, in which specifically stained cells are identified and counted directly. The accuracy of this can often depend upon the visual acuity of the microscopist, and objects resembling parasite cells can interfere with the reliability of the identification. More rapid and precise detection may be possible through the use of modern molecular-based techniques such as the polymerase chain reaction (PCR) or nucleic acid sequence-based amplification (NASBA). Further refinement of such techniques will however be necessary before they can be applied to the routine analysis of food and water. Nonetheless, much work is currently underway in several countries with the intention of producing robust methods for monitoring food, water, clinical and environmental samples for the presence of parasitic protozoa. These detection methods, alongside effective legislative controls and increased consumer awareness, should help to minimize the threat that these emerging pathogens pose to our food and water supply.

REFERENCES

1. Garcia, L. S., and D. A. S. Bruckner. (Eds.) (1988). Diagnostic Medical Parasitology. Elsevier Publishing Co., Inc., New York.
2. Jaykus, L. -A. (1997). Epidemiology and detection as options for control of viral and parasitic foodborne disease. Emerging Infectious Diseases [serial online] 3 (4). Available from www.cdc.gov/ncidod/EID/eid.htm.
3. Rose, J. B., and T. R. Slifko. (1999). *Giardia*, *Cryptosporidium* and *Cyclospora* and their impact on foods: a review. Jour. of Food Protect. 62 1059-1070.
4. Smith, H. V., L. J. Robertson, and J. E. Ongert. (1995). *Cryptosporidiosis* and giardiasis: the impact of waterborne transmission. Journal of Water SRT - Aqua 44 258-274.

Coming Events

OCTOBER

• **2-3, International Fresh-cut Produce Association (IFPA) 8th Annual Technical Seminar, "Biotechnology: Friend or Foe?"** Monterey Marriott, Monterey, CA. For further information, contact Stephanie Grunenfelder at 703.299.6282.

• **4-5, Iowa Assn. of Milk, Food & Environmental Sanitarians, Inc., Best Western Starlight Hotel, Ames, IA.** For additional information, contact Monica Streicher at 319.933.4521, ext. 222.

• **5-6, Alberta Assn. of Milk, Food & Environmental Sanitarians Meeting,** Bernard Schnell Hall, University of Alberta in Edmonton, Alberta, Canada. For additional information, contact Bonnie Jensen at 780.495.2188.

• **9-11, Eighth International Symposium on Animal, Agricultural and Food Processing Wastes (ISAAFPW),** Marriott Conference Center, Des Moines, IA. Co-sponsored by IAFFP. For additional information, phone Brenda West at 800.371.2723.

• **11-12, Associated Illinois Milk, Food & Environmental Sanitarians,** Stoney Creek Inn, East Peoria, IL. For additional information, contact Tom Gruetzmacher at 815.395.8797.

• **11-13, Second NSF International Conference on Food Safety: Preventing Foodborne Illness through Science and Education.** The conference will be held in Savannah, GA at the Hyatt Regency. Co-sponsored by IAFFP and other organizations. For additional information, contact Wendy Raeder at 734.827.6888; fax: 734.827.7114/6831; E-mail: raeder@nsf.org.

• **12-13, HACCP Workshop,** Industry, CA. For additional information, contact AIB, 1213 Bakers Way, P.O. Box 3999, Manhattan, KS 66505-3999; phone: 785.537.4750; fax: 785.537.1493.

• **23-25, The 2000 New Mexico Environmental Health Conference,** Albuquerque Convention Center, Albuquerque, NM. For additional information, contact Tom Duker, P.O. Box 27176, Albuquerque, NM 87125-7176; phone: 505.924.3667; fax: 505.924.3684; E-mail: tduker@mercury.berncov.gov.

• **24, Recalls—Are You Really Prepared?** 9:00 a.m. to 5:00 p.m. Holiday Inn Downtown, Sacramento, CA. Sponsored by the University of California-Davis and the California Department of Health Services. For registration information, call 800.752.0881; Web site: www.university.extension.ucdavis.edu.

• **24-25, Michigan Environmental Health Association's (MEHA) Annual Food Protection Conference,** Amway Grand Hotel, Grand Rapids, MI. For additional information, contact Diane L. Forys, Food Protection Conference Chairperson, (MEHA) at 810.987.5306 or fax: 810.985.2150.

• **31, North Dakota Environmental Health Association Annual Conference,** Grand Forks Holiday Inn, Grand Forks, ND. For additional information, contact Debra Larson at 701.328.1292.

NOVEMBER

• **6-7, HACCP 1: Documenting Your HACCP Prerequisite Program,** Guelph, Ontario, Canada. For additional information, contact Marlene Inglis, Guelph Food Technology Centre, 88 McGilvray St., Guelph, Ontario, Canada N1G 2W1

or phone: 519.821.1246; fax: 519.836.1281; E-mail: gftc@uoguelph.ca.

• **8-10, International Life Sciences Institute (ILSI) Europe 2nd International Symposium on Food Packaging—Ensuring the Safety and Quality of Foods,** Vienna, Austria. For more information, contact ILSI Europe, Avenue E. Mounier, 83-Box 6-B, 1200 Brussels, Belgium, or phone: 32.2.771.00.14; fax: 32.2.762.00.44; E-mail: Packaging.Sympo@ilsieurope.be.

• **8-10, Servsafe® for the Retail and Food Service Sector,** Guelph, Ontario, Canada. For more details, contact Marlene Inglis, Guelph Food Technology Centre at 519.836.1246; fax: 519.821.1281; E-mail: gftc@uoguelph.ca.

• **12, IAFFP Workshop, Latin American Workshop on Safety of Exported Produce,** Guadalajara Mission Carlton Hotel, Guadalajara, Mexico. Watch our Web site at www.foodprotection.org for more information.

• **12-16, American Public Health Association's 128th Annual Meeting,** Boston, MA. For more information, phone: 202.777.2470; fax: 202.777.2531; E-mail: ashell.alston@apha.org.

• **13-16, Pacific Congress on Milk Quality and Mastitis Control,** Nagano, Japan. Co-sponsored by IAFFP. For additional information, contact Secretariat for PC2000, Philpot and Associates International, P.O. Box 120, Homer, LA 71040; phone: 318.927.2388; fax: 318.927.3133; E-mail: philpot@homerla.com.

• **15-17, IFT's International Food Safety and Quality Conference and Expo,** Orange County Convention Center, Orlando, FL. For additional information, call 312.782.8424.

• **16-17, Alabama Association for Food Protection Annual Meeting.** For additional information, contact Patricia Lindsey at 256.734.0243.

• **21-23, Second National On-Farm Food Safety and Quality Assurance Conference,** Novotel Launceston, Tasmania. For more information, contact Tasmanian Quality Assured Inc., P.O. Box 193, Launceston 7250, Tasmania; phone: 03.6331.6377; fax: 03.6331.4344; E-mail: tqainc@microtech.com.au.

• **30, HACCP: An Executive Summary,** Guelph, Ontario, Canada. For more details, contact Marlene Inglis, Guelph Food Technology Centre at 519.821.1246; fax: 519.836.1281; E-mail: gftc@uoguelph.ca.

DECEMBER

• **4-5, Food Safety Objectives: Public Health, HACCP and Science Conference,** Georgetown University, Washington, D.C. For further information, contact Phillipa Orme, FSO 2000 Confer-

ence Secretariat, 12 Church St., West Hanney, Wantage, Oxon OX12 OLN, UK; Phone 44.01235.868811. Fax: 44.01235.868811; E-mail: p.orme@dial.pipex.com.

• **4-6, InterBev 2000,** Morial Convention Center, New Orleans, LA. For more information call Joe Nemchek at 203.840.5949.

• **13-14, HACCP IV: Train the Trainer,** Guelph, Ontario, Canada. For more details, contact Marlene Inglis, Guelph Food Technology Centre at 519.821.1246; fax: 519.836.1281; E-mail: gftc@uoguelph.ca.



International Association for Food Protection

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112	127	142	157	172	187	202	217	232	247	262	277	292	307	322	337	
113	128	143	158	173	188	203	218	233	248	263	278	293	308	323	338	
114	129	144	160	174	189	204	219	234	249	264	279	294	309	324	339	

Career Services Section

Corporate Director of Microbiology

Silliker Laboratories, the global leader in food microbiology and chemistry testing, education and consulting, has an opening for a Corporate Director of Microbiology. Responsibilities include; providing technical direction to all Silliker microbiology personnel, coordinating corporate efforts related to quality systems, managing projects within the area of expertise and providing consulting services to clients as needed. Applicants must have an advanced degree (Ph.D. preferred) in Microbiology or Food Science with a strong emphasis in microbiology and a minimum of five years of food testing industry experience. Professional level written and oral communication skills are required. Position is located in Chicago Heights, IL.

Interested individuals should send resume and salary requirements to Human Resources, Silliker Laboratories Group, Inc., 900 Maple Road, Homewood, IL 60430; Phone (708) 957-7878; Fax (708) 957-3798; e-mail: human.resources@silliker.com

Equal Opportunity Employer M/F

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The Food Safety/Microbiology Department of Campbell Soup has an opening for a Sr. Research Associate. The successful candidate will possess strong oral/written communication skills; the ability to design experiments and correctly interpret data/findings, and the ability to work independently while managing multiple projects/priorities. Candidate must have a Masters in Food Microbiology or Food Science with 2+ years laboratory experience. General knowledge of microbial risk and testing requirements for food products is beneficial. Work experience in a food processing lab, QA or operations is a plus. Travel expectancy is 10-15%.

Contact: Suzanne Tortorelli; E-mail: suzanne_tortorelli@campbellsoup.com; Fax: 856-968-2888.

Director of the University's Center for Animal Health and Food Safety

The College of Veterinary Medicine, University of Minnesota is seeking an outstanding individual to fill the position of Director of the University's Center for Animal Health and Food Safety. This will be a 12-month, 100% time, annually renewable administrative appointment. The individual will also hold a faculty appointment in one of the academic departments of the College, rank and appointment type dependent on qualifications and experience consistent with collegiate and University policy. The Center has been newly created based on substantial continuing funding from the State of Minnesota and is dedicated to improving the safety of food from animals. The successful candidate will have the challenge of assembling a team of people (existing and new faculty with the college and greater university and collaborators from the private and government sectors) who will have a significant impact on safety and wholesomeness of food from animals. The Director will have budget authority for the Center with the advice of an advisory committee and will report to the Dean of the College.

Candidates must have the following qualifications: DVM, VMD, or equivalent foreign veterinary degree or other advanced degree relating to food safety and public health (i.e. MPH, PhD, MD) is required. Candidates must qualify for Assistant, Associate, or Full Professor rank within one of the academic departments of the College of Veterinary Medicine. Excellent communication skills along with abilities and enthusiasm for developing and implementing public communication programs. Leadership skills and demonstrated experience in managing multi-faceted programs. The position requires an aptitude for building an atmosphere of teamwork among a group of individually accomplished, highly motivated people. Clear vision of the importance of food safety throughout the total food chain, the contributions that a university can make in assuring the quality of animal food, and the potential role for the veterinary profession relative to food safety in food animal production. National and/or international stature in food safety programs development, research, education, and/or implementation. Demonstrated understanding of the complex mix of constituencies and market forces at play in implementing food safety at an industry-wide level. Preference given to candidates with a combination of medical and research training and/or experience in administration, program development, budget control, and program leadership.

Salary, rank and appointment type dependent upon qualifications and experience.

Applicants must submit a cover letter outlining qualifications and vision for the position, a curriculum vitae, names, addresses, and phone numbers of three professional references. Applications will be reviewed beginning September 1, 2000 and continuing until the position is filled. Please send application materials to: *Dr. John Fetrow, Search Committee Chair, College of Veterinary Medicine, University of Minnesota, 1365 Gortner Ave., St. Paul, MN 55108. Inquiries are encouraged by contacting Dr. Fetrow at: fetrow001@tc.umn.edu, 612-625-3776.*

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Salary: \$45,000 - \$50,000 per year depending on experience.

For Information & Application Contact: Send a resume and cover letter to: Russell Duke, Idaho Division of Health, 450 West State Street, Boise, Idaho 83720; Fax: (208) 334-6581; Ph: (208) 334-0606 or e-mail: duker@idhw.state.id.us

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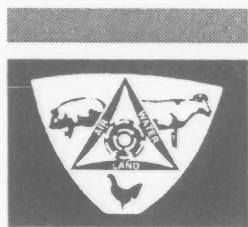
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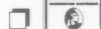
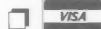
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THOUGHTS on Today's Food Safety...

Food- and Waterborne Parasitic Protozoa

Nigel Cook
Central Science Laboratory
York, United Kingdom

Parasitic protozoa are single-celled microscopic animals which require a host in order to reproduce. Several types are pathogenic for humans, causing intestinal infections and diarrhea. They can, in some circumstances, contaminate water and foodstuffs and cause outbreaks of gastrointestinal disease.

The main protozoan parasites that do this are *Cryptosporidium parvum*, *Giardia lamblia* and *Cyclospora cayatanensis* (Garcia and Bruckner, 1988). These creatures have a complex life cycle with several stages. Each parasite has a stage in which the cell is robust enough to allow it to survive in the environment until a suitable host takes and ingests it. With *Giardia*, which reproduces asexually, this stage is called a cyst; within these bodies, infectious stages, called trophozoites, are contained. After entry into a host's gastrointestinal tract each *Giardia* cyst releases two trophozoites, which attach to the gut wall and, through replication, spread over it and block its surface leading to malfunction. Before leaving the gut, some trophozoites form cysts, and the cycle is thus perpetuated. The symptoms of giardiasis are predominantly diarrhea, with flatulence and abdominal cramps. They begin five to twenty eight days after ingestion of the parasite; acute symptoms normally last for a week and chronic symptoms for several months. Whereas with many bacterial pathogens several thousand cells are required to produce illness, ingestion of ten or more *Giardia* cysts is sufficient to infect a susceptible person. Giardiasis is the most common parasitic infection in the world.

Cryptosporidium and *Cyclospora* display sexual reproduction and their environmental stages are called oocysts; the infectious cells they contain are termed sporozoites. Each *Cryptosporidium* oocyst releases four sporozoites. These invade the intestinal cells, in which they form multiple life stages.

Finally, oocysts are excreted in high numbers. The symptoms of cryptosporidiosis are severe fluid loss, fever, and abdominal pain, and have been likened to those of cholera. They begin by two to twenty-five days after oocyst ingestion, and usually last for two to four weeks. Volunteer studies have shown that as few as ten oocysts can cause infection.

Whereas *Giardia* cysts and *Cryptosporidium* oocysts contain infectious stages immediately after excretion from an infected individual, *Cyclospora* oocysts require some time to mature (or sporulate) in the environment. Sporulation is generally complete by 12 days at 30°C, and requires higher oxygen concentrations than those found in the gastrointestinal tract. Sporulated oocysts each contain two sporocysts; these structures themselves contain two infectious sporozoites. In the gut, free sporozoites penetrate the cells lining the gut wall and proceed to form further stages in the complex *Cyclospora* life cycle. The end result is that infected gut cells die and slough off the intestinal wall along with unsporulated oocysts, to be excreted in feces. The symptoms of cyclosporiasis are prolonged watery diarrhea, abdominal cramps, weight loss, myalgia, and occasionally vomiting and/or fever. These symptoms begin about one week after ingestion of the agent and can persist for a month or longer. It is believed that ingestion of less than ten oocysts is capable of causing infection.

Outbreaks of giardiasis, cryptosporidiosis and cyclosporiasis are associated with consumption of contaminated food or water. This contamination can arise directly from input of excreted cysts or oocysts from infected humans, but some animals can also be sources of infection (Smith et al., 1995). There are no known animal hosts for human pathogenic *Cyclospora*, but cattle and other domestic animals such as lambs, goats, and horses can carry *Cryptosporidium*, while beavers have been implicated as reservoirs of *Giardia* in headwaters of many cold water streams. It is known that low densities of *Cryptosporidium* oocysts and *Giardia* cysts can often occur in water, and, since the number needed to infect an individual may be low, this could account for the large waterborne outbreaks which have been recorded worldwide (Smith et al., 1995). Examples are the 1987 outbreak which occurred in Carrollton, Georgia USA in which an

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