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DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

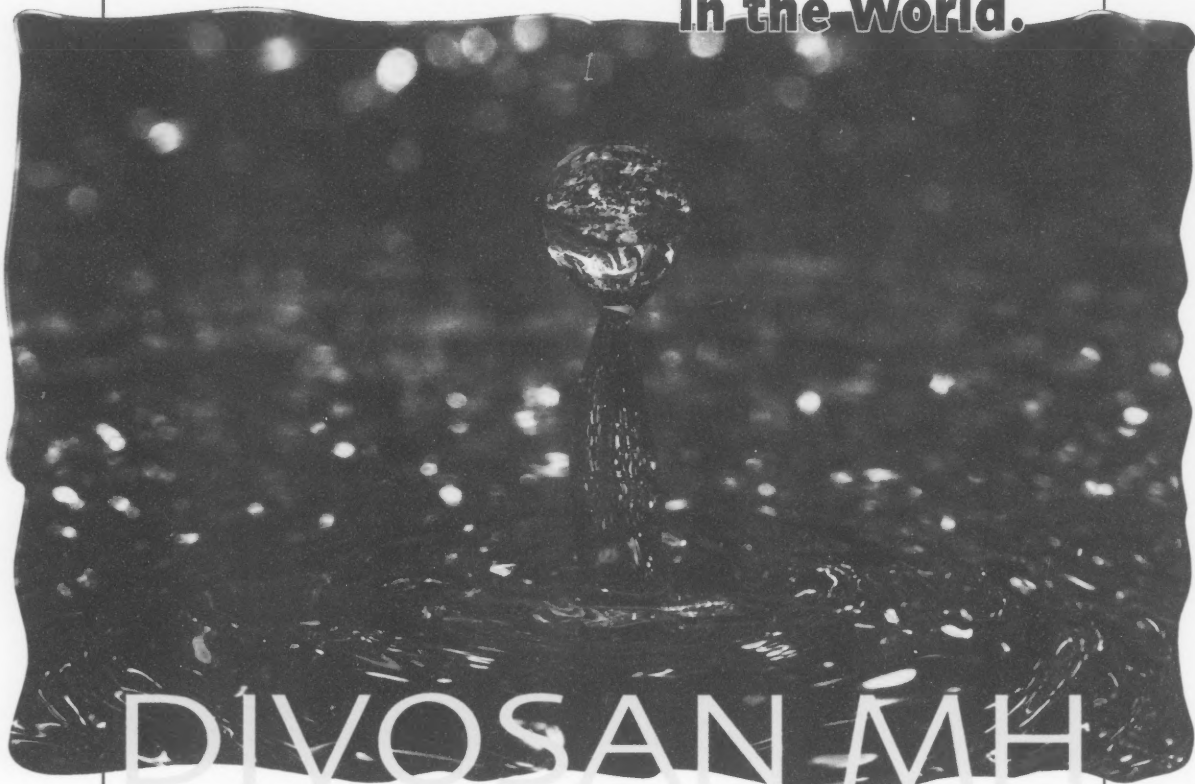
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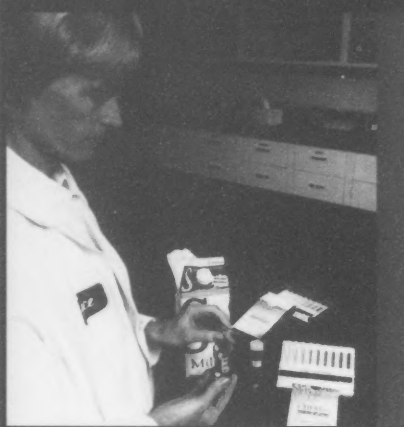
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Sanitation



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Erna Queer

David W. Thump

Karla Jordan



Pam Warringer

Doana Balus



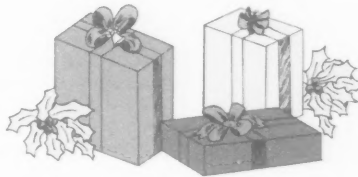
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6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863, USA
Phone: 800.369.6337 • 515.276.3344
Fax: 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

DFES JOURNAL STAFF

David W. Tharp, CAE: *Executive Director*

E-mail: dtharp@foodprotection.org

Lisa K. Hovey: *Managing Editor*

E-mail: lhovey@foodprotection.org

Donna A. Bahun: *Production Editor*

E-mail: dbahun@foodprotection.org

Pam J. Wanninger: *Proofreader*

E-mail: pwanninger@foodprotection.org

INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION STAFF

David W. Tharp, CAE: *Executive Director*

E-mail: dtharp@foodprotection.org

Lisa K. Hovey: *Assistant Director*

E-mail: lhovey@foodprotection.org

Donna A. Bahun: *Design and Layout*

E-mail: dbahun@foodprotection.org

Julie A. Cattanach: *Membership Services*

E-mail: jcattanach@foodprotection.org

Bev Corron: *Public Relations*

E-mail: bcorron@foodprotection.org

Shannon I. Green: *Audiovisual Library Coordinator*

E-mail: sgreen@foodprotection.org

Donna Gronstal: *Senior Accountant*

E-mail: dgronstal@foodprotection.org

Karla K. Jordan: *Order Processing*

E-mail: kjordan@foodprotection.org

Didi Sterling Loynachan: *Administrative Assistant*

E-mail: dloynachan@foodprotection.org

Lucia Collison McPhedran: *Association Services*

E-mail: lmcphedran@foodprotection.org

Beth Miller: *Accounting Assistant*

E-mail: bmiller@foodprotection.org

Pam J. Wanninger: *Proofreader*

E-mail: pwanninger@foodprotection.org

ADVERTISING

David Larson

909 50th Street

West Des Moines, IA 50265

Phone: 515.440.2810

Fax: 515.440.2809

E-mail: larson6@earthlink.net

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EXECUTIVE DIRECTOR

David W. Tharp, CAE, 6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2863; Phone: 515.276.3344; E-mail: dtharp@foodprotection.org.

SCIENTIFIC EDITOR

William LaGrange, Ph.D., Iowa State University, Department of Food Science and Human Nutrition, Food Sciences Building, Ames, IA 50011-0001; Phone: 515.294.3156; Fax: 515.294.8181; E-mail: lagrange@iastate.edu

SCIENCE NEWS EDITOR

Doug Powell, Ph.D., University of Guelph, Guelph, Ontario N1G 2W1 Canada; Phone: 519.821.1799; Fax: 519.824.6631; E-mail: dpowell@uoguelph.ca

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Postcards from Iowa



By JAMES DICKSON
President

“What more could you be doing, that would be fun and beneficial to both you and IAFP?”

I can't believe the year is almost over! How many times have you heard that in the last few weeks? For me, it seems like the last few months are a blur, trying to do all of the things that are necessary for IAFP, my job and my family. But other than a little more time off, I wouldn't change it. This has been one of the most rewarding times of my life, and I am grateful for the opportunities that I have been given.

While we are thinking about opportunities, think about the opportunities that IAFP has to offer you. This may seem like an odd time to consider it, but the point of our organization is to have people involved. We want YOU! Not your dues, (although we do encourage you to pay them!), but your involvement. When we look at the members who are actively involved in comparison to our total members, we find that a lot of our members are good, regular dues-paying members who have never participated beyond coming to an annual meeting. And if your comfortable with that, that's fine. There is room for everyone in our organization. But think about what you are missing! What more could you be doing, that would be fun and beneficial to both you and IAFP? I would like to encourage you to think about that over the holidays. We grow and improve by adding new members, but also by having our long term members get involved in the organization.

So what can you do? Look at our professional development groups, and contact the ones that you are interested in. You may

find that they are not doing what you are interested in, but you may well find a group that is "right up your alley." The reason that I would ask you to start this now, is that if you wait until annual meeting, it will be too late. By the time you attend a few PDG meetings, you may find that you have missed the very one you should have gone to. Do a little homework before the meeting, and you will get more out of it.

And what about other activities? Our President-elect, Anna Lammerding, will be making recommendations for committee appointments at the April Executive Board meeting. If you have an interest in say, the Program Committee or a Journal Management Committee the Nominating Committee, contact Anna and let her know. We need more of our members involved in these activities. We are always trying to involve people who haven't been previously involved, but sometimes it helps if you raise your hand and volunteer. Again, it isn't too early to start thinking about these things.

Finally, I know it has been a trying year for all of us, and many of us are facing budget restrictions in both our professional and personal lives. However, if you are so inclined, send a contribution off to the Foundation Fund. The Foundation Fund is IAFP's future, and besides, you'll warm Harry Haverland's heart.

I'll leave you with this. The other evening as I was pre-occupied with a troublesome issue as I was driving home. Our state is one of many that have

been affected by the economic difficulties of the last several months, and our university and my department have been trying to resolve the budget reductions. I barely noticed the geese on an abandoned rock quarry that I drive by, and would have completely missed seeing the deer if

one hadn't run across the road in front of me. I was thinking about how grim the situation was, and about how difficult life could be at times. As I came down the hill toward my house, I saw something brightly colored moving in the driveway. It took me a few seconds to realize that it was one

of my daughters who was outside playing, and right then I forgot about solving the budget equations. Life isn't so hard if we keep our priorities set on the things that really matter. May you and your family enjoy the Holiday Season.

Same time, next month.

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

Nominate a Colleague Today for the Association Fellows Award

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

Nomination deadline is February 18, 2002.

Nomination forms must be received at the Association office by this date.

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COMMENTARY

From the Executive Director



By DAVID W. THARP, CAE
Executive Director

“One way to judge the financial health of an association is to look at the fund balance”

It is hard to believe that fall is now ending and winter begins – that means that the year 2001 now draws to a close. I believe we can look back on the year and proudly state that we had many successes. In this month's column, I want to focus on three items – one from last year and two that affect next year. The items are the fiscal year financial results and deadlines for both the award nominations and abstract submissions. Let's start with my favorite subject, finances.

As most everyone knows, my background is in accounting. I am a Certified Public Accountant (CPA) as is Lisa Hovey, our Assistant Director. We have both shed our duties and responsibilities of the day-to-day accounting needs of the Association, but we of course continue to oversee the accounting functions; Lisa more so than me. We share a strong belief that the financial health of IAFP is essential to be able to carry out the mission of the Association. IAFP has made outstanding progress over the years since I began in 1993. Lisa also comments on the financial growth she has witnessed since 1997.

One way to judge the financial health of an association is to look at the fund balance. We maintain three fund balances that combine to become the overall total IAFP fund balance. The three funds are the General Fund, the Restricted Fund and the Foundation Fund. The General Fund is the one fund that we are most concerned with.

The General Fund balance more or less shows what amount of cash would be left if the entity were forced to close down as of a certain date. As a guideline, an association's general fund should hold 25% to 50% of one year's budgeted revenue in the fund. For IAFP that amount is \$300,000 or more. At IAFP, we are not that fortunate. In fact, our goal for more than eight years has been to move our General Fund balance to a positive position, meaning that we are in a negative fund balance position!

As I reported at the 88th Business Meeting in Minneapolis, we were faced with a number of financial challenges during the year, the biggest of which was lost income due to the downturn in the capital markets. Our mutual fund investments of course are considered very conservative, but all types of investments were affected during 2001. Even withstanding those losses, we had a very successful year financially. We did not quite make it to where our General Fund balance was positive, but we are now only \$1,500 away! For the fiscal year ending August 31, 2001, our operations added \$15,000 to the General Fund. Much of this success can be directly attributed to a hugely successful Annual Meeting in Minneapolis. It is appropriate to mention that our IAFP 2001 sponsors and supporters also deserve credit for making the 88th Annual Meeting the most financially successful to date. Thank you!

I should also mention that at no time during the past eight plus years has the Association ever encountered a cash flow problem. We are financially strong; we are just not Hercules! I invite you to review the financial results shown on page 1052.

Now I had better move to our other topics for this month. The deadline for abstract submission is quickly approaching. Abstracts for IAFP 2002's technical and poster sessions must be received at our office not later than January 7, 2002. Abstracts may be submitted Online (www.foodprotection.org), via E-mail (abstracts@foodprotection.org) or you can still mail abstracts to our office or send them via express delivery. We encourage your participation

in IAFP 2002's program in San Diego!

Another deadline is quickly approaching. That is the deadline for submitting award nominations. I bet that if you stopped to think about your colleagues, you could list at least four or five (probably more) who are deserving of one of the IAFP Awards. Please review page 1010 to learn more about the Association Awards and the nomination process. Nomination criteria are available at the IAFP Web site.

We should point out that there is a new Award this year titled the "International Leadership Award" which will recognize an individual for their dedication to the high ideals and objectives

of IAFP. It also recognizes individuals for promotion of the mission of the Association in countries outside of the United States and Canada. With the addition of the Maurice Weber Laboratorian Award last year, we now have ten categories of Awards. Surely you can take time from your busy schedule to nominate a deserving colleague so that they receive the recognition they are entitled to.

With that, I will close for this month. All of us at the IAFP office hope that you are able to share the joys of the Holiday Season with your family, friends and loved ones. We wish you the best in what you do and wish you a prosperous New Year!

Congratulations



In October 2001, the International Association for Food Protection participated at the Worldwide Food Expo in Chicago, IL. While exhibiting, we offered a drawing for a one-year Membership with our Association and a registration for IAFP 2002 in San Diego, CA. We are pleased to announce the following winners of the drawing:

IAFP Membership

Paul Skarin-Willey
Crowley Foods, Inc.
Binghamton, NY

IAFP 2002 Registration

Tom Partridge
Rexam Flexibles
Lakeville, MN

Relationships of Live Animal Scores for Ambulatory Status, Body Condition, Hide Cleanliness, and Fecal Matter Consistency to Microbiological Contamination of Dairy Cow Carcasses

Mindy L. Kain,¹ Sherri L. Kochevar,¹ John N. Sofos,^{1*} Keith E. Belk,¹ Chris Rossiter,²
James O. Reagan,³ and Gary C. Smith¹

¹Center for Red Meat Safety, Department of Animal Sciences, Colorado State University, Fort Collins, CO 80523-1171, USA; ²College of Veterinary Medicine, Cornell University, Ithaca, NY 14852-5786, USA; ³National Cattlemen's Beef Association, 9110 E. Nichols Ave., Centennial, CO 80112, USA

ABSTRACT

During a 3-day period, 80 live cull cows (from twelve lots of dairy cattle) were weighed and scored for ambulatory status, body condition, hide cleanliness, and fecal matter consistency, and their carcasses were weighed and, later, graded. Carcasses were sampled for aerobic plate count (APC), total coliform count (TCC), and *Escherichia coli* count (ECC). Excised (100cm²) samples were taken at three plant locations (prior to evisceration, after final carcass washing, and after carcass chilling) from two anatomical sites (brisket and round). In addition, samples of fresh feces, sponge-swab samples from hide surfaces, and samples of excised carcass tissues were analyzed for *Salmonella* and *Escherichia coli* O157:H7. Factors having significant ($P < 0.05$) effects on bacterial populations of carcasses immediately after hide removal (prior to evisceration) were sampling date (APC, TCC) and lot number (APC, TCC). Factors significantly ($P < 0.05$) affecting bacterial counts after final carcass washing included lot number (APC, TCC, ECC), ambulatory status (APC, TCC), and hide cleanliness (TCC). Characteristics having significant ($P < 0.05$) effects on microbial counts after carcass chilling included sampling date (APC, TCC) and lot number (APC, TCC). No samples were positive for *E. coli* O157:H7, whereas *Salmonella* was detected in 0%, 13.8% and 1.2% of fecal (N=77), hide (N=80) or carcass (N=427) samples, respectively. Although microbial contamination on dairy cow carcasses differed among sampling dates and lots of cattle, live animal scores for ambulatory status, body condition, hide cleanliness, and fecal matter consistency were of no use in identifying cattle likely to produce contaminated carcasses.

A peer-reviewed article.

*Author for correspondence: Phone: 970.491.7703;
Fax: 970.491.0278; E-mail: John.Sofos@colostate.edu

INTRODUCTION

In general, the muscles of healthy animals before slaughter are considered sterile, whereas lymph nodes, some organs, and, especially, surfaces exposed to the environment, such as external hide, pelt, or fleece, as well as the tongue and gastrointestinal tract, carry extensive contamination (11, 27). This external, animal-associated contamination is a major source of environmental plant contamination and becomes a very important source of carcass and meat contamination during slaughtering and processing. Every feasible effort should be made to prevent accumulation of excess mud and dung on the animals, because it may introduce bacterial pathogens into the plant environment (17). Understanding any potential relationship of animal characteristics such as size, condition, and cleanliness to microbiological contamination on carcasses should be useful in identifying animal and carcass handling and processing protocols that could reduce microbial contamination on carcasses (29).

Process control systems such as hazard analysis critical control point (HACCP) protocols may include decontamination procedures applied to reduce microbial contamination of carcasses during slaughtering and dressing (8, 28, 29). These interventions may include a chemical hair-removal process, steam-vacuuming, spraying with chemical solutions or hot water, and steam pasteurization (4-6, 13, 14, 16, 20, 21, 25, 28-32). In addition, cleaner, better-conditioned animals entering the harvesting facility may allow control systems and decontamination procedures to be more effective in reducing the microbial contamination on the carcasses. The benefit of improving the microbiological quality of meat will be the delivery of a higher quality product with a consistent and extended shelf life (35).

This study was performed at a commercial slaughtering/dressing operation to determine if live ani-

mal characteristics were associated statistically with levels of microbial contamination of resulting carcasses from dairy cows. Studies of this type, examining the potential relationships of condition, cleanliness, and other characteristics of animals to microbiological populations or incidence of pathogens on their carcasses, may lead to the identification of animal and carcass handling/processing protocols that could be applied to reduce carcass contamination.

MATERIALS AND METHODS

Study design

Eighty animals from twelve lots of cattle were individually weighed (live weight) and scored for ambulatory status, body condition, hide cleanliness, and fecal matter consistency. The animals were slaughtered over a three-day period, and chilled carcasses were weighed (carcass weight) and graded (carcass grade). Samples were collected from each live animal and from each carcass for microbiological analyses. After collection, the samples (in Whirl-Pak™ bags, Nasco, Modesto, CA) were refrigerated and placed in coolers with ice packs for shipment by overnight air express to the laboratory for analysis.

Hide and fecal evaluation

Each cow was assigned scores for ambulatory status (1=normal, 2=obviously lame, 3=severely lame), body condition (1=very lean, 2=some external fat, 3=good condition, 4=some excess fat, 5=fat), hide cleanliness (1=clean, 2=dirty, 3=filthy) and live animal fecal matter consistency (1=dry, 2=normal, 3=diarrheal, 4=fluid). A sample of approximately 30g of feces was removed from each animal through palpation of the rectum, with the person obtaining the sample wearing a clean, plastic palpation glove. Each fecal sample was placed in a sterile sampling bag for shipment to the laboratory.

Immediately post-exsanguination and prior to hide removal, a sterile sponge (Whirl-Pak™) rehydrated with 10 ml of sterile double-strength skim milk (Difco Laboratories, Detroit, MI) was used to aseptically swab 100 cm² of the brisket area of the hide using a sterile rubber template. The person taking the samples used new sterile gloves for each animal being tested. The sponge was placed in a sterile Whirl-Pak™ bag for shipment to the laboratory. A total of 77 fecal and 80 hide sponge samples were obtained during the three-day period.

Carcass evaluation

Carcass sampling was performed at three locations in the plant and on two anatomical carcass sites. The plant locations were designated as prior to evisceration, after final carcass washing, and after carcass chilling. The sampling sites on the carcass (carcass sites) were the round (cushion) and the brisket (in the area anterior to the navel on the ventral mid-line), equivalent to the round and brisket areas, respectively, as described in the United States Meat and Poultry Inspection Regulation (8).

Three 100 cm² portions of the adipose/muscle-tissue surface were aseptically removed from each carcass site at each plant location by use of a sterile rubber template, forceps, and scalpel. The three tissue samples from an individual carcass were placed in a single sterile Whirl-Pak™ bag. At each carcass site and at each plant location, samples were taken from 80 carcasses, and each carcass was followed through the entire slaughtering/dressing/chilling sequence for subsequent sampling. The overall total of carcass samples taken for microbiological analysis was 428, but one sample of round tissue taken at the prior-to-evisceration plant site was not analyzed because of a laboratory accident.

Microbiological analyses

Samples of fresh feces, hide-surface sponged samples, and one of the three 100 cm² excised car-

TABLE 1. Frequency of isolation of *Salmonella* from fecal, sponge-swab hide, and excised carcass samples

Samples	Number of samples tested	Number positive	Percent positive
Fresh feces	77	0	0
Sponged hide	80	11	13.8
All carcass samples	427	5	1.2
Prior to evisceration	155	3	1.9
After final carcass washing	140	1	1.0
After carcass chilling	132	1	1.0
Brisket site	214	3	1.4
Round site	213	2	1.0

cass tissue samples were analyzed for *Salmonella* spp. Enrichment technique, isolation, and/or identification of *Salmonella* were performed according to procedures described in the Microbiology Laboratory Guidebook of the Food Safety and Inspection Service (22, 33).

Samples of fresh feces, hide-surface sponged samples, and the second of the three 100 cm² excised carcass tissue samples were analyzed for *E. coli* O157:H7. The EHEC-TEK™ System (Organon Teknika, Durham, NC) with Dynabeads® (DynaL.A.S., Oslo, Norway) was used for sample screening following enrichment in Modified EC Broth with Novobiocin (Difco). Presumptive positive samples were confirmed according to procedures described by Okrend and Rose (19).

The third 100 cm² excised carcass tissue sample was analyzed for aerobic plate count (APC), total coliform count (TCC), and *E. coli* biotype I count (ECC). The carcass tissue sample was placed in a sterile Whirl-Pak™ bag (Nasco) to which 100 ml of sterile phosphate buffer was added (Difco). The sample was pummeled for 1 min using a Stomacher-3500 (Tekmar, Inc., Cincinnati, OH) and appropriate dilutions were prepared for plating on Petrifilm™ aerobic count plates and

Petrifilm™ *E. coli* count plates (3M™ Health Care, St. Paul, MN). Both types of Petrifilm™ were incubated at 35°C for 48 ± 2 h. After incubation, colonies on the Petrifilm™ aerobic count plates were enumerated and the Petrifilm™ *E. coli* count plates were examined for total coliforms (indicated by red colonies with adjacent gas bubbles) and for *E. coli* colonies (indicated by blue colonies with adjacent air bubbles).

Statistical analysis

All data were converted to log CFU/cm² and analysis of variance (ANOVA), least squares means, standard deviations, and least significant differences for comparison of logarithmic means were used to evaluate the significance of relationships of live animal factors to microbiological contamination of the carcasses. These analyses were completed using the general linear model procedure of SAS (23). All statistically significant effects were reported at the $P < 0.05$ level.

RESULTS AND DISCUSSION

None of the fresh feces, hide, or carcass samples analyzed was found positive for *E. coli* O157:H7 (data not shown), whereas *Salmo-*

nella was detected in 13.8% of the external hide samples and 1.2% of the carcass samples (Table 1). Garber et al. (10) analyzed 4,361 fecal samples from dairy cows on 91 operations and found that 52 (1%) of the fecal samples (found on 22 of the operations) were positive for verotoxin-producing *E. coli* O157 (10). Another study (18) revealed that *Salmonella*-positive samples were more common in herds of more than 100 cows (25.0 per 1,000) than in herds of 51 to 100 cows (11.9 per 1,000); primary sources of *Salmonella* infection were feedstuffs and other infected cattle. In the present study, the carcass samples taken prior to evisceration had a higher incidence of *Salmonella* than did samples taken after final carcass washing and after carcass chilling, with 1.9%, 1.0% and 1.0% recovery rates, respectively. The brisket samples had a slightly higher incidence of *Salmonella* than did the round samples, with 1.4% and 1.0% recovery rates, respectively. Results presented in Table 1 are in agreement with those reported by previous studies (7, 9, 30-32), and indicate the effectiveness of process control in slaughtering/dressing operations in minimizing carcass contamination with pathogens (2). Because so few pathogens were detected on these carcass samples, these results do not permit conclusions to be drawn regarding effects of ambulatory status, body condition, hide cleanliness or fecal matter consistency on pathogen incidence on carcasses.

The brisket site of the carcass was generally more contaminated than was the round (Table 2). In previous studies, the brisket was found to have higher incidence of *Salmonella* (32), while the round had higher counts of *E. coli* (31). Plant design and operation may influence levels of contamination on specific anatomical sites of the carcass. It was not possible from this analysis to determine whether any of the significant effects on bacterial counts were associated with differences in ambulatory status,

TABLE 2. Effects of plant location and carcass site on means (log CFU/cm²) and standard deviations (SD) of aerobic plate count (APC), total coliform count (TCC) and *E. coli* count (ECC)^a

Plant location	Carcass site	APC	TCC	ECC
Prior to evisceration	Brisket	3.1 ^a (1.1)	0.8 ^a (1.1)	0.4 ^a (0.8)
	Round	2.4 ^b (1.3)	0.3 ^b (0.6)	0.1 ^b (0.3)
After final carcass washing	Brisket	2.5 ^a (1.0)	0.5 ^a (1.0)	0.3 ^a (0.7)
	Round	2.1 ^b (0.9)	0.3 ^a (0.6)	0.2 ^a (0.5)
After carcass chilling	Brisket	3.1 ^a (1.3)	0.8 ^a (1.1)	0.4 ^a (0.8)
	Round	2.3 ^b (1.2)	0.2 ^b (0.5)	0.1 ^b (0.2)

^{ab}Values within a column and plant location with the same superscript letter do not differ significantly ($P > 0.05$).

^cEach mean is the average of 66-78 samples.

Detection limit: 1 CFU/cm² (0.0 log CFU/cm²).

body condition, hide cleanliness or fecal matter consistency of cattle harvested, or on plant operation conditions on those particular days.

Analysis of variance (ANOVA) was performed to determine effects of sampling date and lot number on APC, TCC, and ECC from combined (brisket and round) sampling sites, prior to evisceration, after final carcass washing, and after carcass chilling (data not presented in tabular form). Of the nine F ratios generated for each main effect (APC, TCC, and ECC at each of the three locations prior to evisceration, after carcass washing, and after carcass chilling), 4 of the 9 for sampling date and 7 of the 9 for lot number were statistically significant. That sampling date and lot number were significant sources of variability in microbiological counts on dairy cow carcasses suggests that there may have been differences in microbial loads on or in cattle harvested: (a) on different days, (b) originating in different farms/markets, or (c) transported to the packing plant in different vehicles. A study of pens in feedlots (24) concluded that the prevalence of cattle shedding *E. coli* O157:H7 varied widely within feedyards and that muddy pens were more likely to have a higher pen

prevalence than normal pens. Smulders and Upmann (26) reviewed the technical literature available and concluded the following: (a) Cleanliness of the animals determines the hygienic conditions of slaughter; (b) Animals lying down cause the most extensive contamination of hides, especially when stables, transport vehicles, and lairage areas are poorly cleaned; (c) There does not appear to be any realistic method to reduce hide contamination significantly before slaughter; and, (d) Keeping transport vehicles and lairage stables clean, reducing transport time and lairage time, and providing clean feed and water in lairage may be the best approach yet for reducing prevalence of pathogens on the hides of slaughter cattle.

Assuming that differences in live-animal microbial loads (suggested to have occurred in this study by significance of relationships between sampling date or lot number and APC, TCC, and ECC on carcasses) would be related to visually apparent differences among cows was not, in fact, the case as shown by an examination of results of ANOVA for live animal scores and carcass bacterial counts. Presented in Table 3 are ANOVA results for

APC, TCC, and ECC (brisket and round sampling sites combined) from dairy cow carcasses arrayed according to the live animal scores for ambulatory status, body condition, hide cleanliness, and fecal matter consistency. Of the nine F ratios generated for each main effect, 2 of 9 for ambulatory status, 0 of 9 for body condition, 1 of 9 for hide cleanliness, and 0 of 9 for fecal matter consistency were statistically significant. Of greatest importance in the ANOVA results in Table 3 was the finding that not one of the four live animal scores was related to microbiological counts on dairy cow carcasses, after carcass chilling.

Extremes (lowest and highest values) for APC, TCC, and ECC from combined brisket and round sampling sites on dairy cow carcasses are presented in Table 4. There were statistically significant differences between extremes for APC or TCC in 4 of 9 comparisons across three sampling dates and between extremes for APC, TCC, or ECC in 7 of 9 comparisons among the 12 lots of dairy cows, and many of these cow-to-cow and lot-to-lot differences in counts (7 of 11) were 1 log CFU/cm² or more. Extremes for APC, TCC, and ECC from combined brisket and round sampling sites on dairy cow carcasses were not re-

TABLE 3. Statistical significance ($P > F$) of effects of live animal scores on aerobic plate count (APC), total coliform count (TCC), and *Escherichia coli* count (ECC) from combined brisket and round sampling sites on dairy cow carcasses

	Live animal scores			
	Ambulatory status	Body condition	Hide cleanliness	Fecal matter consistency
Prior to evisceration				
APC	0.5130	0.3639	0.4442	0.1509
TCC	0.8050	0.8156	0.7673	0.1047
ECC	0.7739	0.8604	0.1688	0.1100
After final carcass washing				
APC	0.0246*	0.2807	0.0546	0.5822
TCC	0.0086*	0.3739	0.0209*	0.3945
ECC	0.1016	0.5904	0.1323	0.3964
After carcass chilling				
APC	0.4828	0.5812	0.6769	0.5381
TCC	0.1220	0.2265	0.2797	0.7721
ECC	0.3929	0.5350	0.5472	0.9045

*Statistically significant at the probability level indicated.

lated in meaningful fashion to either ambulatory status or hide cleanliness of live cattle. In data not presented in tabular form, relationships of live animal weight, cattle breed, carcass weight, and carcass grade to APC, TCC, and ECC on dairy cow carcasses were sometimes statistically significant, but the differences were not considered useful for predicting potential carcass contamination outside the study population.

A study by Van Donkersgoed et al. (34) found no correlation between "tag" (i.e., mud, bedding, and manure) on hides and bacterial contamination on carcasses, but revealed an association between "tag" on hides and visual demerits assigned by industry personnel. Nevertheless, contamination from the hide and intestinal tract may contain bacteria of potential public health importance, and it should be the goal of modern slaughtering and dressing systems to reduce such

contamination to the lowest possible level (1, 28, 29). Hadley et al. (15) found that the degree of soiling of live sheep significantly affected the microbial load of dressed lamb carcasses. Fecal soiling of the fleece led to increased microbial counts, showing the importance of ensuring that meat animals presented for slaughter are as clean and dry as possible so that the microbiological contamination on the finished carcass is minimized (15).

Individual operations have evaluated, or applied, interventions such as removal (by cutting or shearing) of hair and fecal tags from the exterior of the animals or washing of animals before slaughter, but in many instances the results are generally less than promising (11, 29). Grandin (12) reported that researchers at the Department of Agriculture in Victoria, Australia, found that washing cattle prior to slaughter, or clipping mud balls off hides either before or after slaughter, did not reduce *E. coli* contamination on

the bovines' hide and that *E. coli* contamination was much less likely to occur if cattle were transported in clean trailers.

Pre-slaughter washing of sheep has been practiced in New Zealand (3); the level of microbiological contamination of carcasses from the best-presented animals (shorn, clean, unwashed) was five times lower than that from the worst presented animals (wooly, dirty, washed) (3.9 versus 4.6 log CFU/cm²). In general, the results of animal washing before slaughter have been variable, and application of the procedure may be limited by climate, type of animal, and availability of facilities (28, 29). Nevertheless, when animals are wet or excessively soiled, slaughter speeds should be reduced to minimize accidental transfer of contamination from the exterior of the animals onto the carcass or the plant environment. In addition, modifications in the steps involved in hide removal, or in equipment used for

TABLE 4. Extremes (lowest and highest values^a) for aerobic plate count (APC), total coliform count (TCC), and *Escherichia coli* count (ECC) from combined brisket and round sampling sites on dairy cow carcasses

	log CFU/cm ²			
	Across three sampling dates	Among twelve lots	Normal vs. severely lame in ambulatory status	Clean vs. filthy in hide cleanliness
Prior to evisceration				
APC	2.2 to 3.2*	1.7 to 4.6*	2.7 to 3.0	2.5 to 2.7
TCC	0.3 to 0.7*	0.1 to 1.2*	0.5 to 0.6	0.5 to 0.6
ECC	0.2 to 0.4	0.0 to 0.6	0.2 to 0.2	0.1 to 0.3
After final carcass washing				
APC	2.2 to 2.6	1.7 to 3.3*	2.2 to 2.9*	2.1 to 2.5
TCC	0.4 to 0.4	0.0 to 1.4*	0.3 to 0.9*	0.2 to 0.4
ECC	0.2 to 0.3	0.0 to 0.9*	0.2 to 0.4	0.1 to 0.4
After carcass chilling				
APC	2.0 to 3.2*	1.7 to 4.3*	2.6 to 2.8	2.5 to 2.6
TCC	0.2 to 0.6*	0.1 to 1.0*	0.4 to 0.7	0.4 to 0.2 ^a
ECC	0.1 to 0.3	0.0 to 0.5	0.2 to 0.2	0.2 to 0.1 ^a

^a"Clean" hides had higher numerical counts than "filthy" hides (the reverse of what was expected) so these extreme values are listed highest to lowest.

*Differences in extremes were statistically different ($P < 0.05$).

hide removal, may help in minimizing transfer of contamination onto the carcass surface (15). The contribution of animal cleanliness to reduction of carcass contamination needs additional study, and it may vary depending on various conditions and factors, such as general dressing procedures, speed of slaughter, facility design, and worker practices (28, 29).

Overall, the results of the present study showed no strong association between microbiological populations on carcass samples and characteristics of the slaughtered animals. Thus, it appears that, regardless of live animal condition, it is possible to produce a clean carcass using proper harvesting techniques and decontamination

procedures. Nevertheless, healthy and clean animals would be expected to contribute lower levels of contamination to the environment of slaughtering facilities, while highly soiled animals are an important potential source of plant contamination. However, poor sanitation, hygiene, and manufacturing practices during slaughtering, fabrication, and processing can lead to excessively contaminated meat, even when less heavily soiled animals are processed.

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Handwashing Water Temperature Effects on the Reduction of Resident and Transient (*Serratia marcescens*) Flora when Using Bland Soap

Barry Michaels,^{1*} Vidhya Gangar,² Ann Schultz,²

Maria Arenas,² Michael Curiale,² Troy Ayers,³ and Daryl Paulson⁴

¹Georgia-Pacific Corporation, Technology Center, P.O. Box 919 (Hwy. 216), Palatka, Florida 32178;

²Silliker Research and Laboratory Services, 160 Armory Drive, South Holland, Illinois 60473;

³University of Florida, Department of Food Science and Human Nutrition, Gainesville, Florida 32608; and ⁴BioScience Laboratories, P.O. Box 190, Bozeman, Montana 59771

ABSTRACT

For many years, sanitarians have specified that hands be washed using warm or hot water to reduce cross-contamination risks, with various authors indicating temperatures between 38°C and 48.9°C. However, it has been suggested that these temperatures may contribute to skin damage when frequent handwashing is necessitated (in health care and food service). This study evaluates the bacterial reduction efficacy of water temperature during normal handwashing. The hands of two groups of four experimental subjects were soiled with sterile or contaminated substances (tryptic soy broth and hamburger meat). Uninoculated menstruum was used to study the effects of treatment temperatures on resident microflora reduction, while *Serratia marcescens*-inoculated menstruum was used to study treatment effects on transient microorganism reduction. Following contamination with appropriate media, one hand was immediately sampled to obtain baseline (control) data, using the "glove-juice" technique for microorganism recovery. Hands were then moistened with water at the assigned temperature (4.4°C, 12.8°C, 21.1°C, 35°C or 48.9°C), washed 15 s with bland soap, and rinsed 10 seconds at the same temperature as was used before; and the opposing hand was then sampled. Results indicate that water temperature has no effect on transient or resident bacterial reduction during normal handwashing when bland soap is used.

A peer-reviewed article.

*Author for correspondence: Phone: 904.312.1184;
Fax: 904.312.1198; E-mail: bsmichae@gapac.com.

TABLE 1. Year 2000 Conference for Food Protection water temperature issues

Issue #	Submitter	Requested change from 110°F (43°C) minimum	Reasons given for change requested
2000-I-23	L. Wisniewski (Select Concepts)	"Warm Water"	1. Hand discomfart decreases frequency
2000-I-24	M. Scarborough (GA Dept. of Human Resources, Div. Publ. Health)	37.7°C (100°F)	1. Na science (110°F vs. 100°F) 2. Plumbing code @100°F max. (safety concerns)
2000-I-25	J. Budd (Healthminder/ Slaan Valve Ca.)	35°C (95°F)	1. Na scientific basis 2. Max. soap efficacy at 35°C 3. Hand camfart 4. Hat water discourages hand washing
2000-I-26	E. Rabataski (WI Conference Faad Protection)	"Tempered" 85°F (29.5°C) ta 110°F (43°C)	1. Hand discomfart 2. Passible scalding
2000-I-27	B. Adler (MN Dept. of Health)	Impase temp. range 110°F (43°C) ta 130°F (54.4°C)	1. Need upper limit ar subject ta OSHA 2. Faad warkers dan't wash 25 s sa cannat scald
2000-I-28	F. Reimers (H.E.B. Gracery Ca.)	"Tempered" ta warm	1. Na science 2. Max. saap efficacy 3. 110°F risks injury 4. Waste water as wait far temp. at 110°F

INTRODUCTION

A critical and thorough evaluation of a simple handwashing reveals numerous variables that must be considered to achieve maximum or appropriate degerming of the hands and fingernail regions. Numerous studies have explored topics such as type of soap (e.g., antibacterial vs. plain, liquid vs. bar), amount of soap and handwashing technique, nailbrush or sanitizer use, drying technique (e.g., cloth vs. paper towels, paper towels vs. air-drying), and applica-

tion of hand sanitizers (post-wash liquids). Although studies indicate that these variables are crucial in achieving effective removal of transient bacteria from the hands under controlled testing conditions, testing to determine specific guidelines for water temperatures and flow rates is rarely mentioned in the scientific literature. Many of the currently employed handwashing practices may be based on untested traditions that could actually result in compromised skin health. With so many variables involved in such a "simple" procedure, it would make

sense to explore and maximize all possible aspects of the process while minimizing negative collateral. This is especially important because many observations of food service workers have revealed what are considered poor habits in handwashing techniques. Studies indicate that handwashing compliance drops considerably without supervision and monitoring, or in situations where skin damage occurs. This further amplifies the need to strengthen knowledge of all variables that might improve or weaken daily handwashing prac-

TABLE 2. A comparison of resident flora and transient flora studies

	Resident flora	Transient flora
Test Laboratory	BioScience Laboratories	Silliker Research Laboratories
Location	Bazeman, MT	South Holland, IL
Study Director	D. Paulsan J. Budd	V. Gangar M. Arenas
Test Subjects	Paid Volunteers	Laboratory Workers
Na. Test Subjects	4 (3 Females, 1 Male)	4 (1 Female, 3 Male)
Test subjects age (range)	26 - 56	24 - 25
Test temperatures (°C)	4.4, 12.8, 21.1, 35, 48.9	4.4, 12.8, 21.1, 35, 48.9
Test temperatures (°F)	40, 55, 70, 95, 120	40, 55, 70, 95, 120
Test soil		
Tryptic soy broth (TSB)	1.0 ml (0.5 ml/hand)	1.0 (ml/hand)
Y - irradiated ground beef (GB)	3.0 grams (1.5 g/)	3.0 grams
Microbial inoculum	None	<i>S. marcescens</i>
Na. test days/soil/	1	2
Temperature/ Subject		
Total data points/temperature	8	16
Mean baseline count Log ₁₀		
TSB	6.05	6.91
GB	6.40	7.21
Amount of time massaged with TSB and GB	45 seconds	2 minutes
Amount of time TSB and GB air-dried	2 minutes	1 minute
Amount of soap used for handwashing	3 ml	3 ml

tices throughout the food and health care industries.

Two types of flora, transient and resident, exist on the hands. The transient flora are generally removed fairly easily. They do not have adhesion characteristics that hold them to the skin's surface (8) and are somewhat suppressed by secretions and competitive exclusion by normal resident flora. Resident flora are removed more slowly. Because of co-evolution, resident flora

have adapted to conditions on the skin surface that cause rapid die-off of most transients. Invaginations such as the nail fold, hair follicles and sebum-producing sebaceous glands support a rich resident flora. Transient flora may consist of pathogens, spoilage bacteria or harmless environmental species. Under certain conditions transient flora can change status and become permanent residents. Resident flora as a rule are not pathogenic types.

Frequent or prolonged exposure of the skin to microbial contamination in soils, skin damage or fissures provide portals of entry to deeper tissue and may result in the presence of many pathogenic bacteria among the resident species (11,27).

Removal of viable bacteria, dirt and grease from the skin is accomplished by friction and surfactant action, which lowers surface tension. Alkaline detergent solutions remove bacteria from skin more efficiently than acid or neutral so-

lutions do (20), forming the basis for skin sampling solutions used in this study (37).

Added to the aforementioned studies are the many references to warm or hot water use for hand-washing from the Internet or popular press. These references are meant to provide information to food workers or consumers. Questions need to be answered regarding water temperature guidelines with respect to handwashing: Do soaps perform better depending on the water temperature for hand-washing? Does hot water help cleanse the hands better than cool or plain tap water? What are the physiological changes of the skin when different temperature/soap combinations are used? Does water temperature make a significant difference in reducing the numbers of transient and/or resident bacteria on the hands?

The effective water temperature used for washing and rinsing hands has been under debate recently at the Year 2000 Conference for Food Protection. Six issues were brought before Council I with regard to FDA Food Code hand washing water temperature specifications. The 1999 Food Code (36) requires sinks used for handwashing to be equipped so as to be "capable of providing water of at least 43°C (110°F), accomplished through use of a mixing valve or a combination faucet." An outline summarizing the issues brought forth by the various submitters at the Year 2000 Conference, including requested changes and reasons given for those changes, is provided in Table 1.

All but one of the issue submissions requested temperature decreases with the intent of improving hand comfort, as the discomfort associated with higher temperatures results in decreases in hand washing frequency or compliance (I-23, I-25). Several submitters note a lack of scientific information on the subject (I-24, I-25, I-28). There is concern that a minimum hand-washing temperature of 43°C (110°F) in addition to causing

discomfort (I-23, I-26), will result in injury or scalding (I-28, I-24, I-26) and may even be in conflict with local plumbing codes (I-24). Two submitters point out that soaps currently available target maximum effectiveness at around 35°C (95°F) (I-25, I-28). Two submitters requested that the minimum temperature of 43°C (110°F) be changed to warm water (I-23, I-28) or that it be tempered to a range of 29.5°C (85°F) to 43°C (110°F). And finally, one submission (I-27) sought to place an upper temperature limit of 54.4°C (130°F), for fear that these regulations would be subject to OSHA scrutiny and criticism without a limit. Interestingly, it was noted in this submission, through reference to the Consumer Product Safety Commission, that second- or third-degree burns have been shown to occur in the elderly at temperatures not much over 43°C (110°F). Council I and the General assembly of voting delegates passed a recommendation to lower the Food Code water temperature minimum to 29.5°C (85°F).

The universe of food handling situations requiring effective personal hygiene runs from temporary handwash stations set up in produce fields to advanced state-of-the-art kitchens used to produce extended-shelf-life ready-to-eat foods sold at retail. In many of these situations, it is difficult to provide water meeting strict temperature ranges. Further, it is difficult to manage and monitor food handlers to insure that the 43°C (110°F) temperature minimum is maintained during all handwashing activities. When subject to regulatory inspections, violations are given to food industry entities based on Food Code specifications. Therefore, in the interest of possibly increasing handwashing compliance or efficacy and clarifying the importance of this issue to enforcement authorities, handwashing studies were undertaken.

In a literature search for effect of water temperature on hygienic efficiency, only two experimental studies shed light on this issue. Both

of these involved hand sampling studies, in which the objective was to remove and enumerate as many bacteria on the hands as possible, either as normal or transient flora. In hand scrubbing experiments, Price (27) found that at temperatures from 24°C (75.2°F) to 56°C (132.8°F) there was no difference in de-germing rate. Because he scrubbed hands with a brush for a specific period of time, each in turn in a series of sterile wash basins, he might have been capable of seeing differences upon counting the flora in each basin. After conducting over 80 experiments in a 9-year period, Price concluded that the largest variable in determining the rate of removal of bacteria from the hands was the vigorousness of scrubbing. Other factors, such as soap used or water temperature, were less important. In later hand sampling experiments implementing the glove juice method for recovery of microorganisms, no differences in isolation rates were seen at either 6°C (42.8°F) or 23°C (73.4°F) (12). Although this information is inconclusive and does not answer questions concerning bacterial loads suspended in a confounding soil, they tend to indicate that there may not be a very great difference in efficacy over a range of temperatures from 6°C (42.8°F) to 56°C (132.8°F).

Various menstruum have been used for handwashing efficacy studies. For studies involving transient flora, the most often used soil is tryptic soy broth (TSB). Microorganisms exhibit good survivability, with even distribution of contaminating microorganisms into skin cracks, creases and invaginations being possible. Ground beef probably represents the most appropriate menstruum because of concern for risks of *E. coli* O157:H7 infection, but is only occasionally used (30, 31). Numerous cases of food-borne illness have been tied to poor personal hygiene after ground beef preparation.

On the basis of all the information gained from the literature search and analysis, experiments

were performed to determine if there was a superior temperature or range of temperatures for removal of bacterial contamination from hands during handwashing. This involved contaminating hands with marker bacteria and washing hands with soap and water, followed by counting resident and transient (marker) bacteria. Because it was realized that both the use of antimicrobial soap and drying with paper towels would confound and alter the effects of water temperature washing and rinsing, bland soap was used and hands were not dried with paper towels.

MATERIALS AND METHODS

This study was performed at BioScience Laboratories (for resident bacteria) and Silliker Research and Laboratory Services (for transient bacteria). Table 2 provides a comparison of methods used for testing in the two laboratories.

A stable pigmented strain of *Serratia marcescens* (SLR 1421) was used to simulate transient hand contamination. This organism is used frequently used in hand disinfection studies (5, 22, 23, 24, 28).

Tryptic soy agar (TSA) and tryptone glucose yeast (TGY) agar spread plates, deionized water, sterile stripping fluid, Butterfield's phosphate buffer solution, phosphate buffer with 0.1% Triton X-100, TSB with 1% Tween and 0.3% lecithin, sterile latex-free surgical gloves, alcohol, and Ivory® liquid soap (non-antimicrobial) were used.

Subjects rinsed both hands under running tap water at the designated temperature, and shook off any excess. Three ml of Liquid Ivory® Soap was dispensed into the subjects' cupped hands and rubbed over all surfaces, including the lower third of forearms, making sure not to lose any soap. After complete soap dispersal, a small amount of tap water was added, and subjects lathered their hands and forearms vigorously for 15 s. Subjects then rinsed their hands and forearms for

10 s under running tap water maintained at a flow rate of 7.6 liters/min (2 gallons/min) at the designated temperature, after which they shook the hands two times to remove excess moisture. While still wet, the subjects' hands were gloved for sampling using the Glove Juice technique.

Glove juice sampling procedure

The effectiveness of bacterial reductions from the hands was evaluated using the glove juice recovery method as described in ASTM test methods (4). Following the prescribed wash and rinse procedure, sterile, powder-free latex gloves were donned. Seventy-five ml of Sterile Stripping Fluid (aqueous phosphate buffer with 0.1% Triton) were instilled into the glove, the wrists were secured, and attendants massaged the hands through the gloves in a uniform manner for 60 s. Aliquots of the glove juice were removed and serially diluted in Butterfield's Phosphate Buffer solution containing 1.0% Tween 80 and 0.3% Lecithin as product neutralizers.

Enumeration

For normal (resident) bacteria, duplicate spiral plates were prepared from appropriate dilutions using TSA with product neutralizers. The plates were incubated at $30^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ($86^{\circ}\text{F} \pm 2^{\circ}\text{F}$) for 48 h. Colonies were counted and the data recorded using the CASBA™ 4 plate-counting system.

For transient (*Serratia marcescens*) bacteria, Samples were spread on TGY agar following appropriate dilutions, and incubated at 35°C (95°F) for 24 to 48 h. Any pink colonies observed were considered to be *S. marcescens*, while the others were considered to be normal flora. The number of bacteria were tabulated using the following formula:

$$B = A[\sum x/n]^{10 \cdot D}$$

Where:

B = estimated number of microorganisms

A = portion volume = 75 ml (phosphate buffer added to glove)

$\sum x/n$ = average CFU per plate for each dilution level

D = dilution level

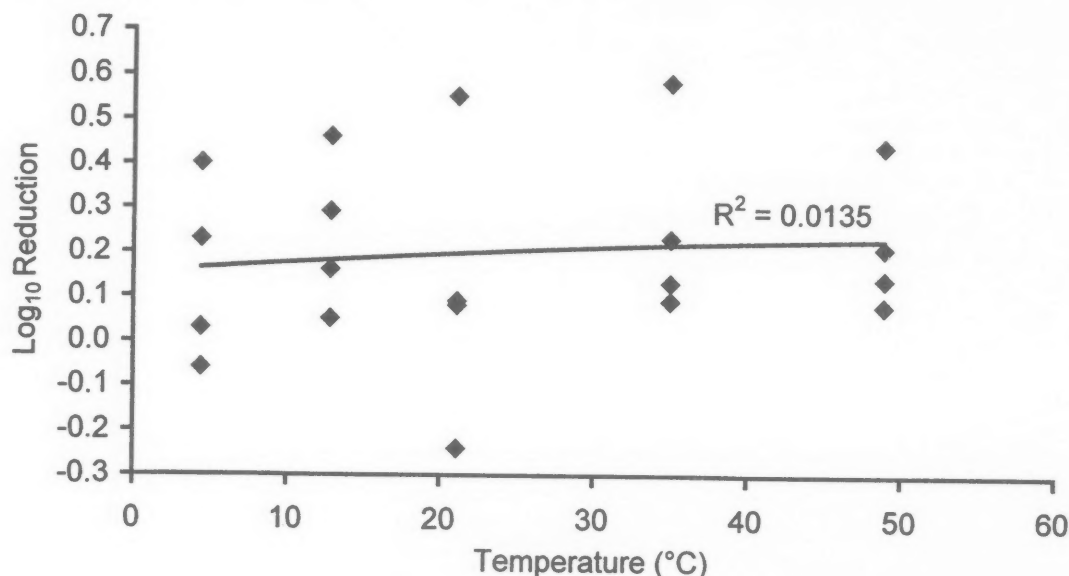
Subjects for normal (resident) flora experiment

The constant exposure of microbiology laboratory technicians to sanitizers and the necessity of disinfection provides the potential for high variability in the resident or "normal" flora and physiological condition of their hands and forearms. Working daily with various microorganisms that are not considered part of the normal (resident) skin flora (including agents used in their testing and evaluation) increases the susceptibility of these individuals to infection and skin damage. For this reason, volunteers were used to get a more accurate picture of the effects of water washing temperature on resident flora.

Between the ages of twenty-six and fifty-six four healthy subjects were selected, three females and one male. All subjects' hands and forearms were free from clinically evident dermatosis, injuries, open wounds, hangnails, or any other disorder that could compromise the subject and the study. Participation was restricted to individuals not currently using any topical or systemic antimicrobials, steroids, or other medication known to affect the resident microbial flora of the skin.

The "pre-test period, seven days prior to the testing portion of the study, was designed to generate optimum levels of resident flora for testing purposes. During this period, subjects were instructed to avoid using medicated soaps, lotions, deodorants and shampoos, as well as skin contact with solvents, detergents, acids and bases, or other

Figure 1. Handwashing efficacy (\log_{10} reduction) for resident flora in TSB and selected water washing and rinsing temperature



products known to affect the microbial population of the skin. Avoidance of UV tanning beds and swimming or bathing in biocide-treated pools or hot tubs was mandatory. During this period, subjects were supplied with a personal hygiene kit, containing non-medicated soap, shampoo, deodorant, lotion, and rubber gloves to be worn when contact with antimicrobials, solvents, detergents, acids, or bases could not be avoided. For subjects' safety, leaving the lab once the testing began was prohibited.

Testing period of normal (resident) flora

Each subject was utilized for approximately one-half hour every other day of the test period, excluding weekends and holidays (a total of ten test days per subject). Subjects were instructed to avoid washing their hands for two hours prior to testing, and fingernails were trimmed to a free-edge of less than 1 mm if not already done. All jewelry was removed from the hands and arms prior to washing.

Testing of normal (resident) flora with TSB

On each of the five test days, subjects had 1.0 ml (0.5 ml per hand) of TSB placed into their cupped hands in ten aliquots of approximately 0.1 ml. The broth was distributed evenly over both hands, not reaching above the wrists, by gentle continuous massage for 45 s. After a timed two-minute air dry, the non-dominant hand of each subject was sampled for baseline using the Glove Juice Sampling technique. Subjects washed their hands as previously described, and the other hand was then sampled using the Glove-Juice technique. These procedures were repeated each day, with the non-dominant hand being used for baseline sampling for each subject on each test day. The water temperature for the handwashes on each test day was adjusted for subjects to wash at a different temperature. Test days one through five were performed at the following water temperatures, respectively: 4.4°C (40°F), 12.8°C (55°F), 21.1°C (70°F), 35°C (95°F), and 48.9°C (120°F).

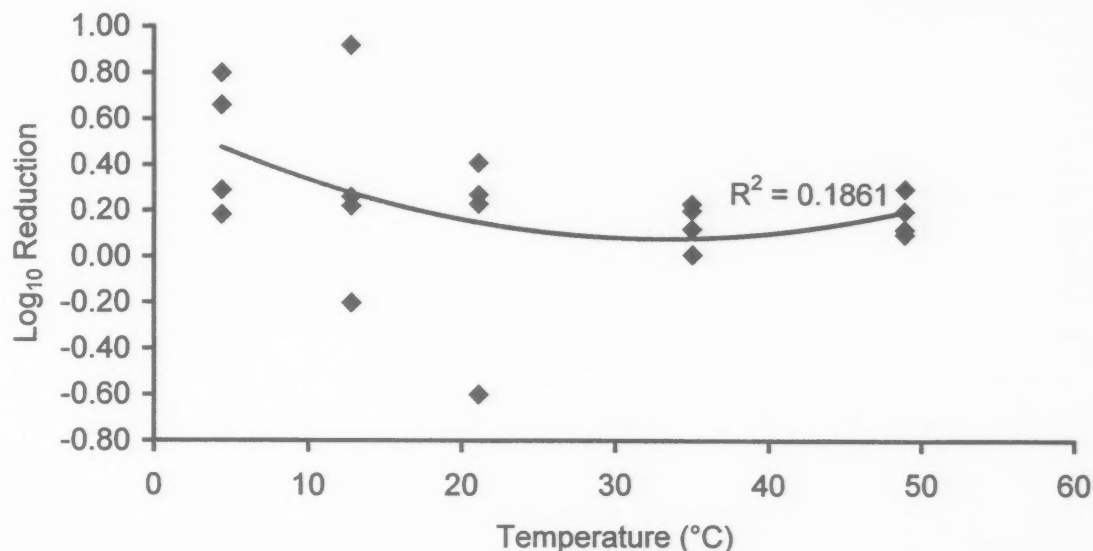
Testing of normal (resident) flora with ground beef

On each of five test days, subjects handled and smeared three grams of gamma-irradiated hamburger meat on their hands for two minutes. After a timed two-minute air dry, the non-dominant hand of each subject was sampled for baseline using the glove juice sampling technique. Subjects washed their hands as previously described, and the other hand was then sampled using the glove-juice technique. These procedures were repeated each day, with the non-dominant hand being used for baseline sampling for each subject on each test day. Wash and rinse temperatures were each day identical to those used for the resident flora with TSB testing.

Testing of transient flora with TSB and gamma-irradiated ground beef

Four laboratory workers, one female and three males, twenty-four to twenty-five years of age, were chosen for this experiment. Testing was performed over a four-week

Figure 2. Handwashing efficacy (\log_{10} reduction) for resident flora in ground beef at selected water washing and rinsing temperatures



period in order to alternate left and right hands for baseline readings for each temperature and inoculum. Testing procedures for the ground beef were identical to testing for normal (resident) flora, with the addition of 1×10^8 *S. marcescens*. Testing with TSB was similar to the tests for transient flora, with the following exceptions: the addition of 1×10^8 *S. marcescens*, a two-minute massage period of broth into the hands, and a one-minute drying period. Subjects washed their hands as previously described, with the opposing hand being used for baseline on alternate days. Hands were washed as previously described, and the glove juice technique was utilized for recovery.

Methods of analysis of normal (resident) and transient bacteria

The plate count data collected from this study were evaluated using MiniTab[®] statistical computer software. Prior to performing a statistical analysis, exploratory data analysis was performed. Stem-leaf ordering, letter value displays, and box plots were generated. Geomet-

ric mean colony counts were obtained and log or % reductions in transient and normal flora were determined from these values through comparisons to baseline counts. The experiments were analyzed for significance using statistical ANOVA software. A series of two-sample Student *t*-tests were conducted using the 0.05 significance level for Type I (α) error and corrected for multiple comparisons on means.

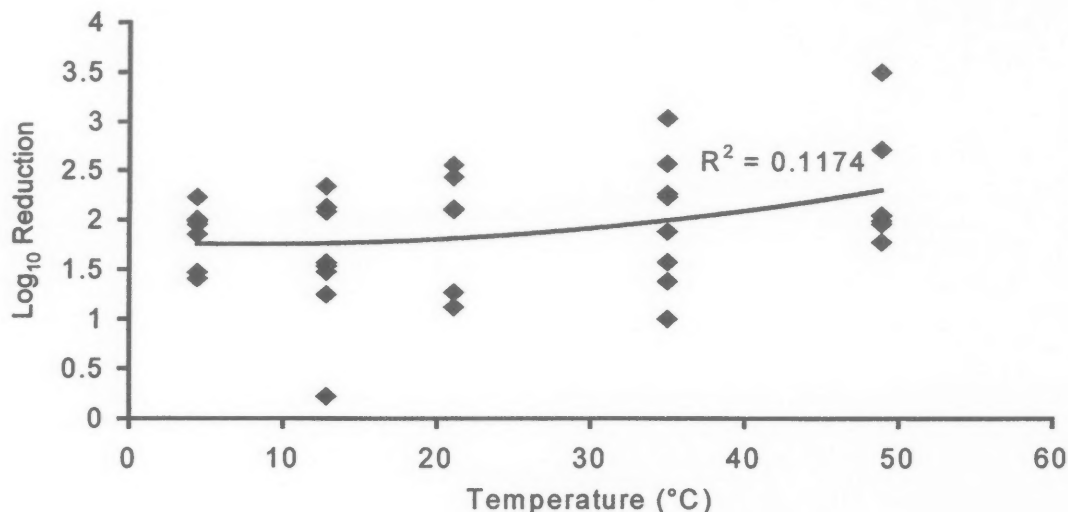
RESULTS AND DISCUSSION

Because a number of submitters at the Conference for Food Protection brought forward the issue of skin injury and possible scalding at temperature above 43°C (110°F), a review of pertinent literature was undertaken to determine if facts support lowering of the temperature for reasons other than efficacy. The Consumer Product Safety Commission has noted that residential water heater thermostat settings should be set at 49°C (120°F) to reduce the risk of the majority of tap water scald injuries. Although the majority of scalding incidents in the home oc-

cur in children under the age of five and in the elderly, third-degree burns are known to result from a 2 s exposure to 66°C (150°F), 6 s at 60°C (140°F) and 30 s at 54.4°C (130°F) (35). As we age, our skin becomes thinner, losing suppleness. This fact is important, as many seniors are now actively involved in the food industry. Due to the elder risk particularly, some have recommended that water be delivered from the tap at even lower temperatures, of less than 43°C (110°F) (33).

The activity of soaps, friction, and rinsing become crucial because the temperatures recommended in handwashing water alone would not provide thermal destruction of pathogenic microorganisms. Relevant to the discomfort issue (brought forward as issues I-23 and I-26) is a study involving dishwashing soaps. In that study, participants could withstand only water temperatures of 43°C, 45°C, and 49°C (110°F, 113°F and 120°F), with tolerance levels related to discomfort peaking at one minute (9). Even though this is considerably longer than the 10 to 25 s exposure period that would result from hand-wash-

Figure 3. Handwashing efficacy (\log_{10} reduction) for transient flora (*S. marcescens*) in ground beef at selected water washing and rinsing temperatures



ing, it is indicative of the fact that temperatures from 43°C to 49°C (110° to 120°F) are at the discomfort threshold.

Appropriate handwashing duration (15 seconds) for this study was determined through review of various governmental agency recommendations and previous handwashing study observations (1, 3, 10, 36). Suggested lathering times by specific agencies are: the 1999 FDA Food Code (20 seconds) (36), the American Society for Testing and Materials (ASTM) (15 seconds) (3), The Association for Professionals in Infection Control and Epidemiology (APIC) (minimum of 10 seconds) (10), and The American Society for Microbiology (ASM) (a 10 to 15 s vigorous scrub) (1). Several studies support a washing duration of at least 10 seconds, with sufficient transient removal efficiency achieved by 30 seconds. A study by Stiles and Sheena (32) involving workers in a meat processing facility determined that a wash of 8 to 10 s was too short for adequate soil removal from the hands. A study by Ojajarvi (21) compared a 15 s and a two-minute wash, with the latter providing only an additional 3% transient bacterial reduc-

tion. Two observational studies were reviewed in the health care and food service industries to determine average durations in the real world. A study of nurses (34) revealed an average wash time of 21 s, while a survey of restaurant employees (4) showed that the average duration was 20 s.

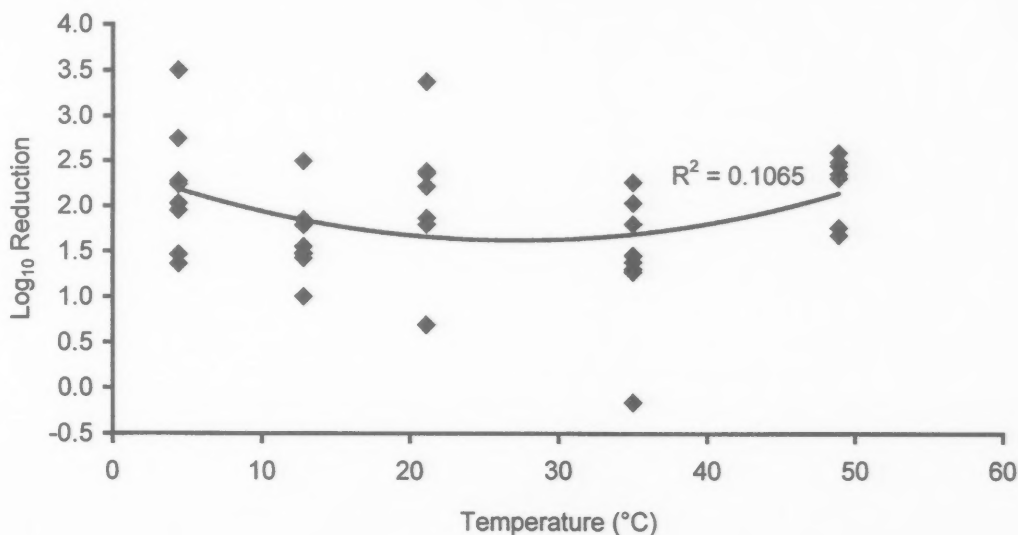
After experiments were completed, \log_{10} reductions of each individual handwashing were calculated by subtracting counts obtained after handwashing from baseline data. Statistical analysis using ANOVA, was performed, with no statistical difference seen between any set of handwashing and rinsing temperatures for normal (resident) or transient flora with either of the two contaminating soils. Figures 1 and 2 show \log_{10} reduction results for the range of temperatures used in these experiments for normal (resident) flora soiled with TSB and with gamma irradiated ground beef, respectively. Four data points are provided at each temperature and soil. Two \log_{10} reduction data points for both TSB and ground beef appear as negative for transient flora. Polynomial regression analysis was performed to display potential trends

even though no statistical significance could be shown. In respect to normal (resident) flora, although rising temperature reduction efficacy seemed to increase slightly with TSB inocula, a slight decrease in efficacy was seen with ground beef. Resident TSB and ground beef R^2 values of 0.0135 and 0.1861, respectively, provide evidence of the lack of a relationship between the two variables.

Figures 3 and 4 show \log_{10} reduction results for transient flora in TSB and gamma irradiated ground beef, respectively, at temperatures tested. Only one negative \log_{10} reduction figure was observed. While polynomial regression showed a slight increase in efficacy with increasing temperature for ground beef inoculum, both high 48.9°C (120°F) and low 4.4°C (40°F) temperatures tended to have higher \log_{10} reductions than the mid temperatures tested. Again, TSB and ground beef R^2 values of 0.1065 and 0.1174, respectively, provide evidence of a lack of relationship between the two variables.

The geometric mean \log_{10} reduction for all transient flora experiments involving both TSB and ground beef inocula was 1.9,

Figure 4. Handwashing efficacy (\log_{10} reduction) for transient flora (*S. marcescens*) in TSB at selected water washing and rinsing temperatures



whereas the resident flora \log_{10} reduction was 0.2 for both menstruum. These \log_{10} reduction figures are in agreement with results from other similarly performed studies of both resident (6, 19) and transient flora (2, 7, 26).

A comparison of \log_{10} reduction variability (as seen in Fig. 1-4) was reviewed for trends that could indicate increased or decreased variability with certain temperatures under specific inoculum conditions. Coefficient of variation values for each temperature group for both resident and transient flora as well as both menstruum were determined by obtaining the ratio of the standard deviations of each group to the mean \log_{10} reductions. Figure 5 shows the coefficient of variation (expressed in percent) for each testing condition. Coefficients of variation are fairly consistent for transient flora, with resident flora data exhibiting a great deal of variation. Overall, there appeared to be a slightly lower variation in \log_{10} reduction figures for the 48.9°C (120°F) temperature over the 35°C (95°F) group. Variability data from the 4.4°C (40°F) and 12.8°C (55°F) groups were similarly low, with variability for temperature

ranges peaking at 21.1°C (70°F). Subjects freely commented that the water at a temperature of 4.4°C (40°F) was uncomfortable. In issues brought before the CFP, temperatures at or above 43°C (110°F) were argued to be uncomfortable. Taken together with the variability noted, it suggests that participants more consistently wash their hands when water temperatures are between 35°C (95°F) and 48.9°C (120°F).

Friction has been identified as a key element in removing microbial contaminants from hands (11, 27). Friction applied during the hand drying process is instrumental in finishing the process. Removal of transient flora appears to be even more friction dependent than removal of resident flora. Surfactant and antimicrobial compounds in soap are responsible for lifting soil and killing microorganisms suspended in the soil. When bland soap is used to wash hands, handwashing efficacy appears to be dependent on the effects of surfactant action of the soap along with friction applied during the washing and rinsing process. Rinsing also provides the necessary removal by dilution. To facilitate appropriate rinsing of the hands, some personal

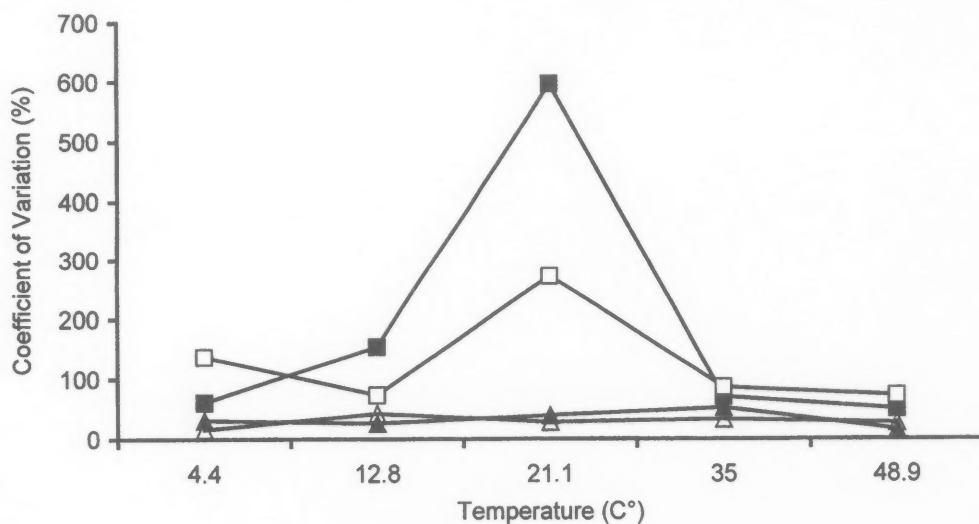
hygiene consultants have suggested the practice of using thicker, higher-viscosity soaps in larger doses, which would require a longer, more vigorous rinsing routine.

Price (27), upon noticing that in his scrubbing experiments water temperature had little effect at de-germing of the skin, commented that water applied to the skin at a given temperature quickly reaches equilibrium with normal skin surface temperature unless hands are totally immersed.

Skin oils derived from sebum are liquid in the sebaceous gland and solidify on the skin surface. Beef tallow melts in the range of 35°C to 40°C (95°F to 104°F), while lard or butterfat are liquefied at temperatures around 30°C (86°F) (15). If handwashing efficacy for both resident and transient floras embedded in both natural and artificially applied fats depended on thermal melting, then \log_{10} reduction figures should have been greatest at the highest temperature and least at temperatures that cause these fats to congeal.

Fats such as tallow or lard are distinguished from oils in that oils are liquids at room temperature.

Figure 5. Coefficient of variation values (%) for handwashing \log_{10} reduction of resident and transient flora with TSB and ground beef soils. Resident flora ground beef -■-, resident flora TSB -□-, transient flora TSB -▲-, transient flora ground beef -△-



Hand soap formulations are designed to lift soil through their foaming action, dispersing and solubilizing organic soils using detergent surfactants. Primary micelles are present, having hydrophilic and hydrophobic groups attached to the ends of the surfactant monomer. Soaps with multiple surfactants form mixed micelles, which increases efficiency with various soil mixtures. In water and organic soil mixtures, these form complex micelle structures around hydrocarbon moieties (encapsulation), resulting in microemulsions. Thus, the soap provides a "bridge" between the oily droplet and water, permitting the soapy water to "wash away" greasy material.

Price (27) described the contradictory aspect of soap, which tends to reduce surface friction. Soaps of his day were not the more developed formulas now available and used in this experiment. In the experiments described here, a 3-ml aliquot of bland soap was used to remove a total of one gram of TSB or three grams of ground beef. Use of lower quantities of soap would obviously provide lower surfactant effectiveness. The quantity of soap used for handwashing has the abil-

ity to affect handwashing efficacy, as shown by Larson (14). Several studies (13, 16, 17, 18, 19, 21, 25, 29, 31) have used soap amounts in the range of 2.5 to 5.0 ml in their handwashing protocol. The higher levels are considered excessive, except in hospital infection control. Many food service operations set soap dispensers at 1 ml per pump, and employees often times use multiple pumps. As the experiments described here utilized 1.5 grams ground beef menstruum per hand, 3 ml of soap was chosen to represent an amount found to be significantly effective in an earlier study (14). In that study, it was determined that 3-ml of soap provided greater bacterial reductions than did 1 ml for a liquid, nonantimicrobial soap. Observations of soap usage by health care employees in the hospital setting were also performed, as nine different departments, from labor and delivery to psychology, determined average soap use to be around 2.18 ml per incidence, compared to 3.5 by the general population (14).

Surfactants in soap have surface tension lowering capabilities. The vigorous rubbing action of hands creates a rapid formation of surfaces and changing pressure gra-

dients, which develop and increase micelle formation. The combined action of soap, friction and dilution appears to outweigh any advantage that temperature might have in the liquefying of fats, which would normally occur in the range of 30°C to 40°C (86°F to 104°F).

Many antimicrobials are inactivated by the presence of organic soils or soaps. Several writers have suggested that these antimicrobial ingredients present in soaps are not in contact with microorganisms long enough to provide sufficient antimicrobial action. Of the commonly used antimicrobial ingredients employed in soap products, only iodophors have been shown to exhibit temperature-dependent antimicrobial effects due to temperature-dependent dissociation constants for PVP and iodine present in the formulation. For these reasons, even if antimicrobial agents were present in soap, it is doubtful that water temperature would have a significant effect on overall hygienic efficiency. It should also be noted that under real-life conditions, hands would be dried (usually with paper towels) and that further bacterial reductions in the range of 1 \log_{10} are seen, reducing any slight difference in efficacy with antimicrobial soaps.

ACKNOWLEDGMENTS

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International Association for
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Award Nominations

The International Association for Food Protection welcomes your nominations for our Association Awards. We encourage both Members and nonmembers to nominate deserving professionals. To request nomination criteria, contact:

International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2863
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
Web site: www.foodprotection.org
E-mail: info@foodprotection.org

Nominations deadline is February 18, 2002. You may make multiple nominations. All nominations must be received at the IAFP office by February 18, 2002.

- ◆ 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 IAFP 2002 - the Association's 89th Annual Meeting in San Diego, California on July 3, 2002.

Fred Weber, Awards Committee Chairperson



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.

Fellow Award – Distinguished Plaque

Presented to Member(s) who have contributed to IAFP and its Affiliates with quiet distinction over an extended period of time.

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.

Sanitarian Award – Plaque and \$1,000 Honorarium

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.

International Leadership Award – Plaque, \$1,000 Honorarium and Reimbursement to Attend IAFP 2002

Presented to an individual for dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

Sponsored by Kraft Foods.

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.

Criteria available at www.foodprotection.org





Call for Abstracts

IAFP 2002

The Association's 89th Annual Meeting

June 30–July 3, 2002

San Diego, California

General Information

1. Complete the Abstract Submission Form.
2. All presenters must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
3. There is no limit on the number of abstracts registrants may submit. However, the presenter must present their presentations.
4. Accepted abstracts will be published in the Program and Abstract Book. Editorial changes will be made to accepted abstracts at the discretion of the Program Committee.
5. Photocopies of the abstract form may be used.
6. Membership in the Association is not required for presenting a paper at IAFP 2002 – the Association's 89th Annual Meeting.

Presentation Format

1. Technical – Oral presentations will be scheduled with a maximum of 15 minutes, including a two to four minute discussion. LCD and 35-mm slide projectors will be available. Other equipment may be used at the presenter's expense. Prior authorization from the office must be obtained. Overhead projectors will not be allowed.
2. Poster – Freestanding boards will be provided for presenting posters. Handouts may be used, but audiovisual equipment will not be available. The presenter will be responsible for bringing pins and velcro.

Instructions for Preparing Abstracts

1. Title – The title should be short but descriptive. The first letter in each word in the title and proper nouns should be capitalized.
2. Authors – List all authors using the following style: first name followed by the sur name.
3. Presenter Name & Title – List the full name and title of the person who will present the paper.
4. Presenter Address – List the name of the department, institution and full postal address (including zip/postal code and country).
5. Phone Number – List the phone number, including area, country, and city codes of the presenter.
6. Fax Number – List the fax number, including area, country, and city codes of the presenter.
7. E-mail – List the E-mail address for the presenter.
8. Format preferred – Check the box to indicate oral or poster format. The Program Committee makes the final decision on the format of the abstract.
9. Developing Scientist Awards Competitions – Check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head. See "Call for Entrants in the Developing Scientist Awards Competitions."
10. Abstract – 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.

Abstract Submission

Abstracts submitted for IAFP 2002 – the Association's 89th Annual Meeting in San Diego, California, June 30–July 3, 2002 will be evaluated for acceptance by the Program Committee. Please be sure to follow format instructions above carefully; failure to do so may result in rejection. Information in the abstract data must not have been previously published in a copyrighted journal.

Submit your abstract to the office. Abstracts must be received no later than January 7, 2002.

Return the completed abstract form through one of the following methods:

1. Regular mail: Abstracts may be sent by post or express courier along with a disk copy (text or MS Word™ format) to the following address:
Abstract Submission
International Association for Food Protection
6200 Aurora Avenue, Suite 200W
Des Moines, Iowa 50322-2863, USA
2. E-mail: Submit via E-mail as an attached text or MS Word™ document to abstracts@foodprotection.org.
3. Online: Use the online abstract submission form located at www.foodprotection.org.

Selection Criteria

1. Abstracts must accurately and briefly describe:
 - (a) the problem studied and/or objectives;
 - (b) methodology;
 - (c) essential results; and
 - (d) conclusions and/or significant implications.
2. Abstracts must report the results of original research pertinent to the subject matter. 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/control; mastitis; environmental health; waste management and water quality. Papers may also report subject matter of an educational and or nontechnical nature.
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. Papers should not appear in print prior to the Annual Meeting.
5. Results should be summarized. Do not use tables or graphs.

Rejection Reasons

1. Abstract was not prepared according to the "Instruction for Preparing Abstracts."
2. Abstract does not contain essential elements as described in "Selection Criteria."
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 and/or data are not presented. Indication that data will be presented is not acceptable.
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 International Association for Food Protection Policy on Commercialism.

Projected Deadlines/Notification

Abstract Submission Deadline: January 7, 2002.

Acceptance/Rejection Notification: March 1, 2002.

Contact Information

Questions regarding abstract submission can be directed to Bev Corron, 515.276.3344 or 800.369.6337; E-mail: bcorron@foodprotection.org.

Program Chairperson

Frank Yiannas
Walt Disney World
P.O. Box 10000
Lake Buena Vista, FL 32830
Phone: 407.397.6622
Fax: 407.397.6630
E-mail: frank.yiannas@disney.com

Abstract Form

DEADLINE: Must be Received by January 7, 2002

(1) Title of Paper _____

(2) Authors _____

(3) Full Name and Title of Presenter _____

(4) Institution and Address of Presenter _____

(5) Phone Number: _____

(6) Fax Number: _____

(7) E-mail: _____

(8) Format preferred: Oral Poster No Preference

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

(9) Developing Scientist Awards Competitions Yes Graduation date: _____

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

(10) 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 International Association for Food Protection Foundation

The International Association for Food Protection 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 oral or poster competition.

Purpose

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

Presentation Format

Oral Competition – The Developing Scientist Oral Awards Competition is open to graduate students enrolled or recent graduates from M.S. or Ph.D. programs or undergraduate students at accredited universities or colleges. Presentations are limited to 15 minutes, which includes two to four minutes for discussion.

Poster Competition – The Developing Scientist Poster Awards Competition is open to students enrolled or recent graduates from undergraduate or graduate programs at accredited universities or colleges. The presenter must be present to answer questions for a specified time (approximately two hours) during the assigned session. Specific requirements for presentations will be provided at a later date.

General Information

1. Competition entrants cannot have graduated more than a year prior to the deadline for submitting abstracts.
2. Accredited universities or colleges must deal with environmental, food or dairy sanitation, protection or safety research.
3. The work must represent original research completed and presented by the entrant.
4. Entrants may enter only one paper in either the oral or poster competition.
5. All entrants must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
6. Acceptance of your abstract for presentation is independent of acceptance as a competition finalist. Competition entrants who are chosen as finalists will be notified of their status by the chairperson by June 3, 2002.

7. All entrants with accepted abstracts will receive complimentary, one-year Association Membership, which includes their choice of *Dairy*, *Food and Environmental Sanitation* or *Journal of Food Protection*.
8. In addition to adhering to the instruction in the "Call for Abstracts," competition entrants must check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head.

Judging Criteria

A panel of judges will evaluate abstracts and presentations. Selection of up to five finalists for each competition will be based on evaluations of the abstracts and the scientific quality of the work. All entrants will be advised of the results by June 3, 2002.

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

Judging criteria will be based on the following:

1. Abstract – clarity, comprehensiveness and conciseness.
2. Scientific Quality – Adequacy of experimental design (methodology, replication, controls), extent to which objectives were met, difficulty and thoroughness of research, validity of conclusions based upon data, technical merit and contribution to science.
3. Presentation – Organization (clarity of introduction, objectives, methods, results and conclusions), quality of visuals, quality and poise of presentation, answering questions, and knowledge of subject.

Finalists

Awards will be presented at the International Association for Food Protection Annual Meeting Awards Banquet to the top three presenters (first, second and third places) in both the oral and poster competitions. All finalists will receive a complimentary Awards Banquet ticket and are expected to be present at the banquet where the awards winners will be announced and recognized.

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 Membership including *Dairy*, *Food and Environmental Sanitation* and *Journal of Food Protection*.

Policy on Commercialism

for Annual Meeting Presentations

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 convener, 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 convener, 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 goods or services must not be the focal point of the slide. Names or logos may be shown on each slide so long as they are not distracting from the overall presentation.

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 author's 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 author's 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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Mail all correspondence to:
 Karen Crawford
 Tuscaloosa County Health Dept.
 P.O. Box 70190
 Tuscaloosa, AL 35407
 205.554.4546
 E-mail: pcrawfor@adph.state.al.us

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Mail all correspondence to:
 Lynn M. McMullen
 University of Alberta
 Dept. of Ag., Food and Nutritional Science
 4-10 Ag. For. Center
 Edmonton, Alberta T6G 2P5 Canada
 780.429.6015
 E-mail: lynn.mcmullen@ualberta.ca

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Mail all correspondence to:
 Clive Kingsbury
 J. M. Schneider
 5523 - 176th St.
 Surrey, BC V3S 4C2 Canada
 604.576.1191 ext. 3740
 E-mail: ckingsbury@home.com

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Mail all correspondence to:
 John C. Bruhn
 Dairy Research and Information Center
 University of California-Davis
 Food Science and Technology
 One Shields Ave.
 Davis, CA 95616-8598
 530.752.2192
 E-mail: jcb Bruhn@ucdavis.edu

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Mail all correspondence to:
 Brett W. Podoski
 FDA-CFSAN
 200 C St., SW
 Washington, D.C. 20204
 202.401.2377
 E-mail: brett.podoski@cfsan.fda.gov

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Mail all correspondence to:
 Beth M. Johnson
 S.C. DHEC Bur. of Labs
 2809 Knightbridge Road
 Columbia, SC 29223-2126
 803.896.0872
 E-mail: johnsoem@columb68.dhec.state.sc.us

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Mail all correspondence to:
 Kevin Gallagher
 Dept. Consumer Protection (Food Div.)
 State Office Bldg., Rm #167
 165 Capitol Ave.
 Hartford, CT 06106
 860.713.6186

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Mail all correspondence to:

Frank Yiannas
Environmental Health
Walt Disney World
P.O. Box 10,000
Lake Buena Vista, FL 32830-1000
407.397.6060
E-mail: frank_yiannas@wda.disney.com

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Mail all correspondence to:

Robert W. Brooks
Woodson-Tenent Laboratories
2035 Atlas Circle
Gainesville, GA 30501
770.536.5909
E-mail: roherthrooks3@compuserve.com

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Mail all correspondence to:

Frank Isenberg
Bureau of Env. Health and Safety
P.O. Box 83720
Boise, ID 83720-0036
208.334.5947
E-mail: isenberg@idhw.state.id.us

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Mail all correspondence to:

Pat Callahan
Prairie Farms
1100 N. Broadway
Carlinville, IL 62626
217.854.2547
E-mail: cvsales@prairiefarms.com

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Helene Uhlman
Hammond Health Dept.
649 Conkey St., East
Hammond, IN 46324-1101
219.853.6358

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Mail all correspondence to:

Monica Streicher
1660 Pleasant Court Dr.
Sheldon, IA 51201
712.324.0163
E-mail: streichm@rconnect.com

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316.283.1637

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Mail all correspondence to:

David Burton
Barren River Health Dept.
P.O. Box 1157
Bowling Green, KY 42102
270.781.8039 ext. 116
E-mail: davidr.burton@mail.state.ky.us

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Mail all correspondence to:
 Deog Hwan Oh
 Division of Food and Biotechnology
 College of Agriculture and Life Sciences
 Kangwon National University
 192-1, Hyoja 2 Dong
 Chunchon, Kangwondo 200-701, Korea
 82.361.250.6457
 E-mail: deoghwa@cc.kangwon.ac.kr

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Mail all correspondence to:
 Barbara A. Kulig
 Town of West Springfield
 Municipal Office Bldg.
 26 Central St.
 West Springfield, MA 01089
 413.263.3204

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Mail all correspondence to:
 Carol Schwar
 Warren County Health Dept.
 319 W. Washington Ave.
 Washington, NJ 07882
 908.689.6693
 E-mail: warrenhd@nac.net

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Mail all correspondence to:
 Alejandro Castillo
 University of Guadalajara
 Monte Alban 1347
 Guadalajara, Jal. 44340 Mexico
 52.3.619.8158 ext. 16
 E-mail: acastillo@cucci.udg.mx

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Mail all correspondence to:
 Lori Simon
 Ingham Co. Health Dept.
 5303 S. Cedar, P.O. Box 30161
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Mail all correspondence to:
 Linda E. Wilson
 Springfield/Greene Co. Health Dept.
 227 E. Chestnut Expressway
 Springfield, MO 65802-3847
 417.864.1661
 E-mail: linda_wilson@ci.springfield.mo.us

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Mail all correspondence to:
 Tom Tieso
 Nebraska Dept. of Agriculture
 3703 S. 14th
 Lincoln, NE 68502
 402.471.2176
 E-mail: tomlt@agr.state.ne.us

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c/o Cornell University
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E-mail: jgg3@cornell.edu

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Debra Larson
Division of Food and Lodging
ND Dept. of Health
600 E. Boulevard Ave., Dept. 301
Bismarck, ND 58505-0200
701.328.6150
E-mail: djlarson@state.nd.us

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Donald Barrett
Ohio Health Dept.
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Canal Winchester, OH 43110
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Glenna Haller
Ontario Food Protection Association
28-380 Eramosa Road, Suite 279
Guelph, Ontario N1E 7E1 Canada
519.823.8015
E-mail: ofpa-info@worldchat.com

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Mail all correspondence to:

Eugene R. Frey
Land O'Lakes, Inc.
307 Pin Oak Place
Lancaster, PA 17602-3469
717.397.0719
E-mail: efrey@landolakes.com

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Marie-Claude Lamontagne
Charcuterie Roy
254 Rue Principale
St. Anselme, Quebec G0R 2N0
E-mail: mlamonta@jms.ca

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Mail all correspondence to:

Gary J. Van Voorst
South Dakota Environmental Health Association
132 N. Dakota Ave.
Sioux Falls, SD 57104
605.367.8787
E-mail: gvanvoorst@sioux-falls.org

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Mail all correspondence to:

Ann Draughon
University of Tennessee
105 Food Safety & Processing Bldg.
P.O. Box 1071
Knoxville, TN 37901-1071
865.974.7425
E-mail: draughon@utk.edu

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Mail all correspondence to:

Ron Richter

Texas A & M University

Dept. of Animal Science

2471 TAMU

College Station, TX 77843-2471

979.845.4409

E-mail: rlr8942@acs.tamu.edu

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Delegate, Jack Ulrich Litchfield

Mail all correspondence to:

Paul Nierman

Dairy Quality Control Institute

5205 Quincy St.

Mounds View, MN 55112-1400

763.785.0484

E-mail: paul@dqci.com

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Mail all correspondence to:

Mary Jane Wolfinger

17066 Tyson's Center Road

Orange, VA 22960

540.854.6208

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Pres., Michael Nygaard Issaquah
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Past Pres., Paul Nelson Seattle
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Delegate, Stephanie Olmsted Seattle

Mail all correspondence to:

William Brewer

12509 10th Ave., NW

Seattle, WA 98177-4309

206.363.5411

E-mail: billbrewer1@juno.com

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Mail all correspondence to:

Randall Daggs

State of Wisconsin

6699 Prairie View Dr.

Sun Prairie, WI 53590-9430

608.266.9376

E-mail: daggsra@dhfs.state.wi.us

WYOMING ENVIRONMENTAL HEALTH ASSOCIATION

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Mail all correspondence to:

Sherry Maston

208 Washington Road

Wheatland, WY 82201

307.322.9671

E-mail: smasto@state.wy.us

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Updates

Safe Foods Corporation Names Governor's Cabinet Member as New Executive Officer

Safe Foods Corporation has announced the appointment of Rush Deacon as executive vice president for strategic initiatives and corporate affairs. Deacon will join the executive team of this Arkansas-based company that owns the exclusive worldwide patent rights to a much anticipated new antimicrobial food safety technology. He will assume his responsibilities in late December.

Since July 1997, Deacon has served in Arkansas' Governor Mike Huckabee's administration as president of the Arkansas Development Finance Authority. A licensed attorney and certified public accountant, Deacon will be responsible for the company's strategic alliances, acquisitions, and partnerships. He will manage the company's domestic and international intellectual properties and regulatory issues and will co-lead the development of the company's international markets.

Deacon earned B.S.B.A. and J.D. degrees from the University of Arkansas at Fayetteville and an L.L.M. in Taxation from Southern Methodist University Law School. He has experience in the private practice of corporate law, as a tax accountant with an international accounting firm, in banking and investment banking, and as chief financial officer of an international trading company.

Silliker Names Gregro New PA Lab Director

Silliker Laboratories recently announced the appointment of Susan Gregro as laboratory director of its testing facility in Sinking Spring, PA. She is responsible for managing scientific operations, quality systems, and staff to provide accurate, timely services to food and feed companies in Virginia, Maryland, Delaware, western New York, and Pennsylvania.

Prior to her appointment, Gregro served as senior account manager and technical sales manager (northeast region) for Silliker Laboratories Group, Inc. A member of the Silliker organization since 1997, she previously served as a national sales representative for the Mushroom Canning Company and quality control manager at Dutch Masters Meats. Susan holds a bachelor's degree in environmental science from Kutztown State University.

FoodHandler Inc. Names Chief Financial Officer and Marketing Vice President

Richard M. Richer, CCM has been named VP/CFO of FoodHandler Inc. He brings over 25 years of finance and operations experience to FoodHandler. Prior to Hirsch, he was VP/COO/CFO of the Sartorius North America Inc., group of Sartorius AG. In that role he also served as president of the firm's filter production and distribution subsidiaries in Puerto Rico and Canada, and was operating head of the stainless steel fabrication unit in

California. Sartorius' scientific products are marketed primarily to the pharmaceutical and biotech industries. His extensive experience also includes over eight years at Seagram's Tropicana Dole Beverages subsidiary, where he most recently was director of finance for the US domestic direct store delivery and dairy distribution channels. Earlier assignments included financial roles at United Technologies and McKesson Food Products Division and marketing and sales roles at American Brands.

David Keeffe has joined FoodHandler Inc. in the newly created position of vice president of marketing. A foodservice industry veteran with more than 20 years in the business, he will oversee all marketing and brand-building activities.

Recently, Keeffe was senior director of category marketing at Kraft's Foodservice Division, where he was responsible for brand management of Kraft/Nabisco products. He will spearhead product development, category management initiatives and channel marketing strategies, and will assist in identifying and integrating acquisitions.

Prior to his recent position at Kraft, Keeffe served as the category director for Kraft's meats and desserts. He held progressively responsible positions, including category director for the Philadelphia cream cheese, Breyers yogurt and Polly-O dairy products at various times. A Saint Lawrence University graduate with a degree in economics, Keeffe earned his MBA from Michigan State University in 1980.

Larry Beuchat Retires as JFP Scientific Editor

Dr. Larry Beuchat will retire his position as Scientific Editor for the *Journal of Food Protection (JFP)*



Dr. Larry Beuchat

effective 12/31/01. He has served as Scientific Co-Editor since 1994.

During his term of office, he saw

the journal expand its scientific scope, widen its international author base, and more than double the number of manuscripts submitted for publication. Dr. Beuchat has served on the *JFP* Editorial Board since 1977 and has been a Member of the International Association for Food Protection since 1971.

It would not be possible to publish the high quality papers that appear in *JFP* if it were not for the unselfish service of the Scientific Editors. Dr. Beuchat had a large responsibility to keep the review process moving smoothly so there is an even flow of papers for publication. There are pressures above his own workloads that must be incorporated as part of the daily routine. The Association and the Journal are indebted to Larry for his dedication and service as Co-Editor.

Dr. Joe Frank and Dr. P. Michael Davidson have been selected to join Dr. John Sofos as Scientific Co-Editors of the *Journal of Food Protection*. The addition of a third scientific editor was to facilitate the increase in manuscript submissions and the need to develop a system to speed the flow of manuscripts through the publication process. Dr. Beuchat will continue his position at the University of Georgia in Griffin, GA.



New Notification Program Provides Electronic Updates on Meat, Poultry, and Egg Product Testing Samples

The US Department of Agriculture's Food Safety and Inspection Service has launched a new notification system that will provide electronic status reports on testing samples taken from meat, poultry, and egg product establishments. The Laboratory Electronic Application for Results Notification (LEARN) system will allow FSIS field personnel, agency staff, establishments, and state officials, to electronically monitor information on species identification, food chemistry, microbiological samples, and completed *Salmonella*/HACCP sets.

After a pilot test in several FSIS districts, LEARN, as the program is known, is now online across the country. LEARN is an automated process to track each sample as it is received, analyzed, and the results are reported. The reports state whether a microbiological test such as *Listeria monocytogenes* in ready-to-eat meat and poultry products or *E. coli* O157:H7 in raw ground beef products initially indicates the presence of a pathogen. When confirmation testing on a poten-

tial or presumptive positive is complete, a report with the final analysis is posted.

LEARN replaces the notification system that used a combination of phone calls, fax, and multiple computer applications to inform field personnel and establishments of test results. LEARN combines the previous delivery methods into one application to provide faster, more up-to-date information while using fewer agency resources. "The agency has incorporated suggestions from FSIS field personnel and industry in developing this program. LEARN provides increased feedback to both inspectors and establishments on the status of samples from the time they are received at the laboratories until the analysis is complete," said Thomas J. Billy, FSIS administrator.

Sample status information will be automatically updated several times each day. Establishments and state officials will receive updated E-mail reports for individual samples. Agency personnel can access the information through an FSIS intranet site. Once logged on to the FSIS server, staff can check on samples from individual establishments or view circuit, district, and management summaries of results. FSIS personnel will also be able to access information on residue samples through LEARN.

The system has safeguards in place to ensure that only authorized officials will have access to the information. Establishment officials receive results only from their plant and state officials receive results only for establishments within their state. Each sample is identified with a collection date, the plant's establishment number, and a corresponding form number. At the laboratories, each sample is marked with a lab code and assigned a unique internal lab number.

FSIS is responsible for ensuring that meat, poultry, and egg products are safe, wholesome, and correctly labeled. As part of that responsibility, FSIS conducts verification sample testing to monitor microbiological, chemical, and other types of contamination.

Salmonella Enteritidis Outbreak among Norwegian Tourists Returning from Crete and Karpathos

Norway's Statens institutt for folkehelse (National Institute of Public Health, NIPH) has recently noticed an unusually high number of cases infected with *Salmonella* Enteritidis after a stay in Crete or Karpathos. The national reference laboratory for enteropathogens at NIPH has noticed a particular cluster of cases infected with *Salmonella* Enteritidis. An unusual property of the strain isolated from these patients is that it does not produce gas when fermenting glucose.

The phage type is 14b or variant 14b (typing has been performed on only 11 isolates so far). By September 24, 37 cases returning from holidays in Crete and six from Karpathos, island east of Crete, were reported to NIPH. Twenty-seven of the tourists from Crete stayed in the Chania district, on the west of the island. The median age of cases was 31 years, with an equal number of male and female cases. All cases had symptoms of gastroenteritis. The onset of symptoms in the first case was July 24, but cases are still occurring.

NIPH is currently conducting an investigation of this suspected outbreak. The source of infection has not yet been identified. The institute has established contacts with the public health authorities in Greece and with the Internet surveillance hub.

New Food Allergy Training Program Available for Restaurant-and-Food Service Professionals

More than seven million Americans suffer from some type of food allergy, causing them to be mindful of their food choices when cooking at home or dining at restaurants. The Food Allergy & Anaphylaxis Network (FAAN), in cooperation with the National Restaurant Association (NRA), has released the Food Allergy Training Program for Restaurants and Food Services providing restaurant-and-food service staff vital information on food allergies and how to handle potential situations.

As the restaurant-and-foodservice industry is considered the industry of choice, it is not an uncommon practice for restaurants to provide consumers options so they may customize menu items or alter food preparation methods. This is particularly evident when accommodating customers to meet their lifestyles, tastes and needs, and any health restrictions, which includes food allergies. "A lot of customers have a lot of different requests. It could be a diet, it could be allergies. The one you take most seriously as a chef is allergies," says Marcus Samuelsson, chef and co-owner of Aquavit restaurant in New York City.

In an effort to educate and train restaurant and foodservice professionals regarding the complexities of food allergies, FAAN and the NRA compiled the Food Allergy Training Program, a two-part set with video and manual (Spanish and English versions available), which contains information for "front of the house" and "back of the house" staff. In addition to providing important allergy information, the video offers clear visual scenarios

illustrating strategies for handling food-allergic customers from the moment they review the menu, place their order, and receive their food. There are several how-to demonstrations in food preparation and service and a section on what to do in an emergency situation.

NFPA Supports Single Food Policy, Not Single Food Agency

The current regulatory system governing food safety is sufficient to meet new challenges facing the United States food supply and can be improved through stronger communication and coordination among the responsible agencies, according to testimony delivered by NFPA President and CEO John R. Cady before the Senate Government Affairs Subcommittee for Government Management, Restructuring and the District of Columbia. "Our current food safety system not only works, but works well. There continues to be strong evidence that America's food safety regulatory system ensures that the food products that consumers purchase in their neighborhood grocery stores, or that are delivered to their local restaurants are safe," Cady said. Cady cited data from the Centers for Disease Control and Prevention that show a decreasing trend across the United States in illness due to nine common food pathogens. NFPA does not see value in terms of increased efficiency or effectiveness in forming a single national food safety agency, as some lawmakers have proposed. "We are not convinced that a new layer of management, led by a single administrator, would achieve the goal of enhanced US food safety," Cady said. "NFPA believes that the way to achieve such improvements is through the creation of a unified food safety policy, drawing on the best

expertise throughout various departments and agencies. This means a truly science- and risk-based policy and system with uniform requirements to ensure that the same food safety guidelines will be followed and enforced," Cady said.

A unified policy is needed to provide cohesion and promote the sharing of technology, information and resources to better ensure food safety. "It is important that any actions we take regarding food regulation neither lessen public confidence in food safety nor compromise the effectiveness of our existing programs. This is especially true in light of the tragic events of September 11th," Cady said. In his testimony, Cady described NFPA's role in helping to launch the Alliance for Food Security, the food industry's effort to coordinate and communicate with federal agencies to ensure all potential threats to the US food safety system are addressed and minimized. "Americans deserve to know that the food industry and federal agencies have long fought to ensure that our products present minimal risk from contamination," he said. "We recognize that the food safety system is not perfect. We have long advocated for more resources for the Food and Drug Administration to ensure it can perform its core mission. In particular, FDA's information tracking system for imported foods, called OASIS, needs to be updated. More research to develop better sampling and testing techniques is needed to get a more rapid response. We understand that the Bush Administration is advocating more inspectors at our borders and ports to make sure that nothing slips through," Cady said. "Given the vast powers that the FDA already has over imported foods, we don't believe, however that

additional authorities, at this time, are necessary. Any emergency regulatory actions taken during this period of crisis must have sunset provisions," Cady added.

Salmonella stanley and Salmonella newport in Imported Peanuts

Following an international outbreak of *Salmonella stanley* associated with consumption of a specific brand of imported peanuts in Australia and Canada, a request for information was sent via Internet on October 8, 2001 to ascertain whether any other countries had any cases that may be associated with this product. To date, seven cases have been identified in Australia and Canada; no other countries have reported cases associated with this product. *S. stanley* has been isolated from an unopened packet of this product in Australia, whereas in Canada both *S. stanley* and *S. newport* have been isolated from unopened packets. The peanuts originate from and are produced in China, and are distributed via Singapore. If found in the United Kingdom these peanuts are more likely to be sold through specialist stores.

At the request of the Food Standards Agency (FSA), local sampling was undertaken by the Public Health Laboratory Service (PHLS) and environmental health departments of local authorities in London and the north west to determine whether any of these imported peanuts, on sale, are contaminated with *Salmonella* spp. To date, three samples of garlic flavored in-shell peanuts from the same batch with a best before date of June 28, 2003 have been found positive for *S. newport* or *S. stanley* by the PHLS London Food, Water and Environmental Laboratory and Preston

PHL. A further two samples of the same product and batch have been found positive for *Salmonella* spp. by Chester PHL. Molecular typing of these food isolates together with recent human isolates is in progress in the PHLS Laboratory of Enteric Pathogens (LEP).

The UK importer has initiated a recall of the product. As a protective measure, the FSA has advised consumers of what products to avoid, and has issued a food hazard warning asking local authority enforcement officers to ensure that these products are removed from sale.

From January 1, 2001 to September 30, 2001, LEP has reported on 78 and 138 human isolates of *S. stanley* and *S. newport*, respectively, in England and Wales.

Import Policy for Guatemalan Fresh Raspberries and Blackberries

In September 1998, the Canadian Food Inspection Agency (CFIA) restricted the importation of Guatemalan fresh raspberries in light of the 1998 spring outbreak of Cyclosporiasis in Ontario and the epidemiological link to Guatemalan fresh raspberries.

In the spring of 1999, another Cyclosporiasis outbreak occurred in Ontario. This outbreak was epidemiologically linked to Guatemalan fresh blackberries. On April 4, 2000, Health Canada (HC) asked CFIA to restrict the importation of Guatemalan fresh blackberries into Canada.

On December 6, 1999, the CFIA allowed the importation of Guatemalan fresh raspberries and blackberries grown in the 1999 fall season and which had been produced, harvested, packed and shipped under the Guatemalan Model Plan of Excellence. On March 15, 2000 and April 4, 2000,

the CFIA introduced an import restriction on the Guatemalan fresh raspberries and blackberries, respectively.

In December 2000, HC recommended the importation of Guatemalan cultivated fresh raspberries and blackberries into Canada for a period corresponding from August 15 to March 14 of each year. This decision was based on the HC Qualitative Risk Assessment and Management Options and on the fact that no Cyclosporiasis outbreaks have been reported during that period of time in Canada, United States (US) or other countries.

California Polytechnic State University Ranked First in the All Products Category

For the second consecutive year, a team of students from California Polytechnic State University ranked first in the All Products category at the 80th Collegiate Dairy Products Evaluation Contest. This year's contest, sponsored by the Foundation of the International Association of Food Industry Suppliers (IAFIS),

was held October 20 at Worldwide Food Expo in Chicago, IL.

Teams of undergraduate and graduate students from 19 colleges and universities evaluated six categories of dairy foods: milk, cottage cheese, ice cream, butter, cheddar cheese and yogurt. The contest is designed to encourage students to hone their sensory evaluation skills and to pursue their interest in food and dairy industry careers. For the first time this year, the entire contest was held on the show floor at the biennial Worldwide Food Expo trade show, where Expo attendees could see the students in action.

The IAFIS Foundation funds the \$2,000 Shirley Seas Memorial Scholarship, which is awarded to the university that places first in the All Products category. Cal Poly is this year's Shirley Seas Memorial Scholarship winner. Cal Poly coach Will Gillis won the Coach of the Year Award.

The Joe Larson Merit Award, which includes \$500 and a plaque, was granted to Emily Buxton of Ohio State University. The Larson Award rewards an individual for demonstrating key attributes necessary for industry

leadership, rather than for technical placement in the contest.

Saputo Inc., presented an award to Sandra Mak of the University of Alberta in memory of Bert Aldrich. The Bert Aldrich Award is presented to the first place individual in the Butter competition and includes a plaque and \$500.

The top five students in the All Products category win a lifetime membership, funded by the IAFIS Foundation, to the National Dairy Shrine. The Dairy Shrine records notable contributions to the development of the dairy industry. This year's winners are (in order): Allison Reynolds, Cal Poly State; Carrie Cumbie, Clemson University; Leaine Verdegaal, Cal Poly State; Barry Spors, University of Wisconsin; and Mindy Aust, Mississippi State University.

The graduate student placing first in the All Products graduate student competition received the First Place Genevieve Christen Graduate Student All Products Award. This year's winner is Jelena Stojanovic of Mississippi State University.

Suggested Measures to Assist Food Manufacturers and Suppliers in Countering the Threat of Bioterrorism

Reprinted from *Leatherhead Food RA.*, <http://www.lfra.co.uk>

Introduction

It is recognized that the food supply chain in developed countries can be complex and lengthy. For this reason, the food industry may be vulnerable to the current perceived threat of bioterrorism. All organizations involved in the manufacture and supply of foods therefore need to assess their operations with a view to protecting their products against this potentially serious threat.

The difficulty lies in deciding what measures are appropriate to implement. There is little point in speculating on the various means that might be used to carry out any threat to contaminate, or tamper with, the food supply. There are a large number of pathogenic microorganisms and toxic compounds that might be introduced to the food chain, and an equally large number of ways in which this could be done. To attempt to prepare counter measures for

all these possibilities would be a lengthy process, and probably of little ultimate value.

However, all the scenarios that can be imagined have one thing in common. Human intervention is required, either directly or indirectly, before contamination can take place. Therefore, precautionary measures can be focused on eliminating opportunities for this to occur.

One possible approach to this might be to use an adapted version of HACCP. All food businesses should have an existing HACCP plan designed to protect consumers from foodborne hazards, and the mechanisms and procedures to develop and implement HACCP plans are likely to be in place. By regarding human intervention at any point in the food supply chain as a serious potential hazard, it should be possible to review existing plans and extend them to cover this new threat to food safety. If the same approach is then applied from 'farm to fork', it should be possible to identify suitable control measures (e.g. increased physical security, improved product traceability, etc.) at vulnerable points in the supply chain, relatively quickly and efficiently.

If, at a later date, specific threats are recognized, a HACCP-based system of protection could be quickly modified and improved to counter those threats more directly.

To offer re-assurance to all your company stakeholders, we would suggest widening the scope of your current HACCP plans with special reference to people issues. There are a number of practical precautions and controls that can be adopted quickly within this context and we have listed some of these below.

Practical measures

Management

This is an important 'top down bottom up' issue. Get your staff supporting any additional measures you implement.

Physical Security

Increase all visible levels of security on all your plants. Ensure that no-one has unauthorized entrance. Check all fences, gates, etc. Remove any 'clutter' and tidy all yards, check all perimeter lights.

Increase security on all transport in and out. Ensure that all raw materials arriving at your plant is checked by security.

Initiate a policy of checking all casual staff, especially agency staff, new recruits and night shift workers. Check all references.

Ensure and monitor that only authorized staff enter storage, manufacturing, transport and distribution facilities. Provide staff and visitor identification. To further ensure factory security, introduce color-coded hats or garments to visually alert supervisors that 'someone is out of place'.

Ensure that no staff can get from the locker rooms to the factory floor carrying anything.

All staff must have proper identification with name cards and or key swipe cards. Limit access to high-risk / vulnerable manufacturing environments.

If you have laboratories on-site, restrict access to authorized staff and audit all supplies. Ensure that you know and understand what is going on in your laboratories.

Check computer security, especially e-mails from unknown sources.

Traceability, Sourcing of Raw Materials and Ingredients

Use known suppliers; get them to implement the same precautions that you are taking. All of your standard operating procedures and HACCP plans are designed to protect the safety of the consumer. A rigorous enforcement of your HACCP plan, with special additional reference to people and staff within your supply and distribution chain will give consumers and staff confidence and reassurance that your products and their working environment are safe.

Demand and insist from all your suppliers a greater level security and quality assurance. Assess the sourcing of your raw materials and re-assure yourself of their integrity.

Check security of all 'utilities', especially water. Check all incoming engineers and contractor staff. Do not let them take any unnecessary tools, etc., to the factory areas. Use only known contractors.

Look at all your packaging – is it as tamper-evident as possible?

The Mail Room, Stores and Reception

Request that all mail from your suppliers and customers carries identity, i.e. the senders company name or logo. Advise your mail room not to open any mail that they are suspicious of. Take any unopened suspicious letter or packages outside into the fresh air while you conduct further investigations. Ask all your staff to refrain from having personal mail sent to your offices.

Train and discuss with all reception and security staff the implications of security/crisis management. Get them to monitor write down any thing suspicious. Have an incident response team at every plant.

Undertake a threat assessment. Why should you be a greater risk / threat than any one else. List the reasons and manage them to reduce the threat.

Summary

Your current HACCP Plan, rigorously enforced, and enhanced with special reference to people, can be a useful tool to help ensure your continued safe production and distribution within the food chain.

Industry Products



APV Systems

New Testing Services from Invensys Process Systems Simplify Plant Integrity Checks

Invensys Process Systems has introduced a range of LifeTimeSM Testing Services designed to provide plant integrity tests with minimum disruption to the production process.

Contamination is a constant concern during liquid processing and yet the causes can be extremely difficult to track down. The smallest pinhole or hairline crack can be the beginning of major problems unless they are identified and rectified early.

Now, utilizing new technology, Invensys Process Systems has developed a series of tests that can be carried out on-site with minimum disruption and downtime. Engineers using portable hi-tech equipment can check the integrity of heat exchangers, tanks and vessels in a matter of hours, enabling defects to be identified isolated and repaired quickly and efficiently.

Heat exchanger testing; Testex is a patented system for checking the integrity of heat exchangers. It involves a two-

stage operation, first to identify if a defect exists, and then to isolate any faults so that the heat exchanger can be repaired.

The first stage is the Electrolytic Differential Analysis test. This entails filling one side of the heat exchanger with Sodium Sulphate, which acts as an electrolyte, and the other side with water. The pressure of the electrolyte is increased to create a differential, while probes monitor the conductivity of the water. A consistent rise in conductivity of the water indicates that there is a fault somewhere in the system.

The next stage is Detailed Flaw Detection, which uses a probe placed at intervals on the edge of each plate. Areas with abnormal sound signature indicate a fault. The heat exchanger can then be repaired.

Tank and vessel crack detection; undetected defects in stainless steel tanks and vessels are often very difficult to identify until the product becomes contaminated.

SurfaceScan has been developed by Invensys Process Systems to provide a means of checking tanks and vessels as part of a routine maintenance program. Two methods are used and both can detect the smallest surface or subsurface defects. They pose no threat to product integrity and testing can be carried out during a normal CIP routine.

APV Systems, Rosemont, IL

Reader Service No. 328

Boehringer Ingelheim Lysigin[®] Vaccine Protects against All Three Capsular Serotypes Known to Cause *S. aureus* Mastitis

Independent data show that Lysigin[®] *S. aureus* Bacterin contains an antigen combination against all known US capsular serotypes of *S. aureus* mastitis. The mastitis vaccine is produced by Boehringer Ingelheim Vet-medica, Inc.

Lysigin provides protection against the three capsular serotypes – 5,8 and 336 – that are known to cause *S. aureus* mastitis in US dairy herds – a pricey disease costing US dairy producers about \$2 billion per year. Not every case is visible either. Some studies show that for every case of clinical mastitis, 15 to 40 cases of subclinical mastitis are undetected.

“The National Mastitis Councils estimates mastitis losses at \$470 per infected cow each year,” said Wayne Cole, manager, cattle biologicals. “This includes lost milk production and unmarketable milk from high somatic cell counts.”

Dr. Carol Rinehart, manager of bovine biological research and development agrees. She said that Lysigin continues to be proven as an integral part of managing mastitis.

Boehringer Ingelheim, St. Joseph, MO

Reader Service No. 329

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S & S Biopath Introduced an Easier, Faster, More Accurate Testing Method for *Listeria*

Companies looking for a quicker, easier, more accurate testing method for *Listeria* will find it all in one product; *Listeria* SwabCheck. Manufactured by S&S Biopath, *Listeria* SwabCheck is one of the most versatile testing methods on the market, allowing personnel in a host of industries to quickly and easily check for the presence or absence of *Listeria* at any point during the manufacturing process.

What makes *Listeria* SwabCheck distinctive from its counterparts is its elementary usage of colors following the hydrolysis of esculin to identify the presence of *Listeria*. The product identifies the presence of the bacteria through an easy to interpret color change in the swab media from pale green to black. In addition, *Listeria* SwabCheck "requires none of the pre-incubation and multiple media culture procedures that are required by some other in house 'rapid test' products," points out Joe Murdock, director of sales and marketing filtration at S&S Biopath.

Because of *Listeria* SwabCheck's elementary usage of color in identifying the presence of *Listeria* and its ability to furnish positive presumptive results in a shorter amount of time than its counterparts, the media yields a 95 percent accuracy rate.

The increased accuracy and speed of testing *Listeria* SwabCheck offers translates into significant cost savings for users. In addition, the usage of differing colors to identify *Listeria* contamination helps produce the 95 percent accuracy rate of unmistakable Presumptive positive results. More

accuracy narrows the chance of a *Listeria* problem escaping detection and continuing well into the production process.

Recently, the FSIS passed stricter guidelines for producers of ready-to-eat meat and poultry products. S&S Biopath's *Listeria* SwabCheck will help producers meet these guidelines, effectively reducing the incidence of *Listeria* contamination.

S&S Biopath, West Palm Beach, FL

Reader Service No. 330



Wahl Instruments, Inc.

CALYS 10 Multifunction Calibrator Available from the Instrumentation Group

The Instrumentation Group has introduced the new CALYS 10[®] multifunction calibrator and tester from the French firm AOIP. This rugged, ergonomically designed instrument is suitable for portable, hand-held use or is equally at ease as a bench-type unit for laboratory use. The CALYS 10[®] features a large easy-to-use control keypad,

bright back-lit LCD, and ABS molded case with removable protective rubber boot.

The CALYS 10's multiple capabilities are designed to meet the complex and demanding requirements for calibration and maintenance services. Functions include measurement and simulation of current, temperature (both RTD and thermocouple sensors), DC voltage, and resistance. There is also an option for pressure calibration. The CALYS 10 can be utilized to calibrate controls and perform on-site maintenance of temperature sensors, controllers, converters, regulators, valves, indicators, panel meters, transmitters, recorders, and other process loop devices.

The CALYS 10 is supplied with LCL CAL 10 software package to allow custom configuration and programming by the technician. The software also carries data management, setpoint profiles, and report generation modules. In basic operation, the CALYS 10's software enables full utilization of all built-in capabilities. An insulated RS232 cable (also supplied as standard equipment) provides the link between the calibrator/tester and a Windows[®]-compatible PC.

Additional CALYS 10 functions include relative measurements, step generation, ramp generation, emission value storage of up to 100 simulation values, and memory and recall of the last 1,000 readings.

The CALYS 10 is suitable for industrial maintenance, process calibration, laboratory or R&D department use. It is traceable to NIST and international standards. On request, the Instrumentation Group can supply a calibration certificate for each CALYS 10.

Wahl Instruments, Inc., Asheville, NC

Reader Service No. 331

New Silliker Training Video Takes Food Workers into "The Amazing World of Microorganisms"

In "The Amazing World of Microorganisms," the new employee training video from Silliker Laboratories Group Inc., food workers are provided with a basic understanding of the microorganisms they battle against daily to ensure the safety and quality of products.

The beginning of this entertaining and educational video introduces viewers to the four major categories of microorganisms: bacteria, fungi, viruses, and parasites. The video explores how some microorganisms play a positive role in producing foods such as cheese and bread, developing life-saving antibiotics, and destroying harmful toxins in landfills.

Then the video illustrates the damage caused by microorganisms when they are allowed to grow to dangerous levels in foods, resulting in spoilage, foodborne illness, and even death. Foodborne disease, according to the CDC, is responsible for approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths annually in the United States.

With sobering statistics like these as a backdrop, the video reinforces the critical importance of employing good hygiene practices, avoiding cross-contamination of raw and finished products, and adhering to in-plant sanitation programs.

The Amazing World of Microorganisms (\$189) is available in English and Spanish and includes a free facilitator's training guide. To order, visit the Silliker Web site at www.silliker.com or call 800.829.7879.

Silliker Laboratories Group Inc., Homewood, IL

Reader Service No. 332



Sloan Valve Company

Portable Radiometers Monitor UV Sterilization Lamps from Venmark International

A line of radiometers for monitoring UV sterilization lamps to validate that their operation is consistent with government health requirements is available from International Light, Inc. of Newburyport, MA.

International Light Radiometers for measuring UV sterilization lamps are effective for testing the dose intensity of lamps operating from $0.3 \mu\text{W}/\text{cm}^2$ to $20 \text{ W}/\text{cm}^2$ to be certain they are working properly. Featuring simple pushbutton operation with direct readouts on an LCD display, these instruments are NIST traceable and designed for use by non-technical personnel.

Suitable for a variety of applications, International Light Radiometers for measuring UV sterilization lamps are offered in a portable hand-held unit with a flexible detector probe for direct verification of lamp output, as a thick conveyor version to measure inside uv systems, and as in-situ monitors for integration by OEMs into their sterilization equipment.

Venmark International
Newburyport, MA

Reader Service No. 333

Sloan Valve Announces a Retrofit Kit to Convert Manual Flushometers to Optima Plus® Models

Sloan Valve Company has announced the availability of a retrofit valve kit that can be used to convert the company's manual Royal® Flushometer to a battery-powered Optima Plus® Flushometer within minutes.

Sloan's Optima Plus Flushometer is a completely self-contained flushing system that uses an infrared sensor to detect the presence of the user and automatically flush after every use. The system needs no AC hookups and can be used in any retrofit or new construction application.

The Royal RESS Retrofit Kit requires only one trade installation and includes: Patented Dual Filtered By-Pass Diaphragm helps prevent valve run-on and ensures extended Flushometer performance, even in water conditions with high contents of sand and other particulates; Impact-resistant plastic cover houses four supplied AA Duracell® batteries, the sensor and the self-diagnostic circuitry for operation; Chrome-plated brass locking ring can be removed only when water pressure is off and installation tools needed are screwdriver and strap wrench.

Sloan Valve Company,
Franklin Park, IL

Reader Service No. 334

Pro-Control Multi-Function Wide-Range and Dental Digital kVp Meters/Timers from Nuclear Associates

Nuclear Associates' ProControl Digital Wide-Range kVp Meter/Timer (model 07-463) or the Digital Dental kVp Meter/Timer (model 07-8115) gives you quick and accurate measurements

of your diagnostic x-ray generator tube potential. The instruments need no connection to the x-ray generator. Pro-Control kVp Meters have an automatic display reset, scope output for waveform analysis and no remote control cables. They're easy-to-use, ultra-compact, lightweight, rugged and battery-operated. Ideal for service and biomedical engineers, medical physicists, QC technologists and anyone that requires top-quality, non-invasive x-ray QC test instruments.

The Pro-Control Digital Wide-Range kVp Meter/Timer and Pro-control Digital Dental kVp Meter/Timer; Measure the peak x-ray acceleration voltage from tungsten x-ray generators; direct measurement of peak kV from the x-ray head; simply place in beam and take x-ray; Measure exposure time; Indicate x-ray waveform

type – e.g., half-wave, full-wave or DC/3 phase; Large display readable from outside x-ray room; and Alphanumeric display provides easy-to-understand status and diagnostic messages. In addition, the Pro-control Digital Dental kVp Meter/Timer is optimized for dental x-rays (but can be used on radiographic and fluoroscopic x-rays).

Nuclear Associates, Carle Place, NY

Reader Service No. 335

Rheometric Scientific Introduces New Rheometer for Elastomers and Rubber

Rheometric Scientific announced the release of a new rheometer designed specifically for testing elastomers and

curing systems called the RDA-HT. Utilizing a unique high torque/low compliance transducer and high torque servo motor, the RDA-HT is ideally suited for studying cure behavior, the effects of fillers, and end-use performance testing for the tire and rubber industry.

The RDA-HT comes with disposable plate fixtures in 8mm, 12.5mm, and 25 mm diameters so elastomers can be cured in the fixtures prior to testing, and an optional elastomer sample mold is also available. Using the torsion fixture, finished products from cured rubber to high strength composites can be tested at temperatures from -150°C up to 600°C.

Rheometric Scientific Inc., Piscataway, NJ

Reader Service No. 336



Michelson Laboratories, Inc.

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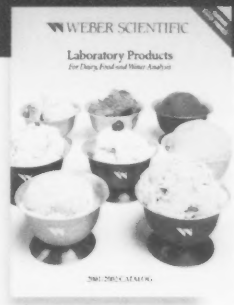
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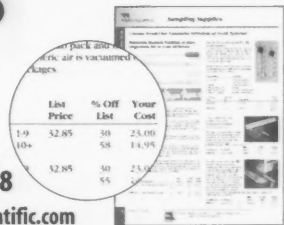
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Hyatt Regency San Diego
San Diego, California

3-A[®] Sanitary Standards for Storage Tanks, Number 01-08

Formulated by
International Association of Food Industry Suppliers (IAFIS)
International Association for Food Protection (IAFP)
United States Public Health Service (USPHS)
The Dairy Industry Committee (DIC)
United States Department of Agriculture — Dairy Programs (USDA)

It is the purpose of the IAFIS, IAFP, USPHS, DIC, and USDA in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Storage tank specifications heretofore or hereafter developed which so differ in design, materials, and fabrication or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAFIS, IAFP, USPHS, DIC, and USDA at any time. The 3-A Sanitary Standards and 3-A Accepted Practices provide hygienic criteria applicable to equipment and systems used to produce, process, and package milk, milk products, and other perishable foods or comestible products. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

A SCOPE

- A1 These standards cover the sanitary aspects of storage tanks for milk and milk products.
- A2 In order to conform to these 3-A Sanitary Standards, storage tanks shall comply with the following design, material, and fabrication criteria.¹

B DEFINITIONS

- B1 *Product*: Shall mean milk and milk products and other comestibles.
- B2 *Storage Tank*: Shall mean a satisfactorily shaped insulated storage tank used for the storage, or storage and cooling of product, except a vertical tank whose inside height is in excess of 10 feet (3.05 m).²

B3 Surfaces

- B3.1 *Product Contact Surfaces*: Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, or be drawn into the product.
- B3.2 *Nonproduct Contact Surfaces*: Shall mean all other exposed surfaces.

B3.3 *Lining*: Shall mean all surfaces used to contain the product, including ends, sides, bottom, and top.

B3.4 *Shell*: Shall mean the material covering the exterior of the insulation and/or heat exchange jacket.

B3.5 *Breast*: Shall mean that portion of the exposed metal used to join the lining to the shell.

B4 Cleaning

B4.1 *Mechanical Cleaning or Mechanically Cleaned*: Shall denote cleaning, solely by circulation and/or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned, by mechanical means.

B4.2 *Manual (COP) Cleaning*: Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallie scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

¹ Use current revisions or editions of all referenced documents cited herein.

² Vertical tanks in excess of 10 feet (3.05 m) inside height are defined as silo-type tanks. Sanitary criteria for silo-type tanks are covered in 3-A Sanitary Standards for Silo-Type Storage Tanks, Number 22-, as amended.

- B5 *Bond*: Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.
- B6 *Close Coupled*: Shall mean mating surfaces or other juxtaposed surfaces that are less than twice the nominal diameter or cross section of the mating surfaces or a maximum of 5 in. (127 mm).
- B7 *Coatings*: Shall mean the results of a process where a different material is deposited to create a new surface. There is appreciable, typically more than 1µm, build-up of new material. The coating material does not alter the physical properties of the substrate.
- B7.1 Coating processes include:
- B7.1.1
1. Chemical (conversion coatings)
 2. Engineering Plating, (e.g., Electrodeposition,³ gold plating)
 3. Thermal spraying (e.g., flame, plasma, arc spray)
 4. Physical Vapor Deposition
 5. Chemical Vapor Deposition
 6. Overlays and Encapsulation
- B8 *Corrosion Resistant*: Shall mean the surface has the property to maintain its original surface characteristics for its predicted service period when exposed to the conditions encountered in the environment of intended use, including expected contact with product and cleaning, sanitizing, or sterilization compounds or solutions.
- B9 *Easily or Readily Accessible*: Shall mean a location which can be safely reached by personnel from a floor, platform, or other permanent work area.
- B10 *Easily or Readily Removable*: Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.
- B11 *Inspectable*: Shall mean all product contact surfaces can be made available for close visual observation.
- B12 *Nontoxic Materials*: Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food, Drug, and Cosmetic Act of 1938, as amended.

B13 *Simple Hand Tools*: Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.

B14 *Substantially Flush*: Shall mean mating surfaces or other juxtaposed surfaces shall be within 1/32 in. (0.794 mm).

C MATERIALS

C1 Metals

C1.1 All product contact surfaces, including the breast, shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series,⁴ (excluding 301 and 302), or corresponding Alloy Cast Institute⁵ (ACI) types, or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent (See Appendix, Section E).

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for umbrellas, slingers and drip shields for vertical agitator assemblies, gaskets, seals, protective caps for sanitary connections, and parts having the same functional purposes.

C2.1.1 Rubber and rubber-like materials when used for the above-specified applications shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials, Number 18-.

C2.2 Plastic materials may be used in sight and/or light openings and for umbrellas, slingers, and drip shields for vertical agitator assemblies, bearings, gaskets, seals, protective caps for sanitary connections, direct reading gauge tubes, and parts having the same functional purposes.

C2.2.1 Plastic materials when used for the above-specified applications shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials, Number 20-.

C2.2.2 Plastic may be used in sight and/or light openings and for direct reading gauge tubes, and when used shall be of a clear, heat-resistant type.

³Federal Specification #QQ-C-320B for Chromium Plating (Electrodeposited). Federal Specification #QQ-N-290A for Nickel Plating (Electrodeposited). Available from the General Services Administration, Federal Supply Services Bureau, Specification Section, 470 East L'Enfant Plaza, Suite 8100, Washington, DC 20407 (202) 755-0325.

⁴The data for this series are contained in the AISI Steel Products Manual, Stainless & Heat Resisting Steels. Available from the American Iron and Steel Society, 186 Thorn Hill Rd., Warrendale, PA 15086 (724) 776-1535.

⁵Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

C2.3 Rubber and rubber-like materials and plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformation characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2.4 The adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic.⁶

C2.5 Where materials having certain inherent functional properties are required for specific applications, such as bearing surfaces and rotary seals, carbon, or ceramic materials, including tungsten carbide may be used. Carbon and ceramic materials shall be inert, nonporous, nontoxic, nonabsorbent, insoluble, resistant to scratching, scoring, and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2.6 Glass may be used in sight and/or light openings and for direct reading gauge tubes, and when used shall be of a clear heat-resistant type.

C3 Nonproduct Contact Surfaces

C3.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion-resistant. If coated, the coating used shall adhere. Nonproduct contact surfaces shall be relatively nonabsorbent, durable, and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

D FABRICATION

D1 Surface Texture

D1.1 All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices in the final fabricated form. (See Appendix, Section F.)

D2 Permanent Joints

D2.1 All permanent joints in metallic product contact surfaces shall be continuously welded.

D2.1.1 Welding shall produce product contact surfaces which are at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices. (See Appendix, Section F.)

D3 Bonded Materials

D3.1 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be bonded in a manner that the bond is continuous and mechanically sound, so that when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.

D4 Cleaning and Inspectability

D4.1 Storage tanks that are to be mechanically cleaned shall be designed so that the product contact surfaces of the storage tanks, including the product contact surfaces of the opening for a vertical mechanical agitator, and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible, readily removable, and inspectable.

D4.2 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an installed position or when removed. Demountable parts shall be readily removable.

D4.3 Appurtenances having product contact surfaces shall be readily removable, or they shall be readily cleanable when assembled or installed, and shall be easily accessible for inspection.

D4.4 Storage tanks having an inside height of more than 96 in. (244 cm) shall be provided with means that will facilitate manual cleaning and inspection of all product contact surfaces or means shall be provided for mechanically cleaning the product contact surfaces of the tank and all nonremoved appurtenances thereto.

D5 Draining

D5.1 All product contact surfaces shall be self-draining except for normal clingage.

D5.1.1 The bottom slope of a vertical cylindrical storage tank with a flat bottom shall be at least 3/4 in. per ft. (6.25 cm per m) toward the outlet.

⁶Adhesives shall comply with 21 CFR 175 — Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (202) 512-1800.

- If the bottom of the lining is of the reverse dish type, the portion of the bottom adjacent to the sidewall shall have a minimum slope of 3/4 in. per ft. (6.25 cm per m) toward the outlet.
- D5.1.2 Horizontal storage tanks shall have a bottom slope of at least 1/4 in. per ft. (2.0 cm per m) toward the outlet when properly installed. Rectangular storage tanks shall have a built-in bottom slope of 3/4 in. per ft. (6.25 cm per m) toward the center line and, when properly installed, the center line shall have a slope of at least 1/4 in. per ft. (2.0 cm per m) toward the outlet.
- D6 Gaskets**
- D6.1 Gaskets having a product contact surface shall be removable or bonded.
- D6.2 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.
- D6.3 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in Section D11.1.
- D7 Radii**
- D7.1 All internal angles of less than 135° on product contact surfaces shall have radii of not less than 1/4 in. (6.35 mm), except that:
- D7.1.1 Minimum radii for fillets of welds in product contact surfaces may be 1/8 in. (3.18 mm) where the thickness of one or both parts joined is less than 3/16 in. (4.76 mm). (See also D7.1.6)
- D7.1.2 The radii in agitator shaft bottom supports or guides and in gasket grooves or gasket retaining grooves for removable gaskets, except those for standard 1/4 in. (6.35 mm) and smaller O-rings, shall be not less than 1/8 in. (3.18 mm).
- D7.1.3 Radii in standard O-ring grooves shall be as specified in Appendix, Section I.
- D7.1.4 Radii in nonstandard O-ring grooves shall be those radii closest to a standard O-ring as specified in Appendix, Section I.
- D7.1.5 The radii of covers and agitator assemblies shall be not less than 1/4 in. (6.35 mm).
- D7.1.6 The radius at a juncture of the end(s), sidewall(s), top, and bottom shall not be less than 1/2 in. (12.70 mm).
- D8 Lining**
- D8.1 The lining shall be constructed so that it will not sag, buckle, or prevent complete drainage in normal use.
- D9 Threads**
- D9.1 There shall be no threads on product contact surfaces.
- D10 Sanitary Tubing**
- D10.1 All metal tubing shall conform to the applicable provisions of 3-A Sanitary Standards for Polished Metal Tubing for Dairy Products, Number 33-, except that materials conforming to C2.1.1 or C2.2.1 may be used for caps of sanitary design for the protection of terminal ends of sanitary tubes, fittings, or vents.
- D11 Fittings and Valves**
- D11.1 All sanitary fittings and connections shall conform to the applicable provisions of the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.
- D11.2 All sanitary valves shall conform to the applicable provisions of the appropriate 3-A sanitary valve standard.
- D11.3 Valves, if provided, or connections to the tank, below the maximum normal product level, shall be close-coupled and free-draining.
- D12 Instrument Connections**
- D12.1 All instrument connections having product contact surfaces shall conform to the applicable provisions of the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections Used on Fluid Milk and Milk Products Equipment, Number 74-.
- D12.2 One or more fittings to accommodate indicating and/or recording thermometer temperature-sensing devices shall be provided. The thermometer connections and/or openings shall be located so that the thermometer is not influenced by the heating or cooling jacket.
- D12.3 If the fittings for temperature-sensing devices do not pierce the tank lining, either the temperature-sensing element receptacles shall be securely attached to the exterior of the lining or means to attach temperature-sensing elements securely to the exterior of the lining shall be provided.

D12.4 The fittings for temperature-sensing devices shall be located to permit the registering of the temperature of the product when the tank contains no more than 20% of its capacity.

D13 Instruments

D13.1 A pressure or level sensor, if provided, shall comply with the applicable provisions of the 3-A Sanitary Standards for Sensor and Sensor Fittings and Connections Used on Fluid Milk and Milk Products Equipment, Number 74-. If the storage tank in which it will be used is designed for mechanical cleaning, the product contact surface of the device shall be substantially flush with the inner surface of the storage tank.

D14 Thermometers

D14.1 Each tank shall be provided with an indicating thermometer, and also may be supplied with a recording thermometer complying with the applicable specifications for indicating and recording thermometers in Appendix, Section J. The indicating thermometer may be analog or digital. Each tank shall be provided with a means for adding a recording thermometer.

D.15 Agitators

D15.1 The agitator shall be of sufficient size and power to maintain the butterfat content of whole milk throughout the storage tank within a variation of $\pm 0.1\%$ as determined by an official AOAC Milk Fat Test⁷ and to maintain product temperature at $\leq 40^\circ\text{F}$ (4.4°C).

D15.2 Mechanical agitators shall meet the applicable provisions of the 3-A Sanitary Standards for Shear Mixers, Mixers and Agitators Number 73-.

D15.3 Air agitation equipment and the means for applying air under pressure shall conform to the applicable provisions of the 3-A Accepted Practices for Supplying Air Under Pressure in Contact with Milk, Milk Products, and Product Contact Surfaces, Number 604-.

D15.3.1 Tubing and related connections within the storage tank shall be of a sanitary design and be readily demountable for cleaning outside the storage tank or be designed for mechanical cleaning. If designed

for mechanical cleaning, the tubing and all related connections shall be self-draining. Permanently mounted air tubing shall be constructed and installed so that it will not sag, buckle, vibrate, or prevent complete drainage of the storage tank or tubing and shall be located so that the distance from the outside of the tubing to the lining shall be at least 2 in. (50.8 mm.), except at the point of entrance.

D15.4 Means for obtaining a product sample shall be provided. It shall be of a type that has its sealing surface substantially flush with the product contact surface of the storage tank unless located in the manhole door and have an inside diameter no less than that of 1 in. (25.4 mm) 3-A sanitary tubing.

D16 Sight and Light Openings

D16.1 Sight and light openings, when provided shall conform to the applicable provisions of the 3-A Sanitary Standards for Sight and/or Light Windows and Sight Indicators in Contact with Milk and Milk Products, Number 65-.

D17 Direct Reading Gauges

D17.1 A direct reading gauge of the sight glass or plastic tube type, if provided, shall be sanitary in design and construction and shall be readily accessible for cleaning or shall be designed for mechanical cleaning.

If designed for mechanical cleaning, the inside diameter of the gauge parts shall be sufficiently uniform that all product contact surfaces will be cleaned.

It shall be designed and constructed so that all product in the gauge will be discarded. Means to accomplish this shall be provided at the lowest point and in such a manner that product in the gauge will not enter the storage tank outlet nor re-enter the storage tank. The valve shall be close coupled.

D18 Inlet and Outlet Passages

D18.1 The inside diameter of the outlet passage of storage tanks shall not be less than the nominal inside diameter of a 1 1/2 in. (38.1 mm) 3-A sanitary fitting. The outlet shall be in a position that will provide complete drainage of the storage tank. The top of the terminal end of the outlet shall be in a position that will provide complete drainage of the storage tank. The top of the terminal end of the outlet passage shall be lower than the lowest point of the lining.

⁷The method of making these tests will be found in the following reference: *Official Methods of Analysis*. Available from the AOAC International, 481 N. Frederick Avenue, Suite 500, Gaithersburg, MD 20877-2417. Phone (301) 924-7077; FAX (301) 924-7089. E-mail AOAC@aoac.org.

D18.2 Inlet and outlet connections in the storage tank shall be provided with welded stub ends, bolted or clamp-type flanges or 3-A sanitary threaded connections. The face of a bolted or clamp-type flange or a 3-A sanitary threaded connection, below the maximum normal product level, shall be close coupled.

D19 **Openings and Covers**

D19.1 The personnel access port(s) shall be located at the outlet end or side of the storage tank or the top of the storage tank. The inside dimensions of the personnel access port(s) shall not be less than 15 in. (381 mm) by 20 in. (508 mm) oval, or 18 in. (457.2 mm) diameter. A top personnel access port(s) shall be not less than 3/8 in. (9.13 mm) higher than the surrounding area and if the exterior flange is incorporated in it, it shall slope and drain away from the opening. The sleeve or collar of a personnel opening for an inside swing-type manhole cover shall be pitched so that liquids cannot accumulate.

D19.2 The cover for an access port in the end or sidewall shall be either of the inside or outside swing-type. If the cover swings inside, it shall also swing outside, away from the opening. Threads or ball joints employed to attach the access port(s) shall not be located within the lining. The cover for an access port in the top shall be of the outside swing type.

D19.3 A hooded air vent of sufficient free open area to prevent back pressure during filling and to prevent vacuum during emptying of the storage tank shall be provided in the front head near the top, or in the top of the storage tank. (See Appendix, Section G.) The vent shall terminate in a processing area and shall drain into the storage tank.

D19.4 The air vent shall be provided with a cover or be fabricated to protect the vent from overhead drip or drainage. Perforations may be provided on the sides and/or the bottom of the vent. Perforations shall have openings not greater than 1/16 in. (1.59 mm) diameter, or slots not more than 1/32 in. (0.794 mm) side for cleaning and inspection. Woven wire mesh shall not be used for this purpose. It shall be so designed that parts are readily accessible and readily removable for cleaning and inspection.

D20 **Insulation**

D20.1 The storage tank shall be insulated with insulating material of a nature and amount sufficient to prevent, in 18 hours, an average temperature change of greater than 2°F (1°C) in the storage tank full of water when the average difference between the temperature of the atmosphere surrounding the storage tank is 30°F (17°C) above or below that of the water in the storage tank. The insulating value of the insulation over nonrefrigerated areas of the storage tank shall be equivalent to not less than:

D20.1.1 An R-value of at least 8 for:

D20.1.1.1 A storage tank designed to be installed wholly within a building; or

D20.1.1.2 That portion of the storage tank within a building on tanks designed to be installed partially outside a building.

D20.1.2 An R-value of at least 12 for that portion of the storage tank outside of a building on storage tanks designed to be installed partially outside of a building.

D20.2 Insulation material shall be installed in such a manner as to prevent shifting or settling.

D21 **Supports**

D21.1 The means of supporting storage tanks designed to be installed wholly within a processing area shall be one of the following:

D21.1.1 If legs are used, they shall be smooth with rounded ends and have no exposed threads. Legs made of hollow stock shall be sealed. Exterior of legs and leg sockets shall be readily cleanable. Legs shall be such that the product outlet is sufficiently high to allow for adequate cleaning and will provide an 8 in. (203 mm) minimum clearance between the floor and the tank outlet valve or bracing, whichever is lower.

D21.1.2 If mounted on a slab or island, the base of the storage tank shall be such that it may be sealed to the mounting surface. (See Appendix, Section H.)

D21.1.3 If mounted on a wall or column, the point of attachment of a storage tank to its mounting shall be designed for sealing. The mounting, if supplied by the manufacturer, shall be designed for sealing to the wall or column. The design of a storage tank to be mounted on a wall or column shall be such that there will be at least a 4 in. (101.6 mm) clearance between the outside of the storage tank and the wall or column.

D21.1.4 Storage tanks may be mounted on load cells. If load cells are provided, they shall meet the material criteria of Section C3 and the fabrication criteria of Section D22 herein.

D21.2 A storage tank to be installed partially outside a processing area shall be provided with a collar, flange, plate, or other suitable member to close the opening in the processing room wall and shall be such that it can be sealed to the wall.

D22 Nonproduct Contact Surfaces

- D22.1 Nonproduct contact surfaces shall have a smooth finish, free of pockets and crevices, and be readily cleanable and those surfaces to be coated shall be effectively prepared for coating.
- D22.2 All seams and openings in the shell shall be effectively sealed against the entrance of moisture and extraneous material.
- D22.3 The outer shell shall be smooth and effectively sealed except for a vent or weep whole in the outer shell of the storage tank. The vent or weep hole shall be located in a position that will provide drainage from the outer shell and shall be vermin proof. Outside welds need not be ground.

- D22.4 Guards required by a safety standard that will not permit accessibility for cleaning and inspection shall be designed so that they can be removed with the use of simple hand tools.

D23 Information Plate

- D23.1 Storage tanks shall have an information plate in juxtaposition to the nameplate giving one of the statements in D23.2 (See D23.2.1 and D23.2.2) and if the storage tank has a vertical agitator, one of the statements in D23.3. (See D23.3.1 and D23.3.2) shall appear on the nameplate. The wording of the statement(s) can be changed but not the intent.

- D23.2 "The insulation of this storage tank complies with the requirements for a storage tank to be installed * a building."

*Insert one of the following:

D23.2.1 "wholly within"

D23.2.2 "partially outside of"

- D23.3 "The agitator of this storage tank is designed so that the portion of agitator shaft outside of the storage tank ** in a processing area."

**Insert one of the following:

D23.3.1 "does not have to be"

D23.3.2 "must be"

D24 Refrigeration

- D24.1 Refrigerated tanks shall be capable of maintaining milk temperature at 40°F (4.4°C) or lower when the tank is full.

APPENDIX

E STAINLESS STEEL MATERIALS

Stainless steel conforming to the applicable chemical composition ranges established by AISI3 for wrought products (See Table 1), or by ACI4 for cast products (See Table 2), should be considered in compliance with the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%.

TABLE 1:

WROUGHT PRODUCTS TYPICALLY USED			
UNS #	ASTM ⁵	AISI/SAE ⁵	Common Names
S30300	A-582	303	Free-Machining S.S.; Austenitic
S30400	A-276 A-666	304	Austenitic S.S.
S30403	A-276 A-666	304L	Low Carbon Austenitic S.S.
S31600	A-276 A-666	316	Austenitic S.S. plus Mo*
S31603	A-276 A-666	316L	Low Carbon Austenitic S.S. plus Mo*

*Molybdenum

TABLE 2:

CAST PRODUCTS TYPICALLY USED			
UNS #	ASTM ⁵	ACI ⁵	Common Names
J92500	A-351 A-743 A-744	CF-3	Cast 304L
J92800	A-351 A-743 A-744	CF-3M	Cast 316L
J92600	A-351 A-743 A-744	CF-8	Cast 304
J92900	A-351 A-743 A-744	CF-8M	Cast 316
J92180	A-747	CB7 Cu —1	Cast 17-4 PH
J92110	A-747	CB7 Cu —2	Cast 15-5 PH
N26055	A-494	CY5Sn BiM	Alloy 88
J92701	A-743	CF-16F	Free Machining Austenitic S.S.

⁵Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Phone (610) 832-9500.

TABLE 3 OPTIONAL METAL ALLOY

Optional metal alloys having the following compositions are examples considered in compliance with Section C herein. (Percentages are maximum unless range is given.)

	UNS N08367	UNS S21800	UNS S20161	UNS N26055	UNS N26455	UNS S17400	UNS S15500	UNS S32900	UNS R20500	UNS R50400
	ASTM A743 Grade	ASTM A743 Grade		ASTM A494 Grade	ASTM A494 Grade	ASTM A747 Grade	ASTM A747 Grade		ASTM A560 Grade	ASTM B67 Grade
	CN-3MN	CF-10 SMnN		CY5SnBIM	CW-2M	CB7Cu-1	CB7Cu-2		50Cr-50Ni	C-2
C	0.03	0.10	0.15	0.05	0.02	0.07	0.07	0.20	0.10	0.10
Mn	2.00	7.00-9.00	4.00-6.00	1.5	1.00	0.70	0.70	1.00	0.30	
Si	1.00	3.50-4.50	3.00-4.00	0.5	0.80	1.00	1.00	0.75	1.00	
P	0.040	0.040	0.040	0.03	0.03	0.035	0.035	0.040	0.02	
S	0.010	0.030	0.040	0.03	0.03	0.03	0.03	0.030	0.02	
Cr	20.0-22.0	16.00-18.00	15.0-18.0	11.0-14.0	15.0-17.5	5.50-17.7	14.0-15.50	23.0-28.0	48.0-52.0	
Ni	23.5-25.5	8.00-9.00	4.00-6.00	Balance	Balance	3.60-4.60	4.50-5.50	2.50-5.00	Balance	
Mo	6.0-7.0			2.0-3.5	15.0-17.5			1.00-2.00		
Cb						0.15-0.35	0.15-0.35			
Cu	0.75					2.50-3.20	2.50-3.20			
N	0.18-0.26	0.08-0.18	0.08-0.20			0.05	0.05		0.30	
Fe	Balance	Balance	Balance	2.00	2.00	Balance	Balance	Balance	1.00	0.30
Sn				3.0-5.0						
Bi				3.0-5.0						
W					1.0					
Tl									0.50	Balance
Al									0.25	
Other										H = 0.015 N = 0.03 O = 0.25

Metal alloys or metals other than the above may be as corrosion resistant as 300 Series Stainless steel. This may be shown when metal alloys or metals are tested in accordance with ASTM G31 Laboratory Immersion Corrosion Testing of Metals and have a corrosion rate of less than 10 mil per year. The test parameters such as the type of chemical(s), their concentration(s), and temperature(s) should be representative of cleaning and sanitizing conditions used in dairy equipment. Alloys containing lead, leachable copper, or other toxic metals should not be used.

F PRODUCT CONTACT SURFACE FINISH

F1 Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in compliance with the requirements of Section D1 herein. A maximum R_a of 32 $\mu\text{in.}$ (0.80 μm), when measured according to the recommendations in American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)⁹ B46.1 — Surface Texture, is considered to be equivalent to a No. 4 finish.

F2 A 2B finish with a maximum R_a of 32 $\mu\text{in.}$ (0.80 μm) free of surface defects is in compliance with the requirements of Section D1 herein.

G AIR VENTING

To insure adequate venting of the storage tank which will protect it from internal pressure or vacuum damage during normal operation, the critical relationship between minimum vent size and maximum filling or emptying rates should be observed. The size of the free vent opening of a storage tank should be at least as large as those shown in Table 4:

⁹Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392 (212) 705-7722.

TABLE 4 — Air Venting

Table 4 — Air Venting	
Minimum Free Vent Opening Size: Inches (mm) I.D.	Maximum Filling or Emptying Rate: Gallons (L) per minute
1 3/4 in. (44.45 mm)	175 gallons (662.40 L)
2 1/4 in. (57.15 mm)	300 gallons (1136 L)
2 3/4 in. (69.85 mm)	400 gallons (1514 L)
3 3/4 in. (95.25 mm)	700 gallons (2650 L)

The above sizes are based on normal operation and are sized to accommodate air only and not liquid. A perforated vent should have a free opening area equal to at least 1 1/2 times the area of the minimum vent opening in the storage tank. The venting system covered in the preceding paragraphs is intended to provide for venting during filling and emptying; however, it is not adequate during cleaning. During the cleaning cycle, storage tanks when cleaned mechanically should be vented adequately by opening the personnel access port door to prevent vacuum or pressure build up due to sudden changes in temperature of very large volumes of air.¹⁰ Means should be provided to prevent excess heat loss of cleaning solution through the personnel access port opening. The use of tempered water of about 95°F (35°C) for both pre-rinsing and post-rinsing is recommended to reduce the effect of flash heating and cooling. Provisions should be made to prevent overfilling with resultant vacuum or pressure damage to the storage tank.

H SLABS OR ISLANDS

When a storage tank is designed to be installed on a slab or an island, the slab or island should be of sufficient height so that the bottom of the outlet connection is not less than 8 in. (203 mm) above the floor. The surface of the slab or island should be coated with a thick layer of waterproof mastic material, which will harden without cracking. The junction of the outer shell of the storage tank and the slab or island should be sealed.

¹⁰For example, when a 6,000 gallon tank (with 800 cu. ft. of 135°F hot air after cleaning) is suddenly flash cooled by 50°F water sprayed at 100 gpm the following takes place: Within 1 second, the 800 cu. ft. of hot air shrinks approximately 51 cu. ft. in volume. This is the equivalent in occupied space of approximately 382 gallons of product. The shrinkage creates a vacuum sufficient to collapse the tank unless the vent, manhole, or other openings allow the air to enter the tank at approximately the same rate as it shrinks. It is obvious, therefore, that a very large air vent such as the manhole opening is required to accommodate this air flow.

I **TABLE 5**
Groove Radii Dimensions for Standard O-Rings

O-Ring Cross Section, Nominal (AS 568 ¹¹)	O-Ring Cross Section, Actual (AS 568)	O-Ring Cross Section, Actual (ISO 3601-1 ¹²)	Minimum Groove Radius
1/16 in.	0.070 in.	1.80 mm	0.016 in. (0.406 mm)
3/32 in.	0.103 in.	2.65 mm	0.031 in. (0.787 mm)
1/8 in.	0.139 in.	3.55 mm	0.031 in. (0.787 mm)
3/16 in.	0.210 in.	5.30 mm	0.062 in. (1.575 mm)
1/4 in.	0.275 in.	7.00 mm	0.094 in. (2.388 mm)

J TEMPERATURE RECORDER

If required, a temperature recorder should be provided on all tanks to record temperatures during the filling, storage, emptying, and cleaning periods. This temperature recorder should be accurate to ±1°F (±0.6°C) within the temperature range for milk storage. The recorded elapsed time, as indicated by the chart, should be the true recorded elapsed time over at least a seven-day period.

TABLE 6

Thickness of Insulation Material Equivalent to R=4.0 at 75° F (24° C).	
Material Type	Thickness
High Density Fiberglass Sheets	0.88 in. (22.3 mm)
Soft Fiberglass Rolls	1.12 in. (28.4 mm)
Polystyrene Foam Sheets	1.02 in. (25.9 mm)
Corkboard Sheets	1.04 in. (26.4 mm)
Polyurethane Sheets	0.66 in. (16.8 mm)

¹¹The document establishing these standard dimensions is Aerospace Standard (AS) 568, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086 (412-776-4970).

¹²The document establishing these standard dimensions is ISO 3601-1: published by the International Organization for Standardization (ISO), 1 Rue de Varembe, Case Postale 58, CH 1 1211, Geneva, Switzerland (41-22-734-1240).

K ENGINEERING, DESIGN AND TECHNICAL CONSTRUCTION FILE

The following is an example of an engineering design and technical construction file (EDTCF) to be maintained by the fabricator as evidence of complying with 3-A Sanitary Standards or 3-A Accepted Practices. (The file may contain more or less information as applicable to the equipment or system.)

K1 Purpose

K1.1 To establish and document the material, fabrication, and installation (where appropriate) requirements for the engineering design and technical construction files for all products, assemblies, and sub-assemblies supplied by the manufacturer thereof to be in compliance with the sanitary criteria found in 3-A Sanitary Standards or 3-A Accepted Practices. It is recommended that the engineering and construction file or files be submitted with applications for 3-A Symbol use authorization.

K2 Scope

K2.1 This EDTCF applies to equipment specified by:

K2.1.1 3-A Sanitary Standards for Storage Tanks, Number 01-08.

K3 Responsibilities

K3.1 This EDTCF is maintained by: The Engineering Manager (or other company official) {name and title of responsible official} is responsible for maintaining, publishing, and distributing this EDTCF.

K3.2 Implementation: All divisions, specifically development engineering, standards engineering, sales engineering, and product departments are responsible for implementing this EDTCF.

K4 Applicability

K4.1 The 3-A Sanitary Standards and 3-A Accepted Practices are voluntarily applied as suitable sanitary criteria for dairy and food processing equipment. 3-A Sanitary Standards are referenced in the Grade A Pasteurized Milk Ordinance: "Equipment manufactured in conformity to 3-A Sanitary Standards complies with the sanitary design and construction standards of this Ordinance."

K5 Reference

K5.1 List any additional regulations that apply to the equipment or system covered by this EDTCF.

K5.2 Date of conformity or 3-A Symbol Authorization and certificate number, if authorized.

K6 Design and Technical Construction File

K6.1 The Engineering Design and Technical Construction File may consist of the following:

- a. an overall drawing of the subject equipment;
- b. full detailed drawings, accompanied by any calculations, notes, test results, etc. required to check the conformity of the equipment with the 3-A Standards or 3-A Practices;
- c. a list of:
 - (1) the essential requirements of the standards or practices;
 - (2) other technical specifications, which were used when the equipment was designed;
- d. a description of methods adopted;
- e. if essential, any technical report or certificate obtained from a competent testing body or laboratory;
- f. any technical report giving the results of tests carried out internally by Engineering or others;
- g. documentation and test reports on any research or tests on components, assemblies and/or the complete product to determine and demonstrate that by its design and construction the product is capable of being installed, put into service, and operated in a sanitary manner (optional);
- h. a determination of the foreseeable lifetime of the product (optional);
- i. a copy of the instructions for the product (Instruction Manuals/Instruction Books);
- j. for serial manufacturing, the internal measures that will be implemented to insure that the equipment will continue to be manufactured in conformity to the provisions of the 3-A Sanitary Standards or 3-A Accepted Practices;
- k. engineering reports;
- l. laboratory reports;
- m. bills of material;
- n. wiring diagrams, if applicable;
- o. sales order engineering files;
- p. hazard evaluation committee reports, if executed;
- q. change records;
- r. customer specifications;
- s. any notified body technical reports and certification tests;
- t. copy of the 3-A Symbol authorization, if applicable.

- K6.2 The file does not have to include detailed plans or any other specific information regarding the sub-assemblies, tooling, or fixtures used for the manufacture of the product unless a knowledge of them is essential for verification of conformity to the basic sanitary requirements found in 3-A documents.
- K6.3 The documentation referred to in K6.1 above need not permanently exist in a material manner in the EDTCF, but it must be possible to assemble them and make them available within a period of time commensurate with its importance (one week is considered reasonable time). As a minimum, each product EDTCF must physically contain an index of the applicable document of K6.1 above.
- K6.4 The EDTCF may be in hard copy or software form.
- K7 **Confidentiality**
- K7.1 The EDTCF is the property of the manufacturer and is shown at their discretion, except that all or part of this file will be available to the 3-A Symbol Council or a regulatory agency for cause and upon request.
- K8 **File Location**
- K8.1 The EDTCF should be maintained at {location} (fabricator's address).
- K9 **File Retention**
- K9.1 The EDTCF (including all documentation referred to in K6.1) shall be retained and kept available for 12 years following the date of placing the product in use or from the last unit produced in the case of series manufacture.

These standards had editorial changes, effective November 20, 2001.

NFPA Food Safety Award Nominations Wanted!

The International Association for Food Protection welcomes your nominations for the National Food Processors Association (NFPA) Food Safety Award. This award honors an individual (Member or non-member) or a group or organization in recognition of a long history of outstanding contributions to food safety research and education.

Eligibility: Individuals or organizations may be from industry (including consulting), academia, or government. International nominations are encouraged. The nominee must have a minimum of 10 years of service in the food safety arena:

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To request nomination forms, contact:



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• **9-11, Frontiers in Microbial Fermentation and Preservation.** Joint meeting of the Society for Applied Microbiology and The Netherlands Society for Microbiology, Wageningen, The Netherlands. See details at www.foodmicro.nl; booking form at www.foodmicro.nl.

• **16-18, International Poultry Exposition,** Georgia World Congress Center, Atlanta, GA. For further information, call 770.493.9401.

• **31-Feb. 3, Association of Water Technologies (AWT) Regional Training Seminar West,** The Fairmont Hotel, Dallas, TX. For further information, call AWT at 800.858.6683.

FEBRUARY

• **3-6, National Mastitis Council Annual Meeting,** Orlando, FL. For further information, call 608.224.0622.

• **5-6, Microbiological Concerns in Food Plant Sanitation and Hygiene,** Las Vegas, NV. For further information, call Silliker Laboratories at 800.829.7879.

• **6-7, Sensory Evaluation: Real World Techniques and Applications,** Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson at 732.932.9271; E-mail: ocpe@acrp.rutgers.edu.

• **19-21, Kentucky Association of Dairy, Food and Environmental Specialists Annual Meeting,** Executive West Hotel, Louisville, KY. For further information, contact David Burton at 270.781.8039.

• **20-21, California Association of Dairy and Milk Sanitarians Annual Meeting,** Holiday Inn, Visalia, CA. For further information, contact John Bruhn at 530.752.2192.

• **20-22, IFT's International Food Safety and Quality Expo,** Atlanta Marriott Marquis, Atlanta, GA. For further information, call 312.782.8424; E-mail: ift@ift.org.

MARCH

• **7, Controlling Listeria in Your Plant,** Nashville, TN. For further information, call Silliker Laboratories at 800.829.7879.

• **14-15, Carolinas Association for Food Protection Annual Meeting,** Holiday Inn, Charlotte. For further information, contact Beth Johnson at 803.896.0872.

• **14-17, Association of Water Technologies (AWT) Regional Training Seminar East,** The Holiday Inn Inner Harbor, Baltimore, MD. For more information, call AWT 800.858.6683.

• **24-27, International Conference on Emerging Infectious Diseases, 2002,** Hyatt Regency Hotel, Atlanta, GA. For further information, contact Charles Schable at cas1@cdc.gov.

• **26-27, Food Irradiation 2002 Conference,** Westin Park Central Hotel, Dallas, TX. For further information, call 207.781.9604.

APRIL

• **3-5, Missouri Milk, Food and Environmental Health Association Annual Meeting,** Ramada Inn, Columbia, MO. For further information, contact Linda Wilson at 417.864.1661.

• **9-10, Upper Midwest Dairy Industry Association Spring Meetings.** April 9, 2002 at the Best Western Hotel, Mankato, MN. April 10, 2002 at the Holiday Inn, Alexandria, MN. For further information, contact Paul Nierman at 763.785.0484.

• **11-13, International Fresh-cut Produce Association's (IFPA) 15th Annual Conference and Exhibition,** Millennium Biltmore Hotel and the Los Angeles Convention Center, Downtown Los Angeles, CA. For additional information, call 703.299.6282; Web site: www.fresh-cuts.org.

• **18, Indiana Environmental Health Association, Inc. Spring Conference,** Valle Vista, Greenwood. For further information, contact Helene Uhlman at 219.853.6358.

• **19-24, Conference for Food Protection,** Sheraton Nashville, Nashville, TN. For further information, contact Trevor Hayes at 408.848.2255; E-mail: TWHgilroy@aol.com.

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For the Year Ended August 31, 2001**

Revenue:

Advertising	\$ 117,573
Membership & Administration	388,228
Communication	621,333
Annual Meeting	466,854
Workshops	32,031
Total revenue	1,626,019

Expense:

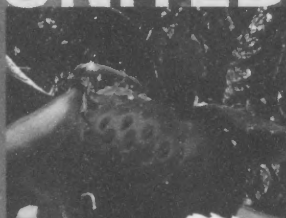
Advertising	106,042
Membership & Administration	560,756
Communication	587,256
Annual Meeting	334,319
Workshops	22,640
Total expense	1,611,013

Change in General Fund **\$ 15,006**

Net Assets as of 8/31/01:

General Fund	(1,546)
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3-A Partners Make Progress Toward TPA

Work is continuing on the 3-A Sanitary Standards Program's transition from self-certification to third party accreditation (TPA). The 3-A Partners, including the International Association of Food Industry Suppliers, the International Dairy Foods Association, the International Association for Food Protection and the 3-A Symbol Council, met in Minneapolis in August. This was the fourth in a series of meetings that have taken place since June 2000 to focus on this transition.

The transition work is being done by five working groups, covering the following areas: third party accreditation administration system, qualification criteria for sanitary design auditors, auditing process, protocol for maintaining certification or re-certifying used, modified, rebuilt or remanufactured equipment, and communication and education.

The meeting focused on two major objectives to: present updated reports from the working groups and to conduct a broader public forum for those just recently learning about this 3-A program transition. Nearly 65 attendees participated in the meeting.

With the progress reported by these groups, the 3-A Partners agreed that there was no need for another meeting of the larger, all-inclusive 3-A Partners group. Instead, the working groups will meet separately and develop the near-final procedures for each working group topic. Their work will then be posted on the 3-A (www.3-a.org) and the 3-A Symbol Council websites for final public comment. This comment period will likely extend from early December 2001 to early January 2002.



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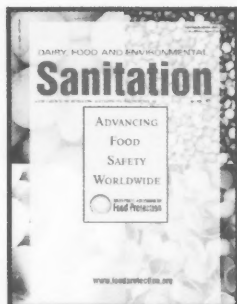
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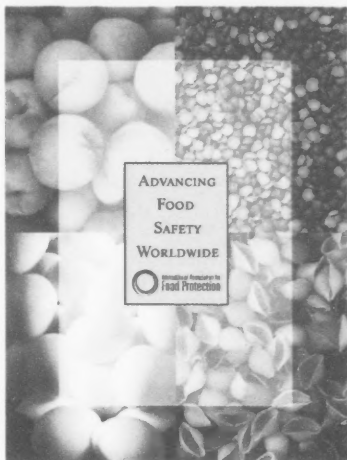
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