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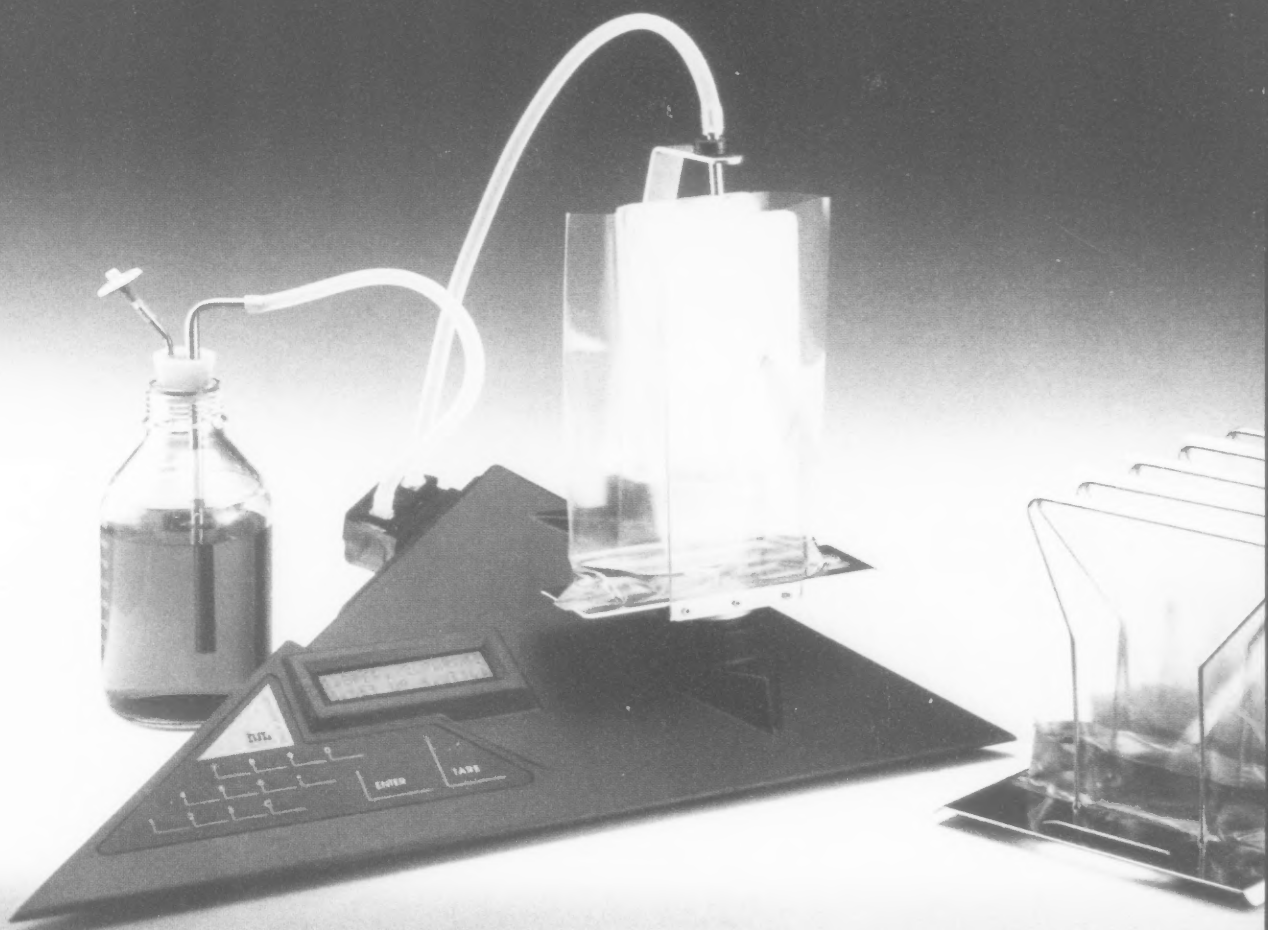
DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. JUNE 1998



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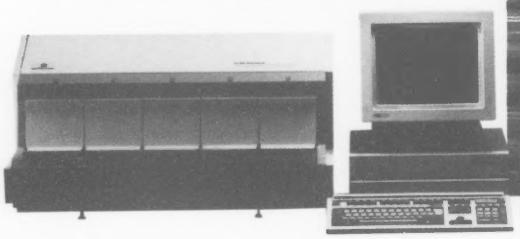

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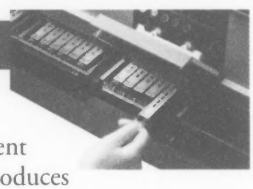

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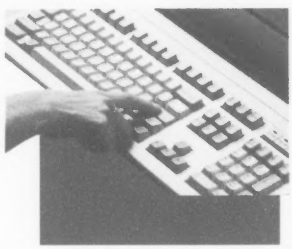

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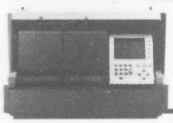

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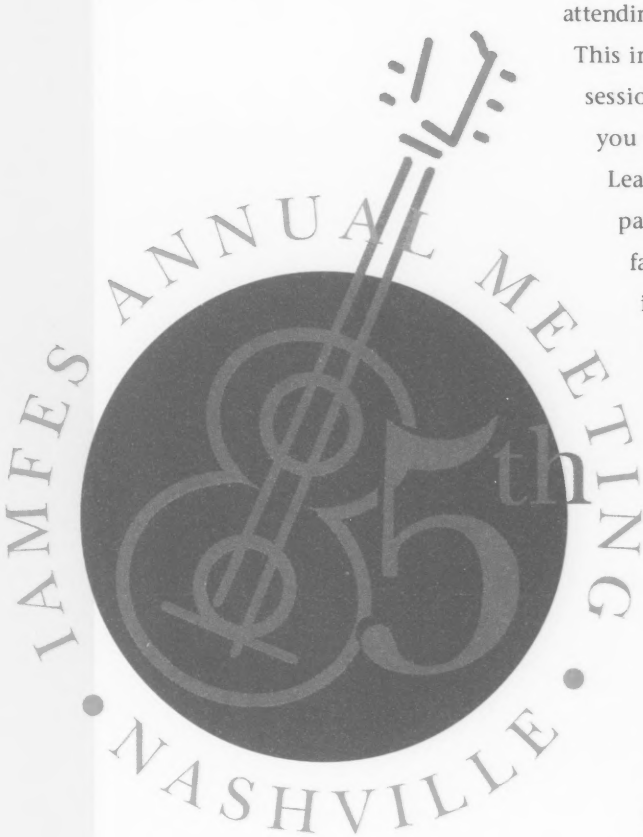
Advancing Food Safety Worldwide

Nashville, Tennessee is the site and **August 16-19, 1998** is the date that leading authorities in food safety from around the world will gather to share and discuss the latest advances in protecting the world's food supply at the **IAMFES 85th Annual Meeting**.



Join over 1,000 of your colleagues in attending more than 250 presentations. This includes symposia, technical sessions, and posters that will allow you to expand your knowledge. Learn more about emerging pathogens, HACCP, Good Manufacturing Practices, foodborne illness surveillance, general food microbiology, and many other issues facing today's food safety professional.

A visit to the IAMFES exhibit hall will keep you current with the latest products and services available to the food industry. Take time to meet with various representatives to learn what may solve the food safety issues facing your industry. Experience over 75 displays of testing materials, cleaning products, pest control materials, services, and more!

Plan now to attend the IAMFES 85th Annual Meeting! Call today for registration information: 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: iamfes@iamfes.org; or visit our Web site: www.iamfes.org for the latest program information.

INDUSTRY GOVERNMENT IAMFES EDUCATION RESEARCH

August 16-19, 1998

ABOUT THE COVER...

Photo courtesy of Cogent Technologies, Ltd. The Chronodilutor improves laboratory efficiency by automatically preparing accurate dilutions of random weight samples for analysis, more quickly than manual dilutions.

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Extras

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Sunday, August 16, 1998
6:00 a.m. – Bus Leaves the Hotel

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Before we deal with problems involving food safety and protection, let's get together for some fun and a GREAT round of golf! IAMFES has organized a FUN, BEST-BALL tournament with you in mind. EVERYONE IS WELCOME, regardless of skill.

About the Golf Course:

We have arranged to play the Hermitage Golf Course on the banks of the Cumberland River, near President Andrew Jackson's stately Hermitage home. The Hermitage Golf Course hosts many tournaments during the year, but is best known for the LPGA's Sara Lee Classic. Its large bent-grass greens, bermuda tees and cool seasonal grasses give the course a rich, green presentation year-round. The course is designed by internationally prominent Course Architect Gary Roger Baird and is 6,800 yards of championship golf at its best!

To join your friends and colleagues in a round of golf, call the IAMFES office at 800.369.6337 (or 515.276.3344) or Fax us at 515.276.8655 to request a registration form. Hurry! Registration deadline is July 15, 1998!

Companies:

Are you looking for a unique way to promote your company at the IAMFES Annual Meeting? IAMFES is looking for sponsorship support for this event. If you will consider providing quality prizes (or cash prizes) for the IAMFES Golf Tournament, we would like to hear from you. Call David Tharp at the phone numbers listed above for more details.

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COMMENTS

FROM YOUR PRESIDENT

By GALE PRINCE
IAMFES President

"Hats off to all the members of the Committees, PDGs, Task Forces, and Support Groups!"

IAMFES is more than a group of people who meet once a year for an Annual Meeting. It is food safety professionals working to make a difference in the world by advancing food safety. The best example of how this is accomplished is to look at the efforts of our various Committees, Professional Development Groups (PDGs), Task Forces, and Support Groups. I am amazed at the efforts so many people put forth; not only at the Annual Meeting, but throughout the year. It's time to recognize their efforts! Hats off to all the members of the Committees, PDGs, Task Forces, and Support Groups!

We can be proud of the accomplishments of our groups with results obvious around the world. One accomplishment is the work from these groups that brings forth the symposia topics for our outstanding IAMFES educational program each year. The Program Advisory Committee spends time each year looking into the crystal ball to make future plans for Annual Meetings. This would not be as successful if it wasn't for the efforts of all the other groups.

The Journal Management Committees provide guidance and direction for the *Journal of Food Protection* and *Dairy, Food and Environmental Sanitation*. They helped make our publications well respected by food safety professionals around the world. The Sanitary Procedures Committee over the years has had a tremendous impact on the sanitary design of equipment and the resulting impact on food safety. Our Dairy, Meat, Poultry, Seafood, Produce, and Food Sanitation PDGs all have their special areas of interest and are important in making sure these areas of food safety are properly represented. Other PDGs such as Applied Laboratory Methods, Viral and Parasitic Foodborne Diseases, Food Safety Net, Audio Visual Library, and Microbial Food Safety Risk Assessment Groups bring us better ways of facing the ever-changing field of food safety. Each of these are key to rounding out the Association and its ability to cross pollinate ideas and build a better food safety system.

I know of no other Committee in the food industry that works harder in serving the human race than the Committee on Communicable Diseases Affecting Man. Their contributions reach far beyond IAMFES with their "Procedures to Investigate" manuals. The Education Task Force is providing the building blocks to spread the word to use our knowledge to educate those in need of food safety information.

The Awards Task Force and the Developing Scientist Task Force see that our Membership is recognized for outstanding achievements. Another Task Force that makes sure we play by the established rules is the Constitution and Bylaws Task Force. Two important support groups that help IAMFES are the Foundation Fund and the Affiliate Council. The Foundation Fund provides special assistance in such areas as the Audio Visual Library and Annual Meeting speaker support. The Affiliate Council is the backbone of the Association and provides affiliate chapters a voice within IAMFES.

There are so many people involved in making IAMFES a leading organization in food safety. I'm proud of their accomplishments and appreciate all the time they devote to the Association. If you want to get more out of your Membership with IAMFES, I encourage you to get involved. On page 382 is a letter to our Members from Vice President Jack Guzewich regarding our many groups. A listing of Committees, PDGs, and Task Force Chairpersons along with their phone, fax, and E-mail addresses follows. Find a group you're interested in becoming involved with and call the Chairperson for more information.

All of our groups will meet on Sunday, August 16, 1998 in Nashville. However, activities are not limited to the Annual Meeting. Activities go on all year long through correspondence, E-mail, and conference calls. Share your expertise and learn from others who are making a difference. Hope to see you in Nashville!

Lecturer: Christine Bruhn, University of California-Davis, Center for Consumer Research, Davis, CA

IVAN PARKIN LECTURE

Communicating Food Safety to the Consumer

SUNDAY, AUGUST 16, 1998

OPENING SESSION — 7:00 P.M.

In 1986, The International Association of Milk, Food and Environmental Sanitarians (IAMFES) established the Ivan Parkin Lectureship to honor those professionals who have made or are making an impact on the food safety field. The lectureship was named after an active and longtime member of IAMFES, Ivan Parkin. He was a Dairy Extension Specialist at Pennsylvania State University. Ivan was IAMFES President from 1954 to 1955 and remained active in the association for many years following. He served as an example to others as a professional, a loyal member, an educator dedicated to protecting the food supply, and is remembered by those who knew him as a kind and warm person.

The Ivan Parkin Lecture is not reserved only for those in research or even specifically in the field of food safety, but is used to honor those who, through whatever means, have impacted the field of food safety. The Ivan Parkin lecture is presented Sunday evening as part of the Opening Session. It has become the highest regarded presentation of the most comprehensive Meeting of food safety professionals in the world. It is considered a tribute to be invited to address the membership and the lecture sets the tone for the Meeting.

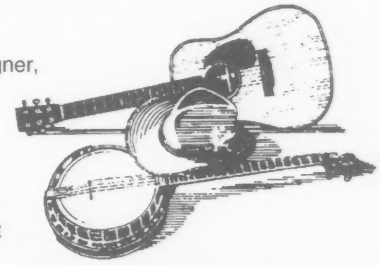
GRAND OLE OPRY

Saturday, August 15, 1998
5:00 p.m. – 9:30 p.m.

It all began here on the night of November 28, 1925. A young announcer on Nashville radio station WSM introduced a new show called "The WSM Barn Dance." Now, 73 years later, the show is still going strong and has since become known as the world-famous Grand Ole Opry. Along the way, it became the foundation for country music making Nashville, a mecca for country music fans the world over.

The Grand Ole Opry is the longest-running, regularly scheduled, live radio show, offering a variety of music and good old country humor. You never know who'll make a surprise appearance for a show.

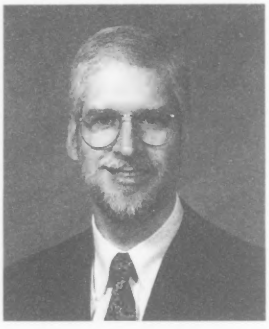
The Opry's membership reads like a "Who's Who in Country Music." It lists more then 70 country music stars, including legends like Porter Wagner, Loretta Lynn, and Brenda Lee as well as today's biggest stars like Vince Gill, Martina McBride, and Garth Brooks.



Join us and experience a true American original — The Grand Ole Opry. With your reserved seating you can share the music and the memories of country music's grandest show. To register for an evening at the Opry, see the reverse side of this form. Complete the form and return it with your Meeting registration materials.

COMMENTARY

FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP
IAMFES Executive Director

"Membership"

What does your IAMFES Membership mean to you? Do you receive a value for your Membership dues equal or exceeding the cost of your dues? We certainly believe so! We are interested in your thoughts on this subject. Please read through the rest of this column and contact me with your input.

The major benefit that we see of being a Member is receiving the monthly Journal, *Dairy, Food and Environmental Sanitation (DFES)*. In addition, many Members choose to "add on" 12 issues of the *Journal of Food Protection (JFP)* for a small additional fee. Both Journals are filled with information on the latest techniques in food safety and protection. *DFES* provides practical and applied research articles along with Association news, updates and related information. *JFP* is our refereed, scientific Journal of research and review papers on topics in food science as related to food safety.

Our Audio Visual Lending Library has 100's of training videotapes available for use by our Members. Many Members use this service and comment on how great it is to have access to such a variety of tapes. Other benefits include a Member's discount when purchasing the 3-A Sanitary Standards or any of our booklets and registration discounts for the IAMFES Annual Meeting. We also offer Member discounts for registration to Workshops. You can easily save an amount exceeding the cost of Membership dues simply by registering for the Annual Meeting. Your savings grow if you purchase other products or when you take advantage of the Lending Library.

To the best of our knowledge, IAMFES Members are not interested in Association affinity programs such as an IAMFES credit card, life or health insurance, and discounted overnight shipping services. We are certainly capable of offering such services, but it is our understanding that this is not of great interest to our Members. We have not pursued these avenues to "artificially" increase the value of your Membership, because we feel you have these services available through other means and that they only serve to cheapen the professionalism of your IAMFES Membership.

We are always open to new opportunities to increase the value of your IAMFES Membership and welcome your comments. We hope that each year when your renewal invoice arrives, you feel compelled to return it quickly with your payment because of the value you receive. If at any time you begin questioning why you belong to IAMFES, please pick up the phone, call us, and let's discuss your questions. Bring to our attention any concerns that you have or changes you would like to see. Your comments do help shape the direction of IAMFES and are so very important.

One last thing I'll ask you to do. If you feel that your IAMFES Membership has benefited you over the years, encourage a colleague to join IAMFES. This may be someone in your office, in your city, in the same country, or someone half way around the world from you; but this someone may only need your encouragement or suggestion to become the next IAMFES Member. Once they have joined, who knows, they may be leading an IAMFES Committee or serving on the IAMFES Executive Board.

Think about your Membership. About what it means to you. About what it can mean to others. Act on your thoughts, invite others to participate, and help build IAMFES into a stronger organization for the future. I cannot think of anything that could be more important to mankind than the protection of our worldwide food supply!

THE IAMFES FOUNDATION FUND WILL BE SPONSORING A SILENT AUCTION AT THE 85TH ANNUAL MEETING!

WATCH FOR ADDITIONAL INFORMATION ON THE SILENT AUCTION

We are looking for members to donate items for the Silent Auction. All proceeds go to the IAMFES Foundation Fund.

What is the IAMFES Foundation Fund?

The Foundation Fund is supported by membership of IAMFES sustaining members and from individual members. Sustaining members are corporations, companies, and individuals whose business interests reflect the goals and mission of IAMFES. Funds in the Foundation are kept separate from the operating funds of IAMFES and are used for worthy causes which enrich the Association.

The Foundation Fund supports:

- Ivan Parkin Lecture
- Audio-Visual Lending Library
- Co-sponsorship of the Crumbine Award
- Developing Scientist Oral and Poster Competition
- Shipment of volumes of surplus *JFP* and *DFES* journals to developing countries through FAO in Rome
- Recruitment of exceptional speakers for the IAMFES Annual Meetings

Why should I contribute to the IAMFES Foundation Fund?

Any contribution, no matter how large or small will help build a secure Foundation for the future of IAMFES. The future of IAMFES depends on how well we can meet the needs of our membership in providing educational programs, journals, products, and services, and on how well IAMFES fulfills its mission. The Foundation Fund was created to provide a long-lasting legacy of information and service for protecting the milk, food, water, and environment throughout the world.

If you would like to donate to the Foundation Fund and/or the Silent Auction, please contact Lisa Hovey at 800.369.6337; 515.276.3344; Fax: 515.276.8655; or E-mail: lhovey@iamfes.org.

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Survey of Coliforms and Enterococci in Retail Swiss Cheese: Ramifications for Choice of Sanitation Indicator Organisms and Enumeration Method

Kevin M. Parks and Steven C. Ingham

SUMMARY

Numbers of coliforms and enterococci were determined for 50 retail samples of Swiss cheese purchased over a 10-week period. Coliforms were enumerated by use of the Violet Red Bile Agar (VRBA), modified Violet Red Bile Agar (VRBA-2; trypticase soy agar basal layer for recovery of injured cells), and Petrifilm methods. Enterococci were counted with Citrate Azide agar (CA), m-Enterococcus agar (mE), and Kanamycin Esculin Azide agar (KEA). There were no statistically significant ($P < 0.05$) differences between coliform enumeration methods. However, CA recovered significantly fewer enterococci than the other two methods, which did not differ from each other significantly. Coliforms were detected in only 18% of samples, with 89% of these samples (16% of overall samples) containing > 1,000 CFU/g. Enterococci were detected in 84% of samples, with 59% of the positive samples (50% of overall samples) containing > 1,000 CFU/g. There was little correlation between the presence of enterococci and that of coliforms. Coliform isolates were mainly *Klebsiella pneumoniae*, whereas enterococci isolates were predominantly *Enterococcus faecium*. Enterococci counts may be more useful than coliform counts as an indication of Swiss cheese sanitary condition and storage time.

INTRODUCTION

Analyses for various groups and individual indicator organisms have been employed to obtain information about the microbiological quality and safety of food *(17)*. The concept of testing for indicator bacteria rather than pathogenic bacteria dates to 1892, when Schardinger instituted the practice of testing water for the presence of *Escherichia coli*. Presence of this common non-pathogenic bacterium was used as an indication of fecal contamination and of possible contamination with *Salmonella typhi (4)*. Various sectors of the food industry have adopted this approach for evaluating the safety of their products.

Despite their potential importance in providing information about food safety, results of testing for indicator bacteria are most often used in the dairy industry to estimate product shelf life and to evaluate the sanitary conditions present during production. Jay *(17)* published criteria for this use of testing for indicator organisms. These criteria specify

that (1) the indicator bacteria should be detectable in all foods whose quality is to be evaluated, (2) growth and numbers of indicator bacteria should have a direct negative correlation with quality, (3) the indicator bacteria should be easily and rapidly detected and counted, (4) the indicator bacteria should be easily distinguishable from other bacteria, and (5) the growth of the indicator bacteria should not be inhibited by other bacteria normally present in the food. Two groups of bacteria commonly used as indicators of product quality and sanitary condition are the coliforms and enterococci.

Coliforms as indicator bacteria

The coliform group is comprised of the genera *Escherichia*, *Enterobacter*, *Citrobacter*, and *Klebsiella*. Each of these genera can colonize the intestinal tract of humans and other animals and can be discharged in their feces *(4)*. However, some coliforms can also colonize plants, so their presence in a food does not invariably indicate fecal contamination. Therefore, the dairy industry generally uses quantitative coliform tests as a measure of sanitary quality *(17)*. Of the coliforms, *E. coli* has particular value as an indicator of quality in moderately acidic foods because the organism is relatively acid tolerant *(9)*. Given an appropriate pH and supply of nutrients, coliforms can be expected to reach high numbers in foods or beverages that are not properly refrigerated. However, the group, as a whole, grows poorly at good refrigeration temperatures *(17)*.

The value of coliform counts as indicators of food safety is limited because some fecal pathogens may persist in foods after the coliforms have been destroyed by processing treatments such as freezing, refrigeration, or heating *(9, 13)*. Also, if a food is improperly stored at a temperature that permits rapid growth of coliforms, the analyst may obtain an artificially inflated number of coliforms that may not be indicative of the original extent of contamination. Therefore, high numbers of coliform bacteria in a dairy product may be attributed to either poor sanitation, faulty pasteurization, post-pasteurization contamination, or, if the dairy food has the appropriate pH and is temperature abused, growth of initially small numbers of coliforms *(3, 4, 13, 17)*. Although coliform enumeration methods, many of which are very well characterized, have been used by the dairy industry for decades, the above-cited shortcomings of the coliform group suggest that enumeration of other indicator bacteria may provide more useful information. One group of indicator bacteria that may be especially useful is the enterococci.

Enterococci as indicator bacteria

The genus *Enterococcus* was defined in 1984, although many of the species comprising this genus were proposed as indices of fecal pollution in 1947 *(21)*. Formerly the enterococci had been part of the genus *Streptococcus*. The genus *Enterococcus* consists of over 20 species *(17)* that primarily inhabit the intestinal tract of humans and animals. The enterococci may contaminate plants and insects via fecal contamination; thus, plants and insects are regarded as secondary habitats *(13)*. In food, *E. faecalis* and *E. faecium* are the two enterococcal species most commonly isolated *(25)*. Therefore, the occurrence of enterococci in dairy products implies direct or indirect fecal contamination *(4)*.

Some *Enterococcus* strains survive HTST pasteurization of milk, whereas coliforms do not *(13)*. However, the enterococci apparently do not survive the more severe heat treatment used in making process cheese *(5)*. The enterococci also are more resistant to cold temperatures than the coliforms are *(13)*. These factors suggest that the enterococci may be a better sanitation indicator than the coliforms. Marshall confirmed this hypothesis in a study of churned butter, and quantitative analysis of enterococci is recommended for the microbiological evaluation of butter *(20)*. Aleksandreva *(1)* reported that a thorough washing and disinfection of all product contact surfaces significantly reduced the numbers of enterococci in dairy products.

Currently available methods for the enumeration of enterococci are less well characterized than those for coliform enumeration. Criticisms of enterococci enumeration methods include poor selectivity and differentiation, lack of quantitative recovery, and relative difficulty of use *(13, 25)*. In addition, there is less historical information on acceptable numbers of enterococci in dairy products. Before the use of enterococci as sanitation and quality indicators can be widely accepted in the dairy industry, it is important to (1) determine their typical prevalence in dairy products, (2) understand their ability to survive and grow in dairy products, and (3) optimize methodology for enumeration. The study reported here was conducted to obtain some of this needed information.

We compared the prevalence of coliforms and enterococci in 50 retail samples of Swiss cheese, a dairy food that reportedly can contain high concentrations of enterococci *(11)*. We also compared three currently available methods for enumeration of coliforms and three for enumeration of enterococci.

MATERIALS AND METHODS

Samples and sample preparation

Retail Swiss cheese samples were obtained over a ten-week period from retail grocery stores in Madison, WI. The samples represented eight brands and were tested when 0 to 9 months (average: 5 months) remained before the expiry date. Samples were transported within 20 minutes to the laboratory, where they were refrigerated at 2 to 8°C upon arrival.

From each sample, an 11.0 g sample was obtained using a sterile spatula. The sample was then diluted 1:10 in 0.1% (w/v) peptone water (NutraMax Products, Gloucester, MA) and homogenized for 2.0 min. using a stomacher (Seward Model 400, London, UK). Appropriate decimal dilutions were prepared using 0.1% peptone water.

Figure 1. Frequency distribution of presumptive coliform concentrotions in retoil Swiss cheese.

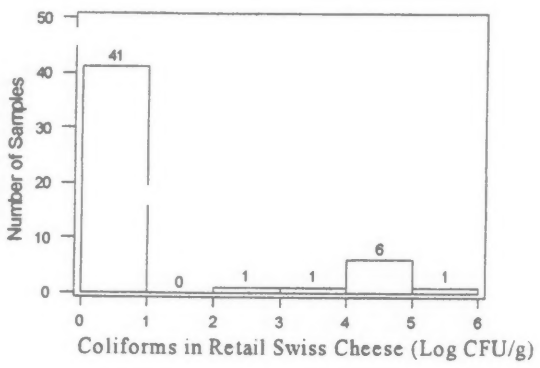
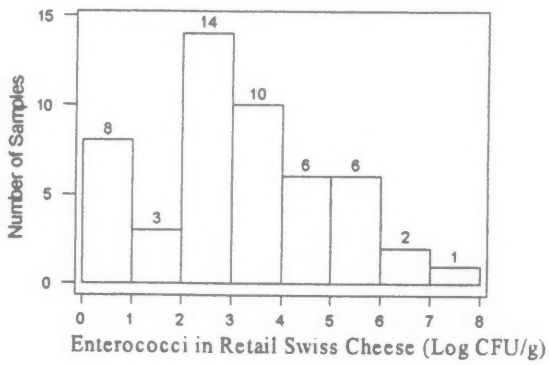


Figure 2. Frequency distribution of presumptive enterococci concentrotions in retoil Swiss cheese.



Presumptive enumeration, confirmation, and identification of coliforms

Appropriately diluted samples were pour-plated in triplicate with the Violet Red Bile Agar (VRBA) and modified Violet Red Bile Agar (VRBA-2) methods, or transferred by pipet onto triplicate Coliform Count Petrifilms *(20)*. For each coliform (+) sample, one colony of the dominant representative morphology was isolated from one of the media; the medium was selected randomly. Isolates from each method were tested for the ability to produce gas in 2% (w/v) Brilliant Green Bile broth (BGB; Difco Laboratories, Detroit, MI) during 48 ± 3 h of incubation at 32°C ± 1°C. Confirmed coliform isolates were transferred to Nutrient agar (Difco) slants, incubated at 32°C ±1°C for 24 ± 2 h and then held at 2 to 8°C. Slant cultures were transferred to fresh Nutrient agar slants monthly. The isolates were identified to the species level with use of the API 20E system (bioMérieux Vitek, Hazelwood, MO).

Presumptive enumeration, confirmation, and identification of enterococci

Enterococci were enumerated by triplicate pour-plating on (1) Citrate Azide Agar [CA; (20)], (2) m-Enterococcus agar (mE; Difco) with added 0.05% (v/v) Tween 80 (Sigma Chemical Co., St. Louis, MO) and 0.2% (w/v) sodium bicarbonate (Sigma), as recommended by Burkwall and Hartman *(8)*, and (3) Kanamycin Esculin Azide agar (KEA; Oxoid, Ogdensburg, NY) with 20 mg kanamycin sulfate (Sigma) added per liter. The CA agar consisted of a basal medium containing (per liter): 10 g yeast extract (Difco), 10 g pancreatic digest of casein (Difco), 20 g sodium citrate (Sigma), and 15 g agar (Difco). This basal medium was sterilized and tempered to 46 to 48°C; then 0.1% (w/v) tetrazolium blue (Sigma) and 4% (w/v) sodium azide (Sigma) were added. Presumptive colonies on the three media were counted after incubation at 37°C ± 1°C for 24 to 72 h: blue colonies on CA, pink to maroon colonies with 0.5 to 3.0 mm diameter on mE, and round white-to-grey colonies about 2 mm in diameter surrounded by black zones of > 1 cm diameter on KEA. For each enterococci (+) sample, one colony of the dominant representative morphology was isolated from one of the media; the medium was selected randomly. Isolates were streaked onto 40% (w/v) Bile Esculin agar (Difco) and incubated at 37°C ± 1°C for 18 to 24 h. Colonies surrounded by black zones were transferred to Brain Heart Infusion broth (Difco) containing 6.5% sodium chloride (Sigma). If growth was observed in this medium after 72 h of incubation at 37°C ± 1°C, a loopful of growth was streaked on Brain Heart Infusion agar (BHI; Difco), which was then incubated at 37°C ± 1°C for 18 to 24 h. The catalase test and the Dryslide™ PYR (Difco) test were then performed on representative colonies to confirm that the isolates were enterococci *(18, 19, 25)*. Confirmed enterococci isolates were transferred to BHI agar slants, incubated at 37°C ± 1°C for 18 to 24 h, stored at 2 to 8°C, and transferred monthly thereafter. Isolates were identified to biotype level within species with the API 20 STREP system (bioMérieux Vitek). Isolates were also tested for vancomycin resistance with a Sensi Disk Vancomycin system (Becton Dickinson, Cockeysville, MD), each isolate being grown as a lawn on Mueller Hinton agar (Difco). Zones of inhibition were measured after 24 h of incubation at 37°C ± 1°C.

Figure 3. Sum and Difference plot for Citrate Azide agar (CA) and m-Enteracaccus agar (mE) enumeration of presumptive enteracacci in retail Swiss cheese.

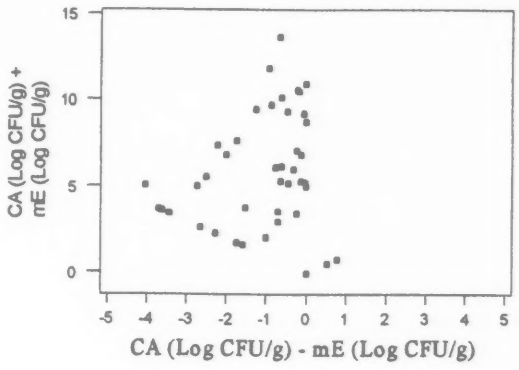


Figure 4. Sum and Difference plot for Citrate Azide agar (CA) and Kanamycin Esculin Azide agar (KEA) enumeration of presumptive enteracacci in retail Swiss cheese.

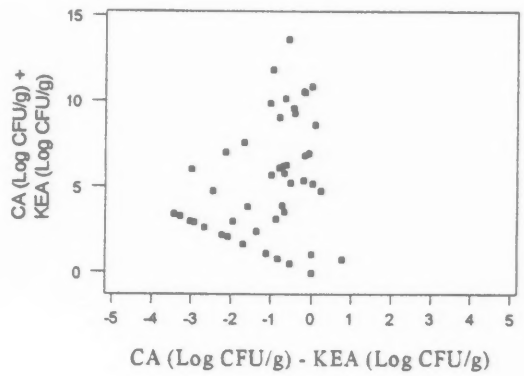
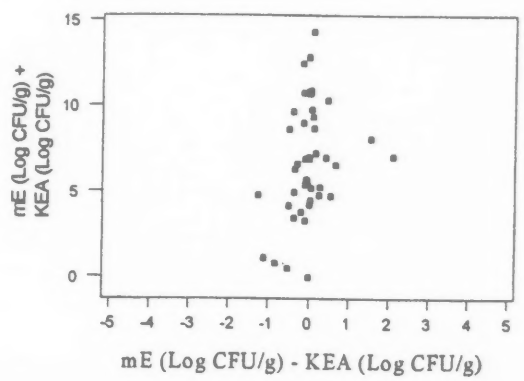


Figure 5. Sum and Difference plot of m-Enteracaccus agar (mE) and Kanamycin Esculin Azide agar (KEA) enumeration of presumptive enteracacci in retail Swiss cheese.



STATISTICAL ANALYSIS

The CFU/g for each sample was transformed to log CFU/g by use of the protocol of Jarvis *(16)*. Transformed data were analyzed by use of one-way analysis of variance, student's *t*-tests, and paired student's *t*-tests on the Minitab statistical package *(2)*. Differences between pairs of enumeration methods were evaluated for statistical significance using the Student's *t*-test. In addition, the Fisher Exact Test for independence was used to evaluate the relationship between coliform and enterococci prevalence *(12)*. Pairs of enterococci enumeration methods were also compared using Sum and Difference plots in which, for each sample, the sum of the log CFU/g for the two methods (y axis) is plotted against the difference between log CFU/g for the two methods (x axis). Similar methods result in points clustered near the zero value on the x axis.

RESULTS AND DISCUSSION

In this survey, we analyzed fifty retail Swiss cheese samples for numbers of coliforms and enterococci, using three methods for each indicator group. Representative coliform and enterococci isolates obtained from presumptive positive samples were identified to the species and biotype levels, respectively.

The frequency distributions for concentrations of presumptive coliforms and enterococci in the retail Swiss cheese samples are shown in Fig. 1 and 2, respectively. There was no meaningful correlation between the length of time remaining before the sample expiry date and concentrations of either indicator bacterial group. Only 18% of the samples contained presumptive coliforms at a concentration greater than 10 CFU/g, with 89% of these samples (16% of overall samples) containing presumptive coliforms at a concentration greater than 10^3 CFU/g. The overall frequency of samples containing presumptive enterococci at a concentration greater than 10 CFU/g was 84%, with 59% of these samples (50% of overall samples) containing

TABLE 1. Identity and frequency of occurrence of *Enterococcus* spp. isolates obtained from retail Swiss cheese samples

Species and Biotype	Number	Percentage of total number of isolates
Enterococcus faecium Biotype 1	24	55.8 %
Enterococcus faecium Biotype 2	11	25.6 %
Enterococcus faecium Biotype 3	0	0.0 %
Enterococcus faecalis Biotype 1	2	4.7 %
Enterococcus faecalis Biotype 2	0	0.0 %
Enterococcus faecalis Biotype 3	1	2.3 %
Enterococcus durans Biotype 1	0	0.0 %
Enterococcus durans Biotype 2	5	11.6 %
Total	43	100.0 %

presumptive enterococci at a concentration exceeding 10^3 CFU/g. Of the samples tested, three (6%) contained presumptive enterococci at a concentration greater than 10^6 CFU/g, and one contained presumptive enterococci at a concentration greater than 10^7 CFU/g.

Enterococci counts are recommended for evaluating the sanitary quality of butter and are reportedly more accurate for this purpose than counts of yeasts and molds or coliforms *(6)*. Coliforms generally do not survive well in the butter microenvironment, although they may be useful in evaluating sanitation at specific processing steps prior to salting *(24)*. Swiss cheese differs markedly from butter with regard to processing temperatures, pH, and salt concentration. Demarigny, et al. *(11)* reported that changes in the microenvironment, particularly the depletion of metabolizable sugars, during the manufacture, ripening, and storage of Swiss cheese limit concentrations of enterococci to not more than 10^6 CFU/g. However, Brandl, et al. *(7)* concluded that enterococci concentrations in hard cheeses varied from 10 to more than 10^7 CFU/g, and our results were consistent with this report.

Results obtained with the VRBA and Petrifilm methods for enumeration of coliforms did not differ significantly ($P < 0.05$). These findings are consistent with those of Ginn, et al. *(14)* and Curiale, et al. *(10)*, and both procedures are standard methods *(20)*. Likewise, we did not detect any significant difference between results with the VRBA-2 method and results with the other two methods. Hartman, et al. *(15)* reported improved recovery of stressed coliforms from foods when the VRBA-2 method was used rather than the VRBA method. However, Reber and Marshall *(22)* found that the improved recovery obtained with use of VRBA-2 varied by genus within the coliform group, with only *E. coli* being recovered in significantly higher numbers on VRBA-2 than on VRBA. The 12 coliform isolates obtained from retail Swiss cheese in our survey were either *Klebsiella pneumoniae* (75%) or *K. oxytoca* (25%). There were no *E. coli* isolates, which may thus explain why the VRBA-2 method did not detect greater numbers of coliforms than the other two methods used.

Results obtained with the three methods of presumptive enterococci enumeration differed significantly, as illustrated by the wide distribution of data points in Sum and Difference plots shown in Fig. 3 and 4. The KEA and mE media yielded similar results, as shown in Fig. 5, and detected significantly higher ($P < 0.05$) numbers of presumptive enterococci than the CA medium. However, there was no significant difference between the KEA and mE media. In addition, the enumeration of presumptive enterococci with CA was the most time consuming of the three methods studied. These results are surprising in that CA is currently the medium used in the recommended standard method *(20)*. This study is the first in which these three methods were directly compared, although Reuter *(23)* compared modified versions of the methods and concluded that no medium was completely selective for enterococci. The 43 *Enterococcus* isolates obtained in our survey included two biotypes of *E. faecium*, two biotypes of *E. faecalis*, and one biotype of *E. durans* (Table 1). The predominant isolates, comprising more than 81% of the isolates, are *E. faecium* biotypes 1 and 2.

Jay *(17)* described *E. faecium* and *E. faecalis* as the classic enterococcal species that can be isolated from mammal feces. *E. durans* has been more commonly associated with poultry and cattle. The identity of the isolates detected suggests that they are directly or indirectly of fecal origin, although their exact source was not determined. All enterococci tested were sensitive to vancomycin. However, the presence of vancomyin-resistant enterococci in foods has been documented *(26)* and may be of public health significance in the future.

No relationship between the presence of coliforms and the presence of enterococci was found with the Fisher Exact Test ($P = 1.000$) *(12)*, nor was there a relationship between a high concentration of coliforms and a high concentration of enterococci ($P = 0.958$). These results agree with those obtained by Brandl et al. *(7)* in a survey of hard cheeses.

In summary, our survey of retail Swiss cheese for numbers of presumptive coliforms and enterococci showed that three commonly used coliform enumeration methods recovered comparable numbers of bacteria, whereas results with three

methods for enumerating enterococci differed significantly. Citrate azide agar is a recommended *(20)* method for enumeration of enterococci, but its performance in the present study was less than ideal. No relationship was apparent between presence or numbers of presumptive coliforms and enterococci when 50 samples of retail Swiss cheese were tested. At least two explanations are possible for these results. It is possible that these two groups of bacteria reflect different routes of contamination that do not always occur. Alternatively, our findings may simply reflect the more cold-tolerant nature of the enterococci. It is evident from our findings, however, that enterococci are more common than coliforms in retail Swiss cheese and may therefore be more easily correlated with sanitary conditions during processing or environmental conditions such as storage temperature. In the future, a step-by-step analysis of Swiss cheese during manufacturing and storage needs to be done to thoroughly understand the relationship(s) between prevalence of enterococci, sanitary quality, and storage conditions.

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The Healthcare Continuum: A Classification Model for Topical Antimicrobial Products Including Those Used in the Food Industry

Rhonda D. Jones

SUMMARY

The Food and Drug Administration (FDA) 1994 Tentative Final Monograph addressed topical antimicrobial wash products and proposed that foodhandler products be included in this regulation. However, the Monograph provided no guidelines for the regulation of foodhandler products. An industry coalition proposed the Healthcare Continuum Model as a classification system based on six categories of topical antimicrobial wash products: Antimicrobial Bodywash, Antimicrobial Handwash, Foodhandlers Handwash, Healthcare Personnel Handwash, Surgical Scrub, and Preoperative Preparations. The Model proposes specific *in vitro* and *in vivo* test methods, effectiveness criteria and product labeling guidelines for each category based on its application, frequency of use, microbial flora, and attendant health risks. A review of the regulatory history of foodhandler topical antimicrobial products, the types and use patterns of currently marketed formulations, foodborne microorganisms, the process and risk of disease transmission, and the costs associated with outbreaks of foodborne illness are presented to introduce the Healthcare Continuum Model and the Foodhandler Handwash category.

INTRODUCTION

Proper foodhandling has been long recognized to contribute significantly to prevention of foodborne illness. As new and more virulent forms of bacterial pathogens appear, and as commercial preparation of food becomes more prevalent, our national strategies for prevention and control of foodborne disease will be increasingly tested.

Recent well-publicized outbreaks of foodborne illness have reinforced the need to review foodhandling practices. Hazard Analysis and Critical Control Point (HACCP) principles are based on the study of systems of food manufacture or preparation to determine significant practices that impact food integrity. Evaluations of food preparation and serving practices identify personal hygiene of foodhandlers as a control point. U.S. regulations list the use of topical antimicrobials as a measure available in a concerted effort to break the chain of disease transmission *(10, 37)*.

TABLE 1. The USDA Food Safety and Inspection Service (FSIS) classification system for products used for washing and sanitizing hands in federal inspected meat and poultry plants *(37)*

USDA DESIGNATION	DESCRIPTION
E1	Hand cleansers without claims of antimicrobial efficacy.
E2	Hand cleansers with documented sanitizing efficacy and that are rinsed fram the hands. FSIS requires use af the AOAC Chlorine (Available) in Disinfectants Test ta demanstrate that the praduct is equivalent ta 50 ppm available chlorine *in vitro (2).*
E3	Known as hand sanitizers and may not possess cleansing capabilities. The efficacy of these products is alsa measured by use af the AOAC Chlarine (Available) in Disinfectants Test *(2).* Typically, they are dips, shakes, ar rubs. They are applied in the prescribed manner and are nat rinsed off the hands.
E4	Cleansers, lations, or creams that are intended far use after leaving the processing area and before leaving the facility.

FOODBORNE ILLNESS

The role of topical antimicrobial products in the food processing and preparation industries is apparent when the cause and incidence of foodborne illness are reviewed. The cause of most foodborne illness is widely recognized to be infection by pathogenic microorganisms *(33).* Although the acute gastroenteritis caused by these pathogens is preventable, no segment of the population is immune to it. The symptoms of foodborne illness vary, but may include vomiting, diarrhea, abdominal pain, and fever and may progress to more severe disorders, such as blood clotting abnormalities, arthritis, kidney failure, autoimmune disorders, and death *(23).*

The Center for Disease Control and Prevention (CDC) has reported data derived from a composite review of several national surveillance systems *(12)* that indicates 7 million to 33 million cases of foodborne illness occur each year resulting in 7,000 to 10,000 deaths. The data also indicate that 17% of these deaths involve meat/poultry products contaminated by pathogenic microorganisms. These numbers are suspected to be inaccurately low because of the voluntary nature of the surveillance systems and the large number of cases that go undiagnosed and unreported. The CDC estimated the cost of all foodborne illness in 1993 to have been between $5.6 billion and $9.4 billion. Meat and poultry products were associated with approximately $4.5 billion to $7.5 billion. The remaining foodborne illness was associated with sources other than meat and poultry *(12).*

As the United States population ages and the proportion of immunosuppressed individuals continues to rise, the foodborne illness will become an even greater threat *(12).* This fact reinforces the need to prevent contamination of the food supply through the transfer of organisms from raw food to noncontaminated food or prepared/cooked food by employees' hands *(18, 19, 26, 30).* Bryan and Doyle *(5)* reported that investigations of two poultry processing facilities, showed that "[s]almonellae of the same serovars that were on incoming carcasses were found on 30% of hands, 38% of rubber gloves, and 31% of wire gloves of workers." Microbial contamination may rapidly grow out of control when combined with poor refrigeration, inappropriate storage, or improperly sanitized equipment *(8).*

Some estimates report that 70% of foodborne illnesses result from restaurant incidents and 20% result from home food preparation incidents *(34, 35).* The CDC reports that 20 to 30% of food poisoning incidents are the direct result of consumer mishandling of food *(7).* With the dramatic increase in the number of restaurants and their popularity in our society, the rate of foodborne illness is expected to continue to skyrocket *(34).* High-turnover, part-time, or improperly-trained food-service workers in the food-service industry, children and illiterate/uninformed food preparers in the home, and those with barriers in the form of language or cultural practices are at the greatest risk for instigating an outbreak *(11).*

Bean et al. *(3)* reviewed cases of foodborne disease outbreaks reported to the CDC from food service rather than food production. The authors state, "[f]or each year from 1983 to 1987, the most commonly reported food preparation practice was improper storage or holding temperature, followed by poor personal hygiene of the foodhandler." The report concludes that poor personal hygiene was a contributing factor in 13.4% of 1983 cases. The 1983 to 1987 cases were noted as originating from the home (25%), restaurants (32%), schools (5%), and churches (3%) *(3).* Similarly, the CDC, having reviewed the cases of reported foodborne disease outbreaks from 1988 through 1992, concluded that the two most commonly reported practices that resulted in foodborne illness were also improper holding temperature and poor personal hygiene of foodhandlers. Of outbreaks in which the responsible factors were reported, a dramatic increase to 35.8% in foodborne illness resulting from poor personal hygiene was described for 1988 to 1992 *(6).*

HACCP systems are achieving prominence as a way to improve food

safety by focusing on prevention. The focus on prevention has prompted an emphasis on proper handwashing in both commercial and private food production, preparation, and service areas *(9)*. The 1995 *Federal Register* declares that, "[t]he disturbing but real fact is that consumers fail to make a connection between their food-handling behavior and safe food *(12)*."

REGULATORY HISTORY

The food supply system of the United States is regulated by a network of federal, state, and local agencies. At the federal level, the Food and Drug Administration (FDA) and United States Department of Agriculture (USDA) regulate a variety of aspects of the use, manufacture, and effectiveness claims of topical antimicrobial products.

USDA regulations for meat and poultry processing plants include authorizations for hand cleansers and sanitizing products *(36)*. Products authorized for use in meat and poultry processing plants inspected by USDA are identified in the *List of Proprietary Substances and Nonfood Compounds* issued annually by the USDA Food Safety and Inspection Service *(37)*. These products receive designations based upon the intended use and antimicrobial properties and are described in Table 1.

The active ingredients usually found in USDA E2 formulations (Table 1) are chloroxylenol (PCMX), triclosan, triclocarban, alcohols, quaternary ammonium chloride, chlorhexidine gluconate and iodophors *(37)*. USDA E3 formulations may be formulated with iodine or quaternary ammonium chloride per 21 CFR 178.1010, which restricts the active ingredients for these uses to USDA-recognized ingredients. In addition, numerous USDA E1 and E4 products contain these active ingredients and are labeled as having antimicrobial properties. The E2 and E3 products that pass the Association of Official Analytical Chemists (AOAC) Chlorine (Available) in Disinfectants Test may be equivalent with regard to antimicrobial effectiveness to product formulations sold for surgical and healthcare uses *(2, 25)*.

The USDA has been reviewing, testing, and/or authorizing products in the E2 and E3 categories since 1970 and 1958, respectively *(38)*. The current U.S. Food Safety and Inspection Service (FSIS) List names more than 500 E2 products and over 200 E3 products registered by more than 385 companies *(37)*. The USDA designations do not include the many antimicrobial handwash products sold for use in kitchens, restrooms, restaurants, hotels, bakeries, grocery stores, schools, nursing homes, and hospitals.

The handwashing products currently sold to food production facilities are proven efficacious in reducing Gram positive and Gram negative bacteria *(21, 25, 29, 32)*. A survey addressing antimicrobial effectiveness of handwashing for food establishments, indicated that washing reduces the number of viable organisms remaining that would be available to contaminate handled food and that use of an E2 level product produces measurably greater reduction than washing with plain soap *(27)*.

The Food and Drug Administration (FDA) regulates topical antimicrobial products through a monograph process. A monograph may detail product labeling, accepted antimicrobial test methodology, approved ingredients, and effectiveness criteria. Monographs are initially published as proposed rulings termed "Tentative Final Monographs (TFM)" that invite public comment on the proposed regulation. Because of the complexity and scope of the topical antimicrobial industry, the FDA has revised and published three TFMs addressing handwash products over the past 22 years *(13, 14, 15, 16)*.

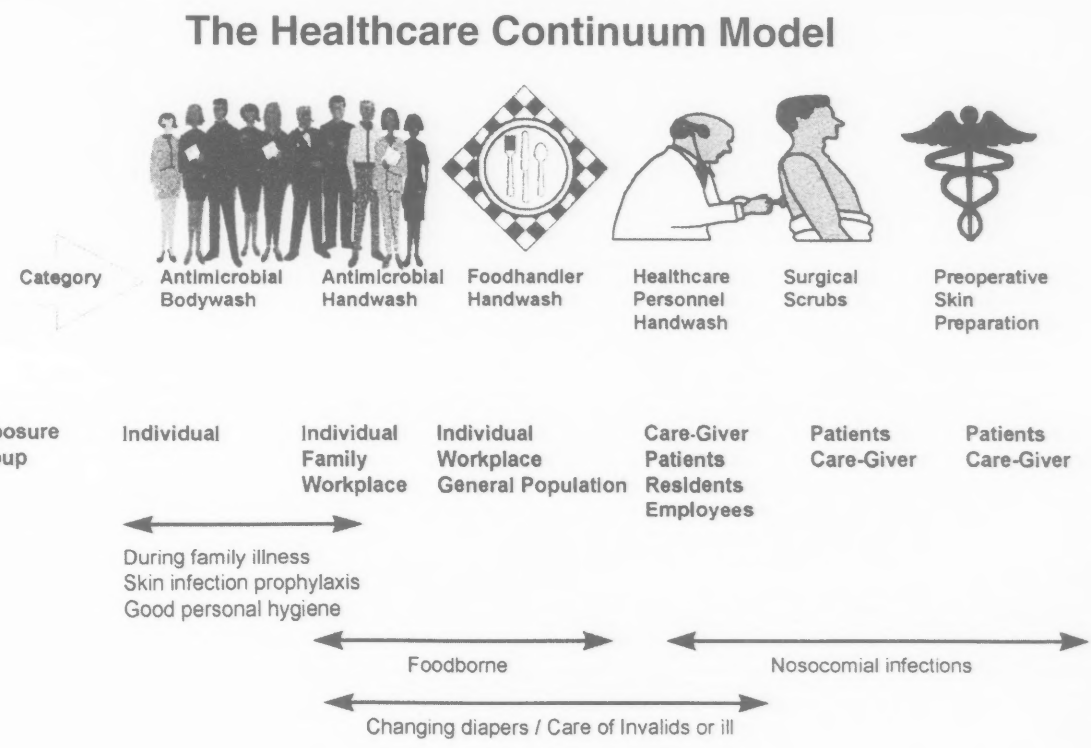
Since the early 1970s, the FDA has been preparing monographs to regulate over-the-counter (OTC) drugs. In the 1994 TFM *(16)*, which was a continuation of the early monograph work, the FDA declared that some hand sanitizer and dip products currently used in the food industry "include label claims the Agency considers drug claims." The FDA intends to regulate these products as OTC topical antiseptic drugs and has requested technical data and comments to assist in that effort. In 1997, the USDA announced their intention to transfer the regulation of "E" products to the FDA, although the FDA does not have a final monograph or other mechanisms in place for the testing, classification, or regulation of "E" or other topical antimicrobial products.

The Healthcare Continuum Model (HCCM) was proposed in 1995 as a comprehensive model to address public and professional use of topical antimicrobial products, including those intended for foodhandler use *(4, 16, 31, 39)*. Test methodologies, criteria for determination of effectiveness, and the labeling for each of the six proposed categories of products, including foodhandler handwashes, have been recommended to the FDA *(31)*. The HCCM is a classification system that covers health professional products, professional and consumer foodhandler products, and personal care products. The 1994 TFM did not include many of the categories of antimicrobial products included in the previous TFM.

The Healthcare Continuum Model does not intend to claim that use of antimicrobial handwashes or hand sanitizers are the only or even the primary defense against the spread of infectious pathogens by hands in foodhandling operations. However, foodhandler hygiene is a control point in any adequate hazard analysis, and antimicrobial products provide an additional margin of safety in these areas *(32)*.

The President's Initiative on Food Safety, a new effort initiated by President Clinton in 1997 to protect the nation's food supply, has emphasized the need to reduce the incidence of foodborne illness through all possible mechanisms *(22)*. The comprehensive program includes improving surveillance, inspections, research, risk assessment, education, and coordination among local, state, and federal health authorities. The Foodhandlers Handwash category of the HCCM contrib-

Figure 1. A depiction of the Healthcare Continuum Model health impact and exposure groups *(31)*.



utes to the President's Initiative by providing a structured system for uniformly measuring efficacy and classifying topical antimicrobial products used in federally inspected meat and poultry plants ("E" products) as well as the formulations used in restaurants, food preparation, and food manufacturing for reducing bacterial levels on the hands. Through the HCCM, properly formulated and effective topical antimicrobial products would be aligned for use in the various food production venues from commercial manufacturing to the home.

THE HEALTHCARE CONTINUUM MODEL

The Model aligns an appropriately formulated, efficacious product with a specific set of target microorganisms, frequency of use, and health risks associated with a use pattern (Fig. 1). The Model proposes six categories of use pattern: Preoperative Skin Preparation, Surgical Scrub, Healthcare Personnel Handwash, Foodhandler Handwash, Antimicrobial Handwash, and Antimicrobial Bodywash *(31)*. The categories are based on five principal characteristics: spectrum of antimicrobial activity, speed of activity, persistence, and effectiveness against resident and transient flora. Test methods for each category are designed for demonstrating these characteristics.

The Preoperative Skin Preparation, Surgical Scrub, and Healthcare Personnel Handwash categories address the topical antimicrobial products used in the healthcare industry. Although the focus is on a limited population on a daily basis, the health risk is greatest in these categories. The Foodhandlers Handwash category establishes requirements for wash products used in food handling, preparation, and manufacture. The Antimicrobial Handwash and Bodywash categories focus on personal care products typically used by a large segment of the population at relatively little risk of microbial infection.

Topical antimicrobial products should be formulated to meet the proposed performance criteria for each use pattern. Aligning products that are precisely formulated for specific use patterns (i.e., surgical scrubbing versus general handwashing) discourages inappropriate consumer use of professional strength products, which in turn reduces the potential for irritation, staining, and improper use due to complex use directions, all of which may lead to an overall reduction in handwashing. The performance criteria for the foodhandler category are based upon an understanding of the microbial flora in the food production, preparation, and service areas; typical hygiene practices, including product use and frequency; and the health risk.

FOODHANDLER HANDWASH CATEGORY

The Healthcare Continuum Model proposes test methods, procedures, and efficacy criteria for use in

TABLE 2. Proposed *in vitro* antimicrobial requirements for foodhandler topical antimicrobial products *(31)*

TEST METHOD	TEST ORGANISMS	ATCC NUMBER	PRODUCT CONCENTRATION	CONTACT TIME	REDUCTION CRITERIA
	S. oureus	6538			
	S. typhi	6539			
	E. coli	11229			
Minimum	*S. enteritidis*	13076			
Inhibitory	*S. choleraesuis*	10708	N/A*	N/A*	N/A*
Concentrotion	*L. monocytogenes*	7644			
	P. stutzeri	17588			
	S. sonnei	11060			
	K. pneumonioe	10031			
	S. typhimurium	11311			
	S. aureus	6538	E2: 50%	1 minute	1 $\log_{10}$
	S. typhi	6539	E3: 100%		
Time Kill	*E. coli*	11229	Liquid: 50%	5 minutes	2 $\log_{10}$
	L. monocytogenes	7644	Gel: 50%		
	K. pneumonioe	10031	Solid: 10%		

*The product concentrotion ond contoct times will be unique to eoch formulotion ond test orgonism. A reduction criterio is not specified os this test serves solely to delineote the product spectrum.

evaluating Foodhandler Handwash products. The test methods and criteria establish a uniform level of effectiveness for topical antimicrobial handwash products.

In vitro test methods establish the spectrum and/or speed of the antimicrobial activity of a formulation (Table 2) and the active ingredient prior to formulation. For the Foodhandler Category, the Minimum Inhibitory Concentration (MIC) and Time Kill tests would be required for all products *(31)*. The proposed MIC method is long established *(31)*. A Time Kill Method has been submitted to the American Society of Testing and Materials (ASTM) for review and adoption as a standard method. The test organisms were selected on the basis of their frequent role in foodborne illness and presence in food preparation environments. The proposed test concentrations reflect the actual use levels of the products (e.g., 50% for liquid soaps and 100% for hand dips or rubs).

The HCCM proposes three simulated use methods from which one or more may be selected depending on the nature of the product formulation, use pattern, and desired demonstration of efficacy characteristics (Table 3). These tests are technique sensitive and therefore should be performed by skilled microbiologists. The AOAC Chlorine (Available) in Disinfectants Test is currently required for the USDA "E2" and "E3" designations *(2, 36)*. Although this test is an *in vitro* test, the required equivalency to 50 ppm active chlorine is a stringent requirement *(24, 25)*.

The proposed *in vivo* test methods include the General Use Handwash Method and a Hand Rub Method (Table 3) *(31)*, both of which have been submitted to the ASTM for review and adoption as standard methods. The General Use Handwash Method is based on and has been combined with the ASTM E1174 Standard Test Method for Evaluation of Health Care Personnel Handwash Formulations by the ASTM Committee *(1)*. These combined methods are now progressing through the ASTM process. The Hand Rub Method is based on the test methodology published by Rotter et al. *(17, 28)*. The proposed reduction criteria would establish the appropriate level of product effectiveness for foodhandling environments *(24, 25)*.

The Healthcare Continuum Model, with the Foodhandler Handwash category, was introduced for public discussion in Washington, D.C. at a June 1997 symposium entitled "The Healthcare Continuum Model: Topical Antimicrobial Wash

TABLE 3. Proposed simulated use methods for demonstration of effectiveness of foodhandler topical antimicrobial products *(31)*

TEST METHOD	TEST ORGANISMS	ATCC NUMBER	PRODUCT CONCENTRATION	EXPOSURE	REDUCTION CRITERIA
AOAC available chlorine test	*S. typhi* *S. aureus*	6539 6538	Equiv. to 50ppm active chlorine control	30 seconds	Equiv. to 50ppm active chlorine control
General use handwash method	*S. marcescens* *E. coli*	14756 11229	Use level	1st wash 5th wash	1.5 $\log_{10}$ 2 $\log_{10}$
Hand rub method	*E. coli* *S. marcescens*	11229 14756	100%	5 rubs	2 $\log_{10}$

Products in Healthcare Settings, the Food Industry, and the Home." The proposed Foodhandler Handwash category was welcomed and critiqued by attending representatives of the regulatory agencies that monitor the food industry including the FDA Center for Drug Evaluation and Research, FDA's Center for Food Safety and Applied Nutrition, and USDA's Food Safety and Inspection Service, as well as manufacturers, academicians, and testing laboratories. A representative from the FDA Center for Drug Evaluation and Research described the Healthcare Continuum Model as a comprehensive proposal based on a thoughtful and careful review of the Agency's proposed monograph that should prove valuable in the development of a final monograph. A USDA official declared, "This is very timely from our perspective, because FDA is moving in the area. This group has provided a new model that integrates the foodhandlers, and we strongly support and endorse the Foodhandler category being addressed under this monograph."

CONCLUSION

The proposed Healthcare Continuum Model addresses the need for a uniform system of categorization and regulation of topical antimicrobial products. The Model currently describes six product categories that suggest specific test methodologies, performance criteria, and labeling. The Model strives to align properly formulated products with the intended purpose of use based on the antimicrobial spectrum, frequency of product use, inherent health risks, and desired product attributes.

The FDA is currently reviewing the Healthcare Continuum Model as a comprehensive and flexible model for a topical antimicrobial classification system. The initial FDA response has acknowledged the HCCM "as a reasonable first step to open discussion towards the resolution of a number of issues relating to the TFM for OTC healthcare antiseptic drug products *(20)*." Various aspects of the Healthcare Continuum Model, including additional product categories, topical antimicrobial test methods, effectiveness criteria, statistical methodology and labeling for each category of antimicrobial wash product will be the subject of future public discussion.

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Jim Dickson

Dickson Elected IAMFES Secretary

Jim Dickson is Interim Department Executive Officer and Associate Professor for the Department of Microbiology, Immunology and Preventative Medicine at Iowa State University, Ames, Iowa. Prior to his employment with Iowa State University, Dr. Dickson held positions as Research Food Technologist and Lead Scientist at USDA-ARS Meat Animal Research Center, Clay Center, Nebraska; Microbiologist, Tony's Pizza Service, Salina Kansas; and Manager, Food Irradiation Applications, Radiation Technology, Inc., Rockaway, New Jersey.

Dr. Dickson received his Ph.D. from the University of Nebraska-Lincoln in 1984. He began his academic career at Clemson University where he received his B.S. in 1977. He received his M.S. from the University of Georgia in 1980.

Research interest for Dr. Dickson includes the microbiological safety of foods of animal origins. Within this area, his interest is in the growth and physiological activity of bacteria of public health concern, especially the Gram negative bacteria, as affected by food processing and storage. He has also conducted reseach on bacterial attachment to food and food contact surfaces. The result of this research has led to a patent on a process to reduce bacterial contamination on animal carcasses.

Dr. Dickson has been an active member of IAMFES since 1987. His involvement includes serving on the Nominating Committee in 1995 and 1996; Vice-Chair of the Applied Laboratory Methods Professional Development Group in 1991 and 1992; Current Vice-Chair of the Meat Safety and Quality Professional Development Group; and a member of the *Journal of Food Protection* Management Committee. He has also published numerous articles in the *Journal of Food Protection* and serves on its Editorial Review Board. Other professional involvement includes membership in the American Academy of Microbiology, American Society for Microbiology, Institute of Food Technologists and the International Meat and Poultry HACCP Alliance Expert Committee on Certification.

An outstanding performance award and three certificates of merit for outstanding performance in research from the USDA are among the numerous honors Dr. Dickson has achieved. Others include a Fellow in the American Academy of Microbiology, and a member of Phi Kappa Phi, Phi Tau Sigma, and Gamma Sigma Delta.

Announcement

of the 1998 IAMFES Awards

Black Pearl Award:

Kraft Foods, Inc.

Honorary Life Membership:

Henry V. Atherton

David D. Fry

Harry Haverland Citation Award:

Anna M. Lammerding

Educator Award:

Ronald H. Schmidt

Sanitarian Award:

Terry B. Musson

NFPA Food Safety Award:

Food Research Institute at University of Wisconsin-Madison

A Bridge to Global Food Safety in the 21st Century

Challenges to Reinventing Food Regulations and Standards

Thomas M. Gilmore, Vincent Mills, and John C. Bruhn

"No parent should have to think twice about the juice that they pour their children at breakfast, or a hamburger ordered during dinner out..." President Clinton's radio address, January 25, 1997.

The world has become a competitive global economy, and no industry can exist in isolation. The food industry's future (both the supply and finished product sides) is very much related to its ability to be internationally competitive. Because of the numerous opportunities for cultural exchange, food from many parts of the world is in demand by consumers in most developed countries. Food products are no longer produced and consumed within narrow geographic areas but are produced by fewer farmers, processed by fewer, but also larger enterprises, and distributed more widely. Farm-to-table may be halfway around the globe. The food-handling chain is longer and involves more people, and thus health risks are increased, especially when consumers demand "fresher" food with fewer preservatives.

The need to safely meet the food needs of the burgeoning global population is an important demand. Furthermore, the occurrence of foodborne disease and emerging pathogens necessitates preventive measures. These are as important today as ever. Over six million people suffered foodborne illness in the U.S. in 1994 and nearly 9,000 died, according to the U.S. Centers for Disease Control and Prevention. Today the number of foodborne disease incidents may be as high as 33 million per annum. An example was the notorious *E. coli* O157:H7 outbreak, traced to a San Diego-based fast food chain, resulting in the deaths of several children. In addition to the toll in human suffering, the average cost to all affected by a food poisoning outbreak in the U.S. is $75,000. This rather startling sum includes direct medical expenses, lost wages, lost productivity, legal fees, insurance premiums, and court judgments. And finally, we have a moral obligation to provide consumers with safe foods, and the consumers put their trust in us to fulfill this obligation.

THE U.S. REGULATORY PICTURE — AN OVERVIEW

"I applaud your desire to get rid of costly, unnecessary regulations. But when we deregulate, let's remember what national action in the national interest has given us: Safer food for our families" President Clinton, State of the Union Address, January 24, 1995.

The American food system is justifiably admired around the globe for its ability to provide consumers with an abundant supply of convenient, high-quality, and safe food products. Enterprising U.S. agribusiness is built on the innovation of those who supply the food and is driven by the high expectations of the American consumer.

Protecting the safety and integrity of the U.S. food supply is one of the oldest functions of our government, and one expected by all Americans. Our federal and state governments' oversight of food safety, wholesomeness, and labeling has contributed significantly to the success of the U.S. food system, especially where it has set and successfully enforced sound standards for sanitation and safety.

The federal system of food regulation is nearly a century old. The original Food and Drug Act, written in 1906 by Dr. Harvey W. Wiley, became the

basis for the current statute: The United States Food, Drug and Cosmetic (FD&C) Act of 1938, later amended. The U.S. Department of Agriculture (USDA), under the Federal Meat Inspection Act and the Poultry Products Inspection Act, regulates the meat and poultry industry.

Government standards include those issued by federal, state, county, or municipal agencies. They include those mandated by the FD&C Act, voluntary ones developed by the USDA, and standards developed cooperatively by industry and regulatory officials such as 3-A Sanitary Standards.

Regulatory efforts and voluntary standards that have been successful in protecting the U.S. public for 100 years are being reassessed as new food safety and other consumer concerns come increasingly into focus. Taxpayers also must be assured that government resources are being used in the most effective and efficient manner possible.

President Bill Clinton and Vice President Al Gore are committed to fundamental reform of food regulation to improve food safety, making the best use of human and financial resources and eliminating unnecessary burdens to the industry. The present system of food regulation is not adequately addressing the problems outlined in the introduction. It is costly and burdensome largely because it depends heavily on detecting and correcting problems after they occur, rather than preventing them, a prescriptive "command (statutes and regulations) and control (regulatory oversight)" system that can deter beneficial innovation.

Both the FDA in the Department of Health and Human Services, and the Food, Safety and Inspection Service (FSIS) in the USDA intend to adopt a common framework and build a common approach to food safety by incorporating a science-based system of food safety controls into their programs, known as HACCP (Hazard Analysis Critical Control Points), the specifics of which are designed and implemented by the food processor. HACCP is designed to reduce sole reliance on command and control regulations to ensure food safety. Under a HACCP system, each company must meet the same rigorous safety standards, yet it has the flexibility to devise and implement food safety plans uniquely suited to its circumstances. Additionally, HACCP is a valuable tool in advancing the progress of food safety internationally and is a critical element in expanding U.S. food trade. Many countries, including European Union (EU) members, Canada, Australia, and New Zealand, are committed to HACCP-based food safety programs.

The FDA and FSIS are also reviewing and will revise existing regulations to eliminate unnecessary burdens and requirements. However, as President Clinton has said, regulatory reform must not dilute the high level of food safety Americans expect.

The Food and Drug Administration

The FDA has a mandate to protect Americans from unsafe food and drugs. The FDA also protects consumers from economic fraud and promotes sound nutrition. In accomplishing these mandates, the FDA oversees 46,000 U.S. food processors and handlers, which comprise a significant segment of the nation's economy. The retail value of food regulated by the FDA is $430 billion per year. Every year, U.S. food processors spend $1.4 billion on research and development and introduce 15,000 new products. The following is a partial list of matters of public concern addressed by the FDA's food-related regulations:

- Pathogens (bacteria, viruses, parasites)
- Chemical contaminants (pesticides, natural toxins, heavy metals, animal drug and antibiotic residues)
- Loss of wholesomeness (molds, decomposition)
- Standards for safe and sanitary production and processing of food
- Retail food protection
- Mislabeling (false nutrition information or other misleading statements)
- Economic deception (violation of standards, counterfeit foods)
- Safety of food and color additives
- Imported food

All these activities involve food safety and the first five are impacted by machinery and equipment design.

FDA — Milk Safety Branch

The FDA-MSB is the U.S. federal unit empowered with the responsibility of fluid milk (Grade A) surveillance and represents one of our federal agencies to Codex Alimentarius Commission. Codex is a subsidiary body of the Food and Agriculture Organization of the United Nations and the World Health Organization. They also cooperate with the U.S. dairy industry through the National Conference on Interstate Milk Shipments (NCIMS) to maintain the Grade A Pasteurized Milk Ordinance (PMO) and with the 3-A Sanitary Standards Committees in the development of 3-A Standards.

USDA-Food Safety and Inspection Service

The USDA-FSIS is a consumer protection agency that regulates meat and poultry products, primarily by inspection activities of processing facilities. FSIS-

regulated meat and poultry products account for one-third of U.S. consumer spending for food, with an annual retail value of $210 billion. FSIS-regulated products include raw red and white meats and raw poultry, as well as 250,000 processed meat and poultry products.

Under the Federal Meat Inspection Act of 1906 and the Poultry Products Inspection Act, FSIS inspects all meat and poultry sold in interstate commerce, including imported products. About 7,400 federal inspectors enforce inspection laws in some 6,200 plants. Inspectors check animals before and after slaughter, visually examining over six billion poultry carcasses and 125 million livestock carcasses per year. FSIS also inspects products during processing and has had prior approval programs for equipment and facilities.

Unfortunately, these activities have been inadequate to prevent contamination and potential illnesses attributable to pathogenic microorganisms found in meat and poultry. It is estimated that *Salmonella*, *E. coli* O157:H7, *Campylobacter*, and *Listeria monocytogenes* contaminating meat and poultry cause 5 million illnesses and 4,000 deaths annually in the U.S. FSIS is pursuing a broad and long-term science-based strategy to improve the safety of meat and poultry products. FSIS has adopted a "farm to table" approach.

The USDA-FSIS has finalized regulations on pathogen reduction designed to reduce the occurrence and numbers of pathogenic microorganisms in meat and poultry. In part these regulations:

- Place greater responsibility on processing establishments to assure product safety.
- Require a minimum of one antimicrobial treatment.
- Establish enforceable chilling requirements.
- Target a reduction of measurable pathogens via testing.
- Require HACCP adoption.

Additionally, USDA-FSIS regulations would eliminate prior approval programs for labeling, facilities, equipment, and some partial quality-control programs.

To summarize the changes initiated by the federal government to reinvent U.S. food regulations, the FDA and USDA-FSIS are working cooperatively to develop:

- The HACCP approach to control food safety (initially seafood, meat, and poultry products – later other foods).
- Coordinated food safety research and data gathering.
- Safe transportation and distribution of foods.
- Retail food protection.
- Consistent labeling regulations.
- Egg products and animal production safety criteria.
- International standards (to coordinate efforts to achieve consistency among national regulatory policies and international standards and guidelines through the establishment of objective, science-based, internationally recognized health and safety food standards).

The industry is being asked to take control of its own food safety situation; government to maintain a surveillance role with emphasis on prevention and self-regulation, based on state-of-the-art, science-based programs.

The USDA-Agricultural Marketing Service – Dairy Programs

Under the U.S. Agricultural Marketing Act of 1946, the USDA is directed to perform certain voluntary service functions to aid marketing of U.S. agricultural products. The services include developing standards for quality grading, furnishing inspection and grading services, and recommending standards. The USDA-Dairy Grading provides voluntary, fee-for-service inspection of dairy plants to determine whether good sanitation practices, including equipment evaluation, are being followed. The USDA-Dairy Programs have no regulatory authority, but before product grading services are provided, the plant must be approved (inspected). The USDA-Dairy Grading Branch also provides resident grading and inspection services. Additionally, the Dairy Grading Branch conducts equipment hygienic design reviews using 3-A Sanitary Standards and 3-A Accepted Practices (or their own guidelines, if 3-A Standards do not apply). The USDA Dairy Standardization Branch is also involved in Codex activities.

EUROPEAN REGULATORY CLIMATE

With the advent of the EU and the European Community (EC), there has been a significant change with respect to food and safety legislation. Prior to 1985, western-European countries relied on national codes or standards for safety and hygiene. There is now a new approach that emphasizes horizontal directives and a new philosophy, a change from prescriptive standards to information and goal-oriented outcomes. The new approach centers around mutual recognition and acceptance of

standards which will promote free circulation of products throughout the EC and is necessary if a single market is to exist.

To achieve this goal, technical barriers to trade are being removed. Typically, these technical barriers result from national differences concerning regulations, standards, testing, and certification. Such barriers are of two types: those that result from national legislation and regulation, and those that are the result of commercial enterprise (the requirements between buyer and seller). In either case, the effect of national differences is that a manufacturer wishing to sell a particular device in different markets within the EC (or elsewhere) may have to meet numerous requirements. Article 30 of the EC Treaty clearly prohibits barriers to free trade: "Quantitative restrictions on imports and all measures having equivalent effect shall be prohibited between Member States."

The EU Machinery Safety Directive provides the legal framework within the EC for the essential safety and hygienic requirements.

European Committee for Standardization (CEN)/ European Commission (EC)

Prior to 1985, western-European countries did not have a need for regional or international safety or hygiene standards. However, with the signing of the Treaty of Rome by many western-European countries and the establishment of the European Economic Area (EEA), a need for common regulations and standards arose. One of these regulations is the EU Machinery Safety Directive. The European Commission (EC) contracted with CEN and the European Committee for Electrotechnical Standardization (CENELEC) to develop appropriate standards covering specific mechanical safety and hygiene regulations. The CEN/Technical Committee (TC) 153 has been given a mandate by the Commission of the European Communities and the European Free Trade Association (EFTA) to develop standards for food machinery hygienic requirements. The standard is intended to provide a means of conforming with the essential hygiene requirements of the EU Machinery Directive and EFTA regulations. Its scope includes all food processing machines, including the following types: baking, pasta, cereal, animal feed, meat and poultry, seafood, fruit and vegetable, alcoholic and nonalcoholic beverages, food service, oils and fats, confections, egg processing, and dairy.

The CEN/TC 153 document is titled "European Standard on Food Machinery – Common Requirements Part 2: Hygiene Requirements." Together with Part 1, these EU Standards set common safety requirements for machinery used in processing human foods, and, where relevant, machinery for processing animal feeds. Part 1 sets mechanical safety standards; the scope of Part 2 in part states:

"This standard applies to all food processing machines used for batch, continuous, open, and closed processing using any kind of energy for motive power, heating, or control, and used in places of work. It applies to all phases of the life of the machine, and its intended use, including the foreseeable misuse."

A proposal for another project by CEN/TC 153 is clean-in-place (CIP) plants for dairies. The full title of the proposed standard is "Machines for the Food Industry; Machines for the Dairy Industry, Hygienic Design, CIP Plants in Dairies – Safety and Hygiene." The proposed program involves the standardization of safety and hygiene aspects in machines used in the dairy industry.

International Association of Food Industry Suppliers (IAFIS) and 3-A will monitor this activity through the American National Standards Institute-Technical Advisory Group (ANSI-TAG) and International Dairy Federation (IDF). There are technical agreements of cooperation between ISO and CEN and between IDF and CEN. The chair of IDF-B36 reports that this CEN working group is receptive to using the IDF-B36 as a guide for this CEN document.

Federation International de Laiterie — International Dairy Federation (FIL-IDF)

The International Dairy Federation is an independent, nonprofit association that aims to promote international scientific, technical, and economic progress in the dairy field.

Established in Brussels in 1903, the IDF has grown to become an organization representing the global interests of the dairy industry. It has 33 member countries. The IDF's cooperation with other international organizations plays a vital role in avoiding global duplication of effort and conflicts of interest and helps spread the influence of the dairy industry.

The activities of IDF are organized in six specialized commissions, each responsible for the work in a particular sector and for establishing groups of experts to complete it. In this context, IDF Commission B on Technology and Engineering is of greatest interest.

Under Commission B, Group of Experts B36 has developed general guidelines for the hygienic design of dairy equipment. The chair of B36 is Harold Wainess (US) and its expert members represent 12 countries.

The objective of B36 is to produce IDF recommendations on hygienic design and construction of equipment used in dairy plants, covering all

equipment used in the storage, processing, handling, and packaging of dairy products, as well as the instrumentation to permit the equipment to function in a hygienic manner to protect public health.

The group has completed the first phase of its assignment and has published "IDF Bulletin No. 310 – General Recommendations for the Hygienic Design of Dairy Equipment." The second phase of B-36 work will encompass developing several C-level standards for specific dairy equipment. The 3-A Committees are actively participating with IDF B-36.

ISO (International Organization for Standardization)

ISO is an international nongovernmental organization that has developed over 7,500 standards. It has approximately 90 member countries. The American National Standards Institute (ANSI) is the official U.S. member body to ISO and has the right to participate in the work of any ISO technical committee or subcommittee.

A U.S. Technical Advisory Group (TAG) is registered as a P-member to ISO TC-199, which covers safety and hygiene. Within this U.S. TAG, the hygiene group acts as a subgroup coordinated through the 3-A Sanitary Standards Steering Committee and the IAFIS Standards and Technical Committee. The ISO working group has established a work plan to produce a single standard covering all types of hygienic machinery.

This base B-level document will cover both open- and closed-food systems as well as extend the requirements to nonfood machinery. The scope of the proposal ISO/DIS 14159 is as follows: "This international standard applies to all machines and associated equipment used in all processing applications where hygiene risks to the consumer can occur. The requirements are to be applied by designers and manufacturers who in turn are to provide guidance to the users for the intended use of these machines and equipment. Excluded from this standard are requirements for the egress of microbiological agents from the machine."

ISO/Committee Draft (CD) 14159 has been put before participating TC-199 working group members. The CD ballot was very favorable. The working group met on April 18, 1997 to address the comments made during balloting, and has recommended the CD be circulated to all ISO/TC-199 members as a draft international standard (DIS). The DIS 14159 will be balloted in 1998.

European Hygienic Equipment Design Group

The European Hygienic Equipment Design Group (EHEDG) is an independent consortium formed to develop guidelines and test methods for the safe and hygienic processing of food. Formal links with the 3-A Sanitary Standards Committees in the U.S. have been established.

The EHEDG members, representing research institutes, food processing companies, machinery suppliers, and government organizations, have the following key objectives:

- to ensure that in the future there will be no confusion as to whether and under which conditions equipment is microbiologically safe for the processing and packaging of food;
- to ensure that food products are processed and produced hygienically by the food industry;
- to provide standards organizations with specialist views on hygienic aspects of equipment design;
- to identify areas where knowledge of hygienic and aseptic design is insufficient and to encourage research and development in these areas.

The EHEDG has developed guidelines. The 3-A Steering Committee and the EHEDG Main Committee have been exchanging information and has published a joint document passivation in this journal. The 3-A Secretary and 3-A Steering Committee is in cooperation with NSF International. EHEDG is also interested in a three-way cooperative effort among these groups. In order to make a two- or three-way cooperative effort successful, membership (and more importantly, participation) in sub-committees is necessary.

STANDARDS — MANAGEMENT TOOLS FOR SUCCESS

Standards have been in existence since antiquity. In Genesis, God instructed Noah to "Make thee an ark from resinous wood sealing it with pitch" a material specification and then continues with fabrication criteria, including dimensions. Moses received directions for constructing the Ark of the Covenant, and Solomon an entire building code for the temple in Jerusalem. Today these edicts could be called standards.

With the advent of the industrial revolution and measurement unity, some form of standardization became necessary. In addition to the need for uniform engineering and manufacturing specifications, safety codes have also driven standards development. The need for hygienic (sanitary) standards is obvious.

Harmonization or Do Your Own Thing! Harmonize – harmony is from the Greek word *harmonia* – meaning a fitting together, an agreement. A harmonized European Community Standard is one developed and adopted by either the European Committee on Standardization (CEN) or the European Committee for Electrotechnical Standardization (CENELEC). It becomes a Harmonized Standard or European norm (EN) when published in the *Official Journal of the European Community.*

Objectives of Standards Developers (Dos and Don'ts)

Hygienic (sanitary) standards should:

1. Protect public health.
2. Protect product quality.
3. Be performance oriented.
4. Strive for zero defects.
5. Use state-of-the-art technology.

Standards should never:

1. Provide an economic or competitive advantage.
2. Inhibit ingenuity.
3. Be used to restrain trade.

The organizations empowered to develop harmonized hygienic standards must:

1. Be committed to that goal;
2. Be able to withstand controversy and differing approaches that accompany new beginnings;
3. Be willing to accept a voluminous workload, and
4. Most importantly, be able to clear obstacles posed by narrow interests, ingrained tradition, and outdated standards.

Obstacles will exist, but harmonization will overcome them if the standards are placed on a technologically solid and persuasive basis.

3-A SANITARY STANDARDS PROGRAM

The fledgling 3-A Sanitary Standards Committees had to overcome these same problems and did so very successfully. The driving force was the obvious need for national sanitary standards in the 1920s and 1930s. Now, the need exists for internationally harmonized hygienic standards.

The pillars of 3-A's success are three-fold. Its tripartite nature, involving equipment fabricators, equipment users, and control authorities, is critical. A second strength lies in the consensual process of the deliberations. The viewpoints of these three interest groups are often difficult to reconcile. However, when consensus is reached, the standards will be used and accepted.

The goal for 3-A is to set high technical standards based on the state-of-the-art rather than to seek the comfort of the lowest common denominator. High standards of product protection – and that means the most technically sound standards but not necessarily the most conservative or rigid standards – are, for 3-A, its ultimate foundation.

3-A to Broaden Its Horizons in the U.S.A.

The Secretary of the 3-A Sanitary Standards Committees has observed an interesting trend. Since the 3-A Standards Program was initiated in the 1920s, its focus has been on the dairy industry and on developing standards for dairy equipment that ensures that all equipment is designed and installed in such a way that it can be adequately cleaned, sanitized, and inspected. However, the bulk of the calls received over the last five to seven years has been from nondairy industries (such as representatives of the food processing, pharmaceutical, chemical, and personal care products industries) who are, for lack of options, also using the 3-A criteria.

To better address that apparent void, other industries are invited to participate in a 3-A Standards Program, that could evolve as a parallel program to the dairy standards effort. Because industries outside the dairy realm already use 3-A criteria, and because these industries are directly and materially affected by 3-A Sanitary Standards and 3-A Accepted Practices, 3-A is now inviting formal participation by processors and equipment manufacturers representing nondairy industries. The response from the food and personal care products processing industries has been considerable. As of April 1990, the IAFIS Board has approved cooperation of 3-A and NSF International on hygienic standards development.

INTERNATIONAL HARMONIZATION

International harmonization based on solid technology and consensus reached by all affected parties has the capacity for achieving the same lasting value enjoyed by 3-A. Science-driven, consensual harmonization will curtail duplication and conflicting standards, thereby reducing costs.

International harmonization would ensure that all food processing, packaging, and handling equipment would be acceptable for certification by all countries of the EEA, North America, and

perhaps worldwide. Resources could then be released for machinery engineering and development. Internationally accepted and applied hygienic criteria for regulatory inspection procedures would be beneficial to users if all food equipment could meet the same hygienic standards.

Realities of Harmonization

What are the realities? The 3-A Program has a 50-year history and is tied to requirements found in the Grade A Pasteurized Milk Ordinance (PMO), USDA regulations for inspection of dairy and egg processing plants, and FD&C Act requirements. 3-A Sanitary Standards cannot be in violation of state or federal regulations. These regulations require detailed criteria.

As previously noted, there are two European groups and two international groups currently committed to developing hygienic food equipment standards. The 3-A Sanitary Standards Committees are participating in three and are monitoring the fourth. This, however, seems to be an inefficient use of human and economic resources. Also in the U.S., 3-A, NSF International, the American Society of Mechanical Engineers (ASME)-Bioprocessing Committee, and the Baking Industry Sanitary Standards Committees (BISSC) are all working in the same general area-hygienic standards.

A goal of the 3-A Program is to have standards activity for food equipment other than dairy machinery. It is in this field that prospective rather than retrospective harmonization with European standards can and must be realized. Standards and requirements can be agreed upon as they are developed. An important first step by all the above-mentioned groups is to be open and willing to cooperate. The organizations empowered to develop harmony must be committed to that goal, strong enough to withstand controversy and accept differing approaches. The efforts to harmonize must be able to clear obstacles posed by narrow interests, ingrained tradition (also known as the "not invented here" syndrome), and outdated standards.

The logic of international harmonization goes far beyond harmonized documents. The larger purpose is to foster a harmony of attitudes and minds. It is to usher in and nurture an atmosphere of mutual trust and credibility. What is essential is the greater vision of mutual trust and combined effort that goes beyond the individual organizations.

Such international cooperation can be achieved by upholding a zero defect goal and by applying the highest technically achievable standards possible. This means applying the best available, science-based technology. Protection of public health is deeply ingrained in American social and legal framework. This conviction is expressed in the U.S. Food and Drug Act as amended and in the resulting food regulations. There is nothing that would undermine this country's readiness to accept international rules faster than lowering expectations.

A realistic approach to the economic climate is essential. It is extremely important that the timeline for harmonization be attuned to the available human and economic resources within the participating organizations. 3-A is a voluntary organization with time and talent donated by expert committee members. They are financially supported by their employers. The limitation on human and economic resources for U.S. companies demands that the fragmented efforts in European and American standards development be focused into two, or perhaps even one, organization.

The final prerequisite is the matter of openness and consensus. In the U.S., the demand for openness is extremely important. The media and the ethos of public life in the U.S. serve as ample evidence that openness permeates our society. 3-A is bound for legal and ethical reasons to have open, fair, and consensual procedures and has historically taken numerous steps to open their standards development procedures (and now, the harmonization process) to anyone with legitimate interest and the ability to contribute.

There are significant differences in the content and the way standards are developed by the 3-A Sanitary Standards Committees, other U.S. standards developers, and European standards organizations. This means there must be greater exchange of information and mutual trust in order to advance the harmonization cause. We all must be visionary about the goal of harmonization and must strive to overcome any problems. But development of harmonized standards must be based on openness, fairness, and consensual procedures. 3-A is uniquely positioned to lead the U.S. comestible processing industry into this new age of international harmony and at the same time expand its role at home.

CONCLUDING THOUGHTS

The U.S. and European food safety regulatory situations are rapidly changing. In both new approaches are emerging. The U.S. is expecting more of the burden of responsibility to be assumed by the food processor through the adoption of HACCP and GMP procedures. In Europe there will be universal legislation and unifying standards. Both of these new approaches will require increased

reliance on standards. Trade agreements and the global marketplace mandate harmony or equivalent results in standards. We all must have foresight about the goal of harmonization and overcome any problems. Cooperation and focusing standards activity for the development of harmonized international standards is a must.

Established organizations and policies are notoriously slow to change and adapt. We tend to be territorial and protective of our own turf. We need to anticipate and take on the challenges before us to ensure safe food. This will require entrepreneurial activity and creative thinking. It means synergy created through cooperation and mutual support. It means we must believe in each other.

The most important concluding thought is that food safety is **NOT** a national or regional concern, but it **IS** an international concern. International harmonized standards for the hygienic design of equipment is an important road we must travel in our journey to ensure worldwide food safety.

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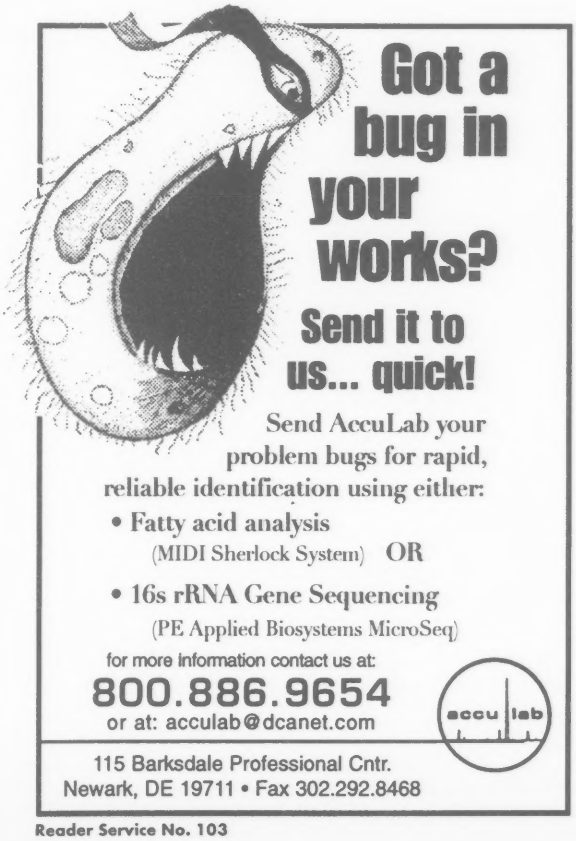

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Call for Symposia

1999 IAMFES Annual Meeting
August 1-4, 1999
Dearborn, Michigan

The Program Advisory Committee invites IAMFES members to submit symposia proposals for presentation during the 1999 IAMFES Annual Meeting. Proposals may be submitted by mail to IAMFES office (for receipt prior to July 30, 1998) or by presenting the proposal to the Program Advisory Committee at its meeting on Sunday, August 16, 1998 in Nashville, Tennessee. Proposals may be prepared by individuals or by committees.

Generally, each symposium will be a half-day session (8:30 to Noon or 1:30 to 5:00) with a scheduled break. Symposia emphasize a central theme and usually consist of six 30-minute presentations by each speaker. Proposals will be evaluated by the Program Advisory Committee for relevance to current science and to IAMFES members.

Guidelines for submitting proposals: Use the printed Symposium Proposal form that appears on the following page or reasonable facsimile. The following information must be included: (1) Title of symposium, (2) Names, telephone numbers, fax numbers, and complete mailing addresses of the person(s) organizing the symposium and convenors of the session, (3) Topics for presentations, suggested speakers, affiliations, complete addresses, (4) Description of audience to which this topic would be of greatest interest, and (5) Signature of submitter.

Organizers for accepted proposals will be contacted after the 1998 Annual Meeting to secure speaker commitment.

Questions? Contact the Program Advisory Committee Chairperson for the 1999 IAMFES Annual Meeting:

Dr. Jeff Farber, Health Canada, Banting Research Center, Ontario, Canada K1A 0L2; Phone: 613.957.0895; Fax: 613.941.0280; E-mail: jeff_farber@hc-sc.gc.ca

Symposium Proposal

1999 IAMFES Annual Meeting
August 1-4, 1999
Dearborn, Michigan

Title of symposium: _____

Organizer's name: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

Topics for Symposium — Suggested Speakers **(Complete address and phone number of Speaker)** — Affiliation

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Convenors of Session — Address — Phone — Fax — E-mail

_____

_____

Description of Audience: _____

Signature of Submitter: _____

Submit by July 30, 1998 to: IAMFES
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863

or Contact: Dr. Jeff Farber
Phone: 613.957.0895; Fax: 613.941.0280
E-mail: jeff_farber@hc-sc.gc.ca

New Members

BRAZIL

Judith Regina Hajdenwurcel
Escola Tecnica Federal deQui Mica
Rio De Janeiro

CANADA

William Lachawsky
University of Guelph
Guelph, Ontario

Lew Skiansby
Lakeland Regional Health Authority
Vegreville, Alberta

DENMARK

Oluva Niclasen
Food and Environmental Agency
Torshavn, Faroe Islands

GREECE

Nikolaos D. Saultas
Azistotle University, Thessaloniki

JAPAN

Hirayuki Masuda
Japan Canners Association
Yokohama, Kanagawa-Ken

UNITED STATES

CALIFORNIA

Mark Bairstaw
Tular Co. Env. Health, Visalia

Karen J. Huggins
Northern California DVC
Stockton

Freda Kelati
Swiss American Sausage
San Francisco

Chang W. Kim
Buena Park

Raymond L. McElwain
Golden State Foods, City of Industry

GEORGIA

Nathanan Trachaa
University of Georgia, Athens

IDAHO

Jeff Kronenberg
PowerBar Corp., Caldwell

INDIANA

James K. Montgamery
Rose Acre Farms, Inc., Seymour

KANSAS

Sarah B. Sporing
Kansas State University, Manhattan

KENTUCKY

Ralph M. Lopez
Aquionics, Erlanger

James F. Wesley
Lake Cumberland District
Health Dept., Science Hill

MARYLAND

Anne J. Bodner
American Standard Companies
Columbia

MASSACHUSETTS

Linda R. Dragone
Gene Trak, Hopkinton

Michael L. Emard
Ocean Spray Cranberries
Lakeville

MICHIGAN

Betty Wernette-Babian
Michigan State University
East Lansing

NORTH CAROLINA

Patricia A. Curtis
NCSU-Food Science, Raleigh

OHIO

Kathleen A. Baxter
Hill Top Research, Cincinnati

Tom R. Katen
Cooper Foods, Van Wert

OREGON

Craig Thebo
Ore-Ida Foods, Inc., Ontario

PENNSYLVANIA

Steve H. Vogel
Frito Lay, Inc., Oxford

TEXAS

Erin M. Harvey
Camelot Desserts, Houston

Patricia Perez
Quality Sausage Co., Dallas

VIRGINIA

James Hodges
American Meat Institute, Arlington

WASHINGTON

Thomas D. Davidsan
Spokane Produce Inc., Spokane

Trevar Rasenbaam
Ecolab Pty., Ltd., Morley

New IAMFES Sustaining Member

Richard W. Daniels
Audits International
Highland Park, IL

New Members

BRAZIL

Judith Regina Hajdenwurcel
Escola Tecnica Federal deQui Mica
Rio De Janeiro

CANADA

William Lachowsky
University of Guelph
Guelph, Ontario

Lew Skionsby
Lakeland Regional Health Authority
Vegreville, Alberta

DENMARK

Oluva Niclasen
Food and Environmental Agency
Torshavn, Faroe Islands

GREECE

Nikolaos D. Soultos
Azistotle University, Thessaloniki

JAPAN

Hiroyuki Masuda
Japan Canners Association
Yokohama, Kanagawa-Ken

UNITED STATES

CALIFORNIA

Mark Bairstow
Tular Co. Env. Health, Visalia

Karen J. Huggins
Northern California DVC
Stockton

Freda Kelati
Swiss American Sausage
San Francisco

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Buena Park

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Golden State Foods, City of Industry

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Kansas State University, Manhattan

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James Hodges
American Meat Institute, Arlington

WASHINGTON

Thomas D. Davidson
Spokane Produce Inc., Spokane

Trevor Rosenboom
Ecolab Pty., Ltd., Morley

New IAMFES Sustaining Member

Richard W. Daniels
Audits International
Highland Park, IL

Al St. Cyr Promoted to Director of Food Safety Engineering

Al St. Cyr has been promoted to Director of Food Safety Education at AIB. St. Cyr, who has worked at the Institute since 1990 as a Food Safety Auditor and Program Coordinator, will oversee AIB's food safety training activities.

AIB conducts educational programs about food safety, HACCP, quality control, and ISO 9000 at its Manhattan, Kansas, headquarters, at regional locations, and also offers customized training in individual plants.

In 1997, AIB Food Safety seminars reached more than 1,000 people in the United States and the United Kingdom.

St. Cyr attended Ferris State and was trained as an Environmental Health Technician in the United States Navy. He has worked in the food safety field in wholesale bakeries in Washington and New York and also in the pest control industry. He holds a Certified Pesticide Applicator's License from New York and has co-authored articles for pest control magazines about termite control issues.

He has been a frequent speaker at regional food safety seminars conducted by FDA, the University of Maryland, and other groups.

Reed Hayes Appointed Executive Vice President

The Educational Foundation of the National Restaurant Association announces the appointment of A. Reed Hayes as Executive Vice President.

In his new role, Hayes will report to President and Chief Operating Officer Stephen J. Caldeira, and will have responsibility for the day-to-day management of Foundation business and for the improvement of operational efficiencies. In addition, he will develop and implement national fundraising strategies, identify key strategic partners and work to continuously improve the responsiveness of the organization to the industry's needs.

Hayes will also serve as the principal liaison between The Foundation and its allied organization, the Hospitality Business Alliance (HBA). The Educational Foundation is a founding partner of HBA, a nonprofit organization whose mission is to promote participation in school-to-career initiatives across the nation by linking high school hospitality courses with worksite experiences.

Hayes is known to many for his leadership of World Tableware International (WTI), a leading manufacturer of tableware products for the restaurant/hospitality industry. He served as Chairman and Chief Executive Officer of the company, as well as principal shareholder, from 1983 to 1995. Hayes began his career with WTI while in college, and after graduation from Yale University with a degree in economics, continued as a full-time employee. In 1983, he purchased the company.

Osmonics Names New District Manager for Asia-Pacific

Osmonics recently announced their new District Manager, James P. Labonte, with their new Liaison Office in Japan. With the introduction of Mr. Labonte, Osmonics is focusing on serving its customers better, as well as expanding its network of distribution. The office is located in a busy area called Chiyoda-Ku, just minutes from the heart of Tokyo.

James graduated from the University of Massachusetts with degrees in electrical engineering and Japanese. Prior to joining Osmonics, James has been living in Japan for four years and has worked for IES, Kenwood, and Sanko Trading Ltd., a distributor of Desal™ products.

Forrest E. Shull Promoted to Senior VP for Special Projects and John H. Kulp Appointed Director of Manufacturing

Smith & Loveless Chairman and President Robert L. Rebori announced the promotion of Forrest E. Shull from Vice President of Manufacturing to Senior Vice President for Special Projects. John H. Kulp will replace Shull as the newly appointed Director of Manufacturing.

Shull's new duties include assisting the Chairman and President with various managing functions, working with the Director of Manufacturing to plan and develop new computerized manufacturing systems, and implementing all field erection projects. Shull brings more than 30 years of experience to this position. He will continue to serve as a member of the Smith & Loveless Board of Directors.

Kulp comes to Smith & Loveless with 10 years of manufacturing management experience acquired at PMI Food Equipment Corporation and U-Line Corporation. He

also worked as an engineer and general foreman for 17 years at Bethlehem Steel Corporation.

Kulp graduated from Lafayette College with a BS degree in metallurgical engineering and later earned an MBA from Lehigh University in Bethlehem, PA. In addition, he has completed management programs at the University of Michigan and the University of Chicago's Kellogg School of Business.

Educational Foundation Announces Staff Appointments, Promotions

The Educational Foundation of the National Restaurant Association announces the appointments of Leslie Chase as Vice President, Marketing, and Ellen Moore, FMP, as Vice President, Operations; and the promotions of Lee Ellen Fox, FMP to Vice President, Industry Relations; Michael Johnson, FMP, to Vice President, Sales; and Emil Poprawski to Vice President, Financial Services.

Chase joins The Foundation from the National Restaurant Association office in Washington D.C., where she served as Director of Marketing for the past year. She was instrumental in the development and management of all marketing functions for the Association, including a revitalized publications program and the development of image guidelines. In addition, Chase participated in the development of a variety of new membership and state partnership initiatives. Chase has more than 15 years of marketing experience.

Moore joins The Foundation as Vice President, Operations, and will have responsibility for the areas of human resources, internal training, product development, research, certification, information technology and technical education. Since 1997, Moore has been acting as a consultant to independent and multi-unit operators for training, development and human resources issues. Prior to that, she held positions as Vice President of Training for Rare Hospitality International, Inc., and Director of Training for the Levy Restaurants.

Fox was promoted to Vice President, Industry Relations. In this role, she will oversee fundraising and sponsorships, scholarships, events, communications and public relations, and Foundation board of trustees' activities. Fox joined the organization in 1992 and has been instrumental in the acquisition of corporate sponsors to support the development and marketing of the Foundation's educational and training programs and events.

Johnson was promoted to Vice President, Sales. In addition to providing leadership for all sales activities of the organization, Johnson expands his responsibilities to include direction of the Foundation's customer relations department. Johnson joined the Foundation in 1995 as Group Product Manager, Safety and was promoted to Director of Sales in 1997.

Poprawski was promoted to Vice President, Financial Services, and will have responsibility for the Foundation's accounting, purchasing and office services departments. He joined the organization in 1996 as Manager of Financial Relations, and since that time has reorganized and restructured its accounting functions for greater efficiency. In addition, great strides were made under his leadership in the areas of office services and purchasing, resulting in improved service to both internal and external customers.

Scientists Seek New Clues on *Salmonella*

Molting, a period when hens get a break from egg laying is known to raise the birds' overall egg production. Now, scientists are testing some promising new ideas for preserving hens' health as well as food quality before and after the two-week molt period.

Egg production drops when hens reach 60 to 65 weeks of age. Many U.S. farmers solve this problem through feed restriction. Restricting feed temporarily shuts down the egg-producing part of the bird's system. That's because when feed is in short supply, the bird's body halts processes that are not vital for survival and egg production is usually the first to go.

This process, called molting, allows the hen's reproductive system to rest briefly, which ultimately restores 85 percent of the bird's original egg production level.

But undetected infections of *Salmonella enteritidis* can grow rapidly during this time. That increases the risk that the hen's post-molt chicks or table eggs will also be infected. Many farmers won't take chances. Evidence of *Salmonella* infection prior to molt means slaughter and money lost. The farmer's European counterparts are less likely to molt their birds, but they do have treatments for *enteritidis*. Their veterinarian can prescribe Enrofloxacin. The treatment is reinforced by another product, Avigard, that helps prevent Salmonella enteritidis from coming back after the Enrofloxacin treatment is completed. U.S. veterinarians can prescribe Enrofloxacin to protect poultry and Avigard to protect the eggs, but only from *E. coli*.

Microbiologist Peter Holt with the Agricultural Research Service is testing the effectiveness and safety of Enrofloxacin and Avigard under a cooperative research agreement with Bayer Corporation. As with any new pharmaceutical, an intriguing success overseas is promising, but lacks the evidence needed to make it available for U.S. producers.

But Holt is also researching low-tech, natural alternatives. He found that putting hens on a low-calcium reduced-calorie diet instead of restricted feeding reduces *Salmonella enteritidis* levels up to 100 fold. Holt is conducting more in-depth studies of the low-calcium strategy at ARS' Southeast Poultry Research Laboratory in Athens, GA.

Michigan Cold Storage Firm Fined $25,000 in Meat and Poultry Adulteration Case

A Taylor, Michigan cold storage warehouse has been sentenced and fined $25,000 for causing meat and poultry products to become adulterated in violation of federal meat and poultry inspection laws, the United States Department of Agriculture's Food Safety and Inspection Service announced.

On February 17, 1998 in U.S. District Court in Detroit before U.S. Magistrate Judge Paul J. Komives, Michigan Cold Storage Facility, Inc., was fined $25,000 and put on probation for 2 years. The firm was also ordered to do repairs to the facility, to maintain the outside premises and storage areas, to implement a sanitation or Hazard Analysis Critical Control Point (HACCP) program, to continue to use an outside pest control service, to require the plant manager to be trained in sanitation, HACCP, or complete a food handling course, and to pass a yearly inspection by the American Institute of Baking or similar outside inspection association.

At the February 17 court appearance before Judge Komives, the firm pled guilty to two misdemeanors counts of causing various meat and poultry products to become adulterated and unfit for human consumption due to rodent infestation and product spoilage.

The firm's President and Plant Manager have agreed to enter into and will be placed in a pre-trial diversion program at a later date.

The conviction and fine was a result of an investigation by FSIS compliance officers who discovered approximately 4,200 pounds of various meat and poultry products that were rodent adulterated, putrid and/or contaminated with filth.

FSIS Readying 'Notice on Notice' for HACCP Plants

USDA's Food Safety and Inspection Service plans to publish a "notice on notice" proposing enforcement steps for dealing with repeated deficiencies in meat and poultry plants under HACCP that do not involve adulterated product.

"We need to give plants a chance to explain or correct problems," Carol Seymour, FSIS Assistant Deputy Administrator for Enforcement Operations, told an April 6 to 7 Federal Food Regulatory Conference in Arlington, VA sponsored by Prime Label Consultants. Industry officials have complained about lack of due process for plant shutdowns under the new HACCP rule (See Food Regulation Weekly, April 6, Page 25).

Acknowledging that Inspectors and Plant Managers are also confused about the current appeals process, Seymour reported that she is currently working on a "fast track" proposal to adjust the process. She stressed that Plant Managers' appeals of noncompliance records are necessary and appropriate. "If we don't get an appeal until an enforcement action occurs, it's too late," she said. "We encourage appealing promptly rather than ignoring the citation."

FDA Guidance on Ruminant Feed Rules Available

FDA's Center for Veterinary Medicine (CVM) has released four small entity compliance guides which explain in plain language how the new regulations prohibiting certain mammalian proteins from use in feed for ruminant animals apply to renderers, feed manufacturers, and livestock feeders. These new guides replace the single "Guidance for Industry - Animal Proteins Prohibited from Animal Feed; Small Entity Compliance Guide" (Guidance Document 60); breaking out the requirements for each of these particular groups.

The titles of these new guides are as follows: "Guidance for Industry - Animal Proteins Prohibited from Animal Feed; Small Entity Compliance Guide for Renderers" (Guidance Document 67); "Guidance for Industry - Animal Proteins Prohibited from Animal Feed; Small Entity Compliance Guide for Protein Blenders, Feed Manufacturers, and Distributors" (Guidance Document 68); "Guidance for Industry – Animal Proteins Prohibited From Animal Feed; Small Entity Compliance Guide for Producers with On-Farm Mixing Operations" (Guidance Document 69); and "Guidance for Industry – Animal Proteins Prohibited from Animal Feed; Small Entity Compliance Guide for Producers Without On-Farm Mixing Operations" (Guidance Document 70).

Among other things, each guide contains a one-page summary of how to comply with the regulations (published in the June 5, 1997 *Federal Register*) that prohibit the use of certain protein products derived from mammals in feed for beef and dairy cattle and in other ruminant animals. FDA adopted the regulations to protect U.S. cattle herds from the establishment and amplification of bovine spongiform encephalopathy (BSE) through feed, which has been reported in Europe. The disease has never been detected in the U.S. Scientists believe cattle can develop the disease after consuming rendered byproducts from infected animals.

The guides are available through the CVM Internet Home page (www.cvm.fda.gov/) or by calling the CVM Communications Staff at 301.594.1755. Additional information on complying with the rule may be obtained by contacting CVM's Division of Compliance, 7500 Standish Place, HFV-230, Rockville, MD 20855, 301.594.1726.

Health and Human Services Publishes Guide on Safe Growing and Processing of Produce

The U.S. Department of Health and Human Services published a draft guide on the safe production and processing of fresh produce. Fresh fruits and vegetables are an important part of a healthy diet, and this guide is intended to further enhance produce safety by providing farmers and processors with steps they can take to combat disease-causing microorganisms from contaminating crops. The draft guide is being issued for public comment as part of President Clinton's "Initiative to Ensure the Safety of Imported and Domestic Fresh Fruits and Vegetables," announced October 2, 1997. In that initiative, the President directed that FDA and USDA take steps to ensure the safety of produce. The guide is one of several actions being taken to fulfill the President's directive. A final guide incorporating relevant comments will be issued later this year.

Secretary of Health and Human Services, Donna Shalala said that recent incidents of consumer illness associated with the consumption of fresh fruits and vegetables were catalysts for the President's initiative and for development of the draft guide.

"The guide is a set of voluntary guidelines describing good agricultural and manufacturing practices designed to minimize the risks of pathogen contamination of produce," said Michael A. Friedman, M.D., FDA's Lead Deputy Commissioner. The document addresses key areas where precautions should be taken to ensure safety: water quality, worker hygiene, field and facility sanitation, manure management and transportation. The guide recommends, for example, training farm and plant workers in proper hygienic practices and monitoring worker health to reduce the risk of transmitting foodborne pathogens.

After the guide is finalized later this year, FDA and USDA plan to initiate a program of grants, partnerships and outreach to provide technical assistance and education on the guide's elements to domestic and foreign fresh fruit and vegetable growers and processors.

In November and December 1997, FDA and USDA held a series of solicited input from consumers, farmers, processors and the foreign exporting industry on the elements that should be included in the guide.

A notice of availability of the guide was published in the *Federal Register*. Copies of the draft guide can be viewed on, and downloaded from, FDA's Web site at www.fda.

gov (select the foods icon). Written comments on the guide may be submitted up through June 29 to the Food and Drug Administration, Dockets Management Branch (HFA-305),12420 Parklawn Drive, Room 1-23, Rockville, MD 20857. Comments should refer to docket number 97N-0451.

IAFIS Foundation Awards Rath Research Fellowships

The first two annual $10,000 Rath Graduate Research Fellowships were awarded to William W. Hayes and David W. L. Ma, by the IAFIS Foundation.

The Fellowships were developed by the IAFIS Foundation in coordination with the Rath Foundation. The Rath Foundation was established in 1989, by IAFIS member Rath Mfg. Co., as an instrument to fund charitable efforts, ranging from the Rath Environmental Center of Janesville, to AIDS research. The Fellowships were granted to IAFIS in the spirit and memory of V. Duane Rath, a former IAFIS Board member.

Hayes is currently working on a Ph.D. program in food science and technology at Mississippi State University. He earned his B.S. degree in food science and human nutrition from the University of Missouri and his M.S. in food science and technology from Mississippi State. While a student at the University of Missouri he was a member of the Collegiate Dairy Products Evaluation Team. He has been involved in the IFT student association by competing in the product development competition and the College Bowl. He also served as President of the MSU food science club.

Ma received a B.S. in honors biochemistry from the University of Alberta, Edmonton, Canada. He is currently working toward the completion of an M.S. in experimental medicine from UA, and contributes to graduate student affairs in the department of medicine. He graduated from high school with honors and earned a partial international baccalaureate in mathematics, chemistry and biology.

FDA Proposals for Juice Safety Regulations 'Should Mandate Pasteurization or Equivalent Process', Says NFPA

Proposed regulations governing the safety of fruit and vegetable juices which the U.S. Food and Drug Administration (FDA) is expected to announce this week "should require that all juices be pasteurized or otherwise treated to ensure their safety," said Dr. Allen Matthys, Vice President of Regulatory Affairs for the National Food Processors Association (NFPA).

"NFPA shares FDA's goal of taking effective measures to further enhance the safety of the U.S. food supply," Dr. Matthys noted. "However it is our strong belief that, unless FDA mandates pasteurization or an equivalent process for all juices, not just most juices this rule will not be successful in advancing food safety in this country."

"The processed food industry has been a pioneer in the development and use of effective food safety technologies," Dr. Matthys commented. "Heat treatment of juice destroys *E. coli* O157:H7 and other pathogenic microorganisms of public health concern. It is our overriding position that juice or juice ingredients should receive heat pasteurization or an equivalent process sufficient to render these products free of dangerous microorganisms."

The FDA proposed regulations while stating that most juice products must be pasteurized or otherwise treated to kill disease-causing organisms do not require pasteurization or heat treatment for all juices, as NFPA has urged. Prior to the effective date of the proposed regulations, the Agency intends to require warning labels on unpasteurized products, to alert consumers that unpasteurized juices can contain bacteria that pose a special risk to certain individuals, particularly children and older Americans.

"It is important for consumers to know that the vast majority of juices sold in the United States, more than 98 percent, have been pasteurized or otherwise heat treated, and that those juices can be purchased and consumed with confidence," Dr. Matthys pointed out. "For example, all shelf-stable juices, those that do not require refrigeration prior to opening have been heat processed. Frozen concentrated juices also are produced from ingredients that have been heat processed. And many refrigerated juices also have been pasteurized. Consumers can check with the retailer or manufacturer if they have questions."

Matthys stated that "NFPA looks forward to closely examining FDA's proposal, and we will work with the Agency to provide assistance in helping to formulate a final rule that truly helps to enhance the safety of our nation's food supply."

NFPA is the voice of the $430 billion food processing industry on scientific and public policy issues involving food safety, nutrition, technical and regulatory matters and consumer affairs.

FDA Publishes Adequate and Well-Controlled Studies Final Rule

In the March 5, 1998, *Federal Register*, FDA published a final regulation further defining "adequate and well-controlled studies." The purpose

of this final rule is to further define "adequate and well-controlled" to require that field investigations be designed and conducted in a scientifically sound manner, taking into account practical conditions in the field and differences between field conditions and laboratory conditions. The rule implements, in part, the Animal Drug Availability Act of 1996, which amended the implements, in part, the Animal Drug Availability Act of 1996, which amended the Federal Food, Drug, and Cosmetic Act to enable more efficient approval and more expeditious marketing of safe and effective animal drugs. The regulation is effective on April 6, 1998.

The *Federal Register* notice for this final rule is available for review or downloading on CVM's Web site at www.cvm.fda.gov/. Paper copies are available from the Communications Staff, FDA/Center for Veterinary Medicine, HFV-12, 7500 Standish Place, Rockville, MD 20855, telephone 301.594.1755.

Questions about this rule may be directed to Herman M. Schoenemann, Center for Veterinary Medicine (HFV-126), Food and Drug Administration, 7500 Standish Place, Rockville, MD 20855, 301. 594.1638.

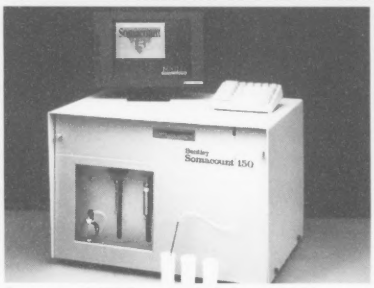
IFT Announces 1998 Fellows

Nine professional members of the Institute of Food Technologists' (IFT's) were selected as IFT Fellows this year. They will be honored at IFT's 1998 Annual Meeting and Food Expo® in June.

Criteria for fellows include a minimum 10-year record of accomplishment in the field of food science and technology, professional membership in IFT for a minimum of 15 years, service to IFT, and activity in professional communications. The 1998 IFT Fellows are: Wayne R. Bidlack, Ph.D., Dean, College of Agriculture, California State Polytechnic University, Pomona, CA; Gloria Brooks-Ray, M.B.A., M.S., Principal Advisor for Codex Issues, Novigen Sciences, Inc., Washington, D.C.; John A. Carpenter, Ph.D., Emeritus Professor, Dept. of Food Science and Technology, University of Georgia, Athens, GA; Ken Lee, Ph.D., Professor, Dept. of Food Science, the Ohio State University, Columbus, OH; William H. Root, Technical Sales, Purcell & Associates, San Ramon, CA; Walter E. L. Spiess, Ph.D., Federal Research Centre for Nutrition, Karlsruhe, Germany; Richard F. Stier, Ph.D., Consultant, Emeryville, CA; Marilyn A. Swanson, Ph.D., R.D., Head and Professor, Dept. of Nutrition and Food Science, South Dakota State University, Brookings, SD; and Kenneth R. Swartzel, Ph.D., Professor, Dept. of Food Science, North Carolina State University, Raleigh, NC.

The fellows will be recognized at the Opening Event of IFT's Annual Meeting and Food Expo® on Saturday, June 20 at 8:00 p.m. in the Ballroom of the Georgia World Congress Center in Atlanta.

Analytical Instruments for the Dairy Industry



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Our instruments analyze milk and milk products for:

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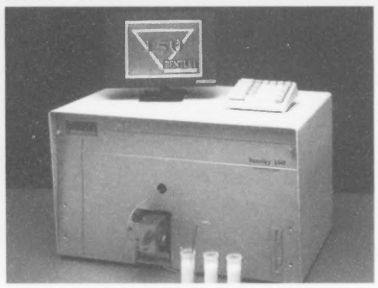

Bentley 150 Infrared Analyzer

Our innovative instruments incorporate:

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- Designs for labs with various testing needs
- Low maintenance components

Bentley Instruments is committed to providing quality, state-of-the-art analytical instruments for the dairy industry. Our commitment extends to providing unparalleled technical service and long-term customer support. The result of our dedication is a successful company solidly built on customer satisfaction.

BENTLEY INSTRUMENTS

For additional information, contact us at:
Bentley Instruments, Inc.
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Tel: (612) 448-7600 ■ Fax: (612) 368-3355
E-mail: bentley@winternet.com

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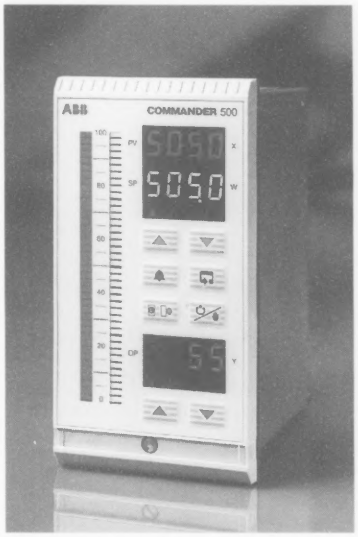

ABB Instrumentation

ABB's Commander 501/505 Process Controllers Offer Multi-Loop Functionality

The Commander 501 Process Controller from ABB Instrumentation provides the high level of functionality that until now was found only in advanced multi-loop controllers.

A powerful standard controller, the Commander 501 delivers advanced functionality with standard math and logic functions. The easy-to-use instrument is simple to configure, and is ideal for single loop control. Users can program the unit by the front panel keys or via ABB's Windows-based PC configuration software package.

The Commander 501 offers eight preconfigured templates for popular applications, including single-loop control, single-loop control with remote setpoint, auto/manual station with low signal selection, auto/manual with digital selection, analog backup with low signal selection, analog backup with digital selection, single indicator/manual loader and dual indicator/manual loader.

The Commander 501 also offers two autotune options and a built-in Control Efficiency Monitor (CEM) feature that permits more accurate and efficient P.I.D. control. In addition, the instrument features dual multi-purpose inputs, two relays, two digital outputs, along with a choice of option cards that provide additional I/0 for complex applications.

The Commander 501, which provides functionality from single loop up to a cascade with feed forward, can process logic control (AND, OR, NOR, NAND) applications.

ABB Instrumentation, Rochester, NY

Reader Service No. 390

Cooper Introduces the New Waterproof Thermocouple for HACCP Monitoring

Cooper Instrument Corporation introduces two new waterproof thermocouples, the FW2000 and FW2000MK to assure correct temperatures in accordance with HACCP requirements. These hand-held thermometers come standard with Cooper's new quick response probe and are specifically designed for use in foodservice, food processing, and restaurant environments.

The FW2000 design features a hard-wired probe (with a two-second response) which eliminates loose cords failing into food. Cooper makes a second version called the FW2000MK. The FW2000MK has a type K mini thermocouple probe jack, making the new waterproof thermocouple capable of using a variety of probes that best fits the users needs. A 3.75" stainless steel probe with a welded fast response needle for longevity, and a tip temperature range of -100° to 400°F (-73° to 204°C) makes this a must have for checking temperatures of meats and liquids in a wide temperature range.

Performance specifications of the FW2000 series include a wide temperature range of -100°F to 999°F, and an ambient operating range of 0°F to 115°F. Accuracy rating of the unit is ±0.5% of reading ±2°F over the entire range. Battery life is an impressive 500 hours and is powered by a 9-volt alkaline. A series of decimals indicate low battery when 8 hours remain. The instrument's contoured design is ergonomic and comfortable to hold. The moisture resistance sealed keypad that houses the ON/OFF and F/C button make it ideal for harsh steam filled environments.

Cooper Instrument Corporation, Middlefield, CT

Reader Service No. 391

The publishers do not warrant, either expressly or by implication, the factual accuracy of the products or descriptions herein, nor do they so warrant any views or opinions offered by the manufacturer of said articles and products.

Approval for Oxoid *Staphylococcus Aureus* Tests

Oxoid Staphytect Plus and Oxoid Dryspot Staphytect Plus have recently been assessed and approved by the United States Food and Drug Administration (FDA). This most recent mark of approval is further testimony to the quality and effectiveness of Oxoid Diagnostic Reagents for the rapid and reliable detection of *Staphylococcus aureus* strains.

Oxoid Staphytect Plus and Oxoid Dryspot Staphytect Plus are latex slide agglutination tests with specificity for clumping factor (coagulase), Protein A and MRSA capsular polysaccharides, enabling a wider range of *S. aureus* strains, including MRSA strains, to be detected. The inclusion of an antibody specific for MRSA capsular polysaccharides is particularly important since it ensures that these life-threatening strains are not missed.

Oxoid Staphytect Plus blue latex reagent is mixed with suspect colonies on a disposable reaction slide. If *S. aureus* is present, a clearly visible agglutination reaction occurs within 20 seconds, and the test result is positive. In the absence of the *S. aureus*, the blue latex particles remain in suspension indicating a negative result.

Oxoid Dryspot Staphytect Plus has the same specificity as Staphytect Plus but the reagents, including control reagent, are conveniently dried onto the reaction card. All that is required is the addition of colonies and within seconds the result can be read. By supplying the kit components in this dried format, the test procedure is simplified, the kit can be stored conveniently at room temperature, and the shelf life is extended to two years.

The FDA ensures that products and their manufacturers meet stringent standards before they are approved for marketing. Oxoid Staphytect Plus and Oxoid Dryspot Staphytect Plus have recently been shown to meet these standards.

Oxoid Inc., Stittsville, ON

Reader Service No. 392

New Mixproof Valve from G&H Products Corp. Meets PMO Requirements

G&H Products Corp. has introduced the SMP-SC-PMO Mixproof Valve, a new single-bodied mixproof valve that complies with the Pasteurized Milk Ordinance, ideal for the dairy and dairy processing industries.

Some of the other features of this new mixproof valve include: full port leak tube (vent); maximum protection against mixing of fluids, including product vs. CIP solution applications; authorized to carry the 3-A symbol; simple valve disassembly/reassembly; compact size; total CIP hygienic environment; and fully pressure-balanced upper and lower valve.

G&H Products Corp., Pleasant Prairie, WI

Reader Service No. 393

3M™ Electronic Pipettor Ideal for Petrifilm™ Count Plates

The 3M™ Electronic Pipettor is the ideal pre-programmed instrument for diluting and pipetting onto 3M™ Petrifilm™ Count plates. The Electronic Pipettor is pre-programmed to perform the most common Petrifilm plate dilutions and provides high accuracy and precision handling for micro-volumes of liquids. A self-calibrating, microprocessor-based system reduces the possibility of human error and instrument contamination by controlling pipetting speed, calibration and volume selection. The Electronic Pipettor's lightweight and ergonomic controls take the effort out of pipetting to help reduce the risk of repetitive strain injuries that are frequent with manual pipetting.

3M Microbiology Products, St. Paul, MN

Reader Service No. 394

Sloan Publishes Master Specification on New Royal® Flushometer

Sloan Valve Company has published its Master Specification for the Royal® Flushometer with Dual Filtered By-Pass. The Specification, which reflects the latest change in the re-engineering of the Royal® Flushometer, the world's most popular Flushometer, will help specifiers achieve their water conservation goals in using low consumption (1.6 gpf/6.0 lpf) and Water Saver 3.5 gpf/3.2 lpf). Flushometers in office buildings, healthcare facilities, educational buildings and other commercial, industrial and institutional new and retrofit projects.

The Master Specification designates the Royal® Flushometer in clear, precise language, and includes product descriptions, options, and possible variations. For example, the new Royal® incorporates the Dual Filtered By-Pass – two filters located in front of the Metering By-Pass of the Diaphragm on the Flushometer to help prevent valve run-on and ensures the extended performance of the Royal® Flushometer. The specification also includes wording that helps distinguish the Royal® from look-alikes in terms of performance, and includes specifics such as Sloan's ADA compliance handle, triple seal packing, skirted high back pressure vacuum breaker with bottom hex coupling nut, and Bak-Chek® control stop that has a

free-spinning, vandal-resistant stop cap.

The Master Specification covers the Royal's body, cover, tailpiece and control stop manufacturing parameters, and includes ASSE, ANSI/ASME and Military Specification requirements that the Flushometer meets.

Sloan Valve Company, Franklin Park, IL

Reader Service No. 395

Tychem® 9400 Protective Wear Provides Splash Protection

Lakeland Industries, Inc. Chemical Protective Clothing Division manufactures its dependable Level B garments using DuPont's tough, durable Tychem® 9400 to provide excellent splash protection against a broad range of chemicals encountered in routine plant tasks and basic cleanup situations. Tychem® 9400 meets all fabric requirements of NFPA 1993. It is comprised of a tear-resistant copolymer film laminated to a rugged spun-bonded material. Lakeland has designed Tychem® 9400 garments in a variety of standard styles, coveralls, encapsulating suits, jackets, pants, hoods; each styled in high-visibility yellow, and all featuring one-piece construction with sealed seams and set-in sleeves for added strength and wearer comfort.

Lakeland Industries, Inc., Ronkonkoma, NY

Reader Service No. 396

Neogen Corporation Develops Solutions for Safety

Neogen Corporation develops and markets solutions for safety and improved quality in food, agriculture and pharmacologics. Neogen's Reveal® test kits include an *E. coli* O157:H7 kit that detects the deadly pathogen in a market best eight hours; and rapid, easy-to-use, and accurate *Salmonella* and *Listeria* test kits. The company's Reveal® BioPlate system detects general *E. coli* and total coliforms quickly and accurately. Neogen's Agri-Screen® and Veratox® product lines offer both qualitative and quantitative ELISA-based tests for aflatoxin, vomitoxin, fumonisin, zearalenone, ochratoxin and T-2 toxin. For the seafood market, tests using the Alert® ELISA format are available to detect the presence of Histamine and Sulfite. Neogen's simple, accurate and supported products also include on-site detection of pesticide and drug residue kits.

Neogen Corporation, Lansing, MI

Reader Service No. 397

IDEXX Food Safety Net™

The IDEXX Food Safety Net is an expanding network of products, consultants and services designed to help improve food quality programs. It includes laboratory, consulting and educational services. It also includes products such as LIGHTING® ATP-bioluminescence system for verifying plant cleanliness; SimPlate™ family of rapid, easy-to-read micro tests for total bacteria, coliforms/*E. coli*, and yeast and mold; BIND® 22-hour *Salmonella* test; and 350 Acumedia™ high-quality dehydrated culture media.

IDEXX Laboratories, Inc., Westbrook, ME

Reader Service No. 398

New Bioactive Peptides from Sigma

Over 40 new bioactive peptides for use in signal transduction and basic peptide research have recently been introduced by Sigma. Included are hot new peptides such as CTOP, SPARC Fragment 119-122, Orphanin FQ, Urocortin, Astressin, Influenza hemaglutinin (HATag) peptide, and c-erb-3 Fragment 1265-1278. Also introduced were several new workhorse peptides, including Amyloid ß-Protein Fragment 1-43, Leuprolide, and Leptin fragment 22-56. With these new additions, the company now offers over 600 bioactive peptides in 20 categories.

As with all Sigma bioactive peptides, these new peptides are competitively priced, guaranteed to meet the company's stringent quality control and purity requirements, and are backed with comprehensive technical support. For added convenience, Sigma bioactive peptides are available in a variety of package sizes, including quantities suitable for laboratory and manufacturing use.

Sigma, St. Louis, MO

Reader Service No. 399

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DAVID W. THARP

To All IAMFES Members:

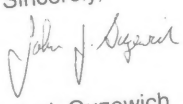
Today I'm writing to encourage your involvement in IAMFES, specifically in our Committees, Professional Development Groups (PDG's), Task Forces and Support Groups. Each of these groups serves a vital function in the organization of IAMFES and your expertise is welcome and needed! If you have participated with our Committees, PDG's, Task Forces or Support Groups (herein referred to as Committees) in the past, I commend you for your service and challenge you to continue.

IAMFES Committees meet during the IAMFES Annual Meeting and may meet throughout the year via conference call or E-mail. Even if you are not able to attend the IAMFES Annual Meeting, your involvement with a Committee is still possible. Please review the listing of Committees on the following page to find a group that your interest and knowledge can benefit. Call the Chairperson listed to learn more about the function of the group, then, if it sounds interesting; volunteer your time to help benefit other professionals.

Your input and ideas are welcome at all times. So accept the challenge today; call one of the Chairpersons to let him or her know of your interest in sharing your knowledge and expertise with other IAMFES Members. We all have a responsibility to help others grow and learn. What better way than to become involved and help your colleagues?

I'm looking forward to seeing your name on our next Committee listing! Thank you in advance.

Sincerely,



Jack Guzewich
Vice President, IAMFES

IAMFES' mission: "To provide food safety professionals worldwide with a forum to exchange information on protecting the food supply"

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Preliminary Program
of the IAMFES 85th Annual Meeting

MONDAY MORNING — AUGUST 17, 1998

(S1) Basic Dairy Field Workshop Part 1

8:30 Dairy Farm Regulations and Inspection — CHARLES PRICE, FDA, Chicago, IL, U.S.A.

9:30 Industry Quality Control Bacterial Standards — RUTH FUQUA, Quality Chekd Dairy Products Assn., Mt. Juliet, TN, U.S.A.

10:00 Break

10:15 Somatic Cell Count — NORM CORLETT, Dairy Farmers of America, Strongsville, OH, U.S.A.

10:45 Drug Residues — JOE SMUCKER, FDA, Washington, D.C., U.S.A.

(S2) Change and Unintended Microbial Consequences — Along the Farm to Fork Continuum

8:30 Historical Perspectives on Inadvertent Changes that Led to Foodborne Microbial Hazards: Lessons to be Learned — DON ZINK, Nestlé, U.S.A., Inc., Glendale, CA, U.S.A.

9:00 Aquaculture: Practices with Unintended Consequences — E. SPENCER GARRETT, National Marine Fisheries Service, Pascagoula, MS, U.S.A.

9:30 Bovine Spongiform Encephalopathy: Milestones and Controversies — To be announced

10:00 Break

10:15 *Pfisteria*: Niche Creation and Safe Seafood — KEVIN SELLNER, National Oceanographic and Atmospheric Administration, Silver Spring, MD, U.S.A.

10:45 *Cyclospora*: A New Pathogen to a Non-Immune Population — BARBARA HERWALDT, CDC, Atlanta, GA, U.S.A.

11:15 Roundtable – All Speakers

(T2) Food Safety & Quality of Meat & Poultry — Technical Session

8:30 Determination of End-Point Temperature in Cooked Ground Beef Patties by Near-Infrared Reflectance Spectroscopy — WILLIAM WINDHAM, USDA-ARS-RRC-QARU, Athens, GA, U.S.A.

8:45 Acid Phosphatase Activity and Myoglobin Denaturation as End-Point Temperature Indicators in Cooked Ground Beef Patties — CARL DAVIS, USDA-ARS-RRC-PPMQ, Athens, GA, U.S.A.

9:00 Recovery of *Salmonella*, *Campylobacter jejuni* and *Clostridium perfringens* from a Poultry Broiler House — PAULA FEDORKA-CRAY, USDA-ARS-RRC-PMSRU, Athens, GA, U.S.A.

9:15 Nonthermal Inactivation Models for *S. typhimurium* in Poultry Processing — LI MA, University of Arkansas, Fayetteville, AR, U.S.A.

9:30 Quantitative Risk Assessment for *Campylobacter jejuni* in Fresh Chicken — AAMIR FAZIL, Health Canada, Guelph, Ontario, Canada

9:45 Experimental Infection of Birds with *Arcobacter butzleri* — IRENE WESLEY, USDA-ARS-NADC, Ames, IA, U.S.A.

10:00 Break

10:15 Occurrence of *E. coli* O157:H7, *Salmonella* and Other Shiga-Like Toxin-Producing *E. coli* in Retail Fresh Ground Beef — MARK BARBOUR, Qualicon, Inc., Wilmington, DE, U.S.A.

10:30 Improved Isolation of Verotoxin – Producing *E. coli* from Ground Beef — LESLIE MAC DONALD, Health Canada, Guelph, Ontario, Canada

10:45 Immunoassays for the Detection of Spinal Cord in Product from Advanced Meat Recovery Systems — LYNDA KELLEY, PMSRU-USDA-ARS, Athens, GA, U.S.A.

11:00 Triclosan-Incorporated Plastic for Reducing Bacteria on Meat Surfaces — CATHERINE CUTTER, USDA-ARS-Roman L. Hruska, Clay Center, NE, U.S.A.

11:15 Studies to Characterize and Optimize the *E. coli* Sponge Sampling Method for Slaughter Process Control Monitoring — RANDY PHEBUS, Kansas State University, Manhattan, KS, U.S.A.

11:30 Ecology and Control Strategies for Salmonellae in Broiler Chickens — STAN BAILEY, USDA-ARS-RRC, Athens, GA, U.S.A.

(S3) Seafood HACCP: Reflections after Implementation

8:30 FDA's Reflection on HACCP Implementation — DONALD KRAEMER, FDA, Washington, D.C., U.S.A.

9:00 SSOP Reflections — Eight Months after Implementation — DEBRA DEVLIEGER, FDA, Bothell, WA, U.S.A.

9:30 Web-HACCP and Seafood Safety Communication — ROBERT PRICE, University of California-Davis, Davis, CA, U.S.A.

10:00 Break

10:15 HACCP Implementation — Perspectives of a Small Family-Owned Business — JAMES JOHNSON, Washington Crab Co., Inc., Washington, D.C., U.S.A.

10:35 FDA Seafood HACCP Implementation — A Large Processor Experience and Key Learnings — RAYMOND JONES, Rich Seapak Corp., Simons Island, GA, U.S.A.

10:55 Seafood HACCP Alliance: Reflections and Goals to 2000 — STEVEN OTWELL, University of Florida, Gainesville, FL, U.S.A.

11:15 Emerging Pathogens and HACCP — DONN WARD, North Carolina State University, Raleigh, NC, U.S.A.

11:35 *Pfisteria* – An Emerging Environmental Concern — JOANN BURKHOLDER, North Carolina State University, Raleigh, NC, U.S.A.

(S4) A Symposium on Fresh-Cut Produce: Field Sanitation, Packaging, Microbiology, Control, Programs, and Regulations — Part I

8:30 The Future of the Produce Industry — STACY ZAWEL, United Fresh Fruit & Vegetable Assn., Alexandria, VA

9:00 Current Microbiological Concerns in the Produce Industry — JEFFREY FARBER, Health Canada, Ottawa, Ontario, Canada

9:30 Methods of Controlling and/or Eliminating Foodborne Pathogens in Produce — LINDA HARRIS, University of California-Davis, Davis, CA, U.S.A.

10:00 Break

10:15 Epidemiological Investigation of Outbreaks Associated with Produce Items — JEFF FERRAR, California Dept. of Health Services, Sacramento, CA, U.S.A.

10:45 Evolution of Packaging Films in Extended the Shelf life of Produce Items — ALAN HATHCOX, Cryovac GRACE Packaging, Duncan, SC, U.S.A.

11:15 The Development and Implication of a Field Sanitation Program — DONNA GARREN, Boskovich Farms, Inc., Oxnard, CA, U.S.A.

Foodborne Pathogens — Poster Session (10:00 a.m.–1:00 p.m.)

(P1) Effectiveness of Trisodium Phosphate for Inactivation of *E. coli* O157:H7 on Apples — ATOBUNDU ATUGHONU, North Carolina A&T State University, Greensboro, NC, U.S.A.

(P2) Cold Shocked *E. coli* O157:H7: Impact on Survival and Injury Following Either Freezing or Heating — JILL BOLLMAN, University of Manitoba, Manitoba, Canada

(P3) Irradiation Inactivation of *E. coli* O157:H7 in Apple Juice — GLENN BOYD, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P4) Effect of pH-Dependent, Stationary Phase Acid Resistance on the Thermal Tolerance of *E. coli* O157:H7 — ROBERT BUCHANAN, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P5) Contamination of Intact Apples after Immersion in an Aqueous Environment Containing *E. coli* O157:H7 — SHARON EDELSON, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P6) Fate of *E. coli* O157:H7 in Four Varieties of Ground Apples Used in Cider Production — TOMEKA FISHER, The University of Tennessee, Knoxville, TN, U.S.A.

(P7) Persistence of *E. coli* O157:H7 in Dairy Cattle Drinking Water — CLIFFORD JOHNSON, USEPA, Cincinnati, OH, U.S.A.

(P8) Heat Inactivation of *E. coli* O157:H7 in Turkey, Pork and Lamb — VIJAY JUNEJA, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P9) Survival and Growth of *E. coli* O157:H7 during Sprouting of Inoculated Alfalfa Seeds — MARK KANTOR, University of Maryland at College Park, College Park, MD, U.S.A.

(P10) Influence of Acidulant Identity on the Effects of pH and Acid Resistance on the Radiation Resistance of *E. coli* O157:H7 — BENNE MARNER, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P11) Antibiotic Resistance of *E. coli* O157:H7 Isolated from Animals, Foods and Humans — JIANGHONG MENG, University of Maryland at College Park, College Park, MD, U.S.A.

(P12) Growth and Recovery of *E. coli* O157:H7 in Reconditioned Wastewater — KATHLEEN RAJKOWSKI, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P13) Attachment of *E. coli* O157:H7 to Lettuce Leaf Surfaces — KUN-HO SEO, University of Georgia, Athens, GA, U.S.A.

(P14) Enumeration of Verotoxigenic *E. coli* in Ground Beef — KRISTIN SLOAN, Health Canada, Guelph, Ontario, Canada

(P15) Reduction of *E. coli* O157:H7 on Apples Using Acetic Acid, Hydrogen Peroxide, and Phosphoric Acid Wash Treatments — JIM WRIGHT, Virginia Tech, Blacksburg, VA, U.S.A.

(P16) Tolerance of Acid-Adapted and Non-Adapted *E. coli* O157:H7 to Reduced pH as Affected by Type of Acidulant — L. R. BEUCHAT, University of Georgia, Griffin, GA, U.S.A.

(P17) Antibacterial Effect of Lactoperoxidase System against *L. monocytogenes* and *E. coli* O157:H7 — C. I. CHUNG, Kon Kuk University, Seoul, South Korea

(P18) Survival of *E. coli* O157:H7 in Apple Cider Containing Dimethyl Dicarbonate, Sulfur Dioxide, and Sodium Benzoate — TOMEKA FISHER, The University of Tennessee, Knoxville, TN, U.S.A.

(P19) Suitability of Selective Media for Recovery of Heat-Stressed *E. coli* O157:H7 — TOMEKA FISHER, The University of Tennessee, Knoxville, TN, U.S.A.

(P20) Thermal Resistance of *Salmonella* sp. in Chicken Broth as Defined by D- and Z-Values — VIJAY JUNEJA, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P21) Effect of Refined Liquid Smoke on Attachment of *Salmonella* sp. on Pork Skin — JOHN KOTROLA, Kansas State University, Manhattan, KS, U.S.A.

(P22) Reduction of *Salmonella* spp. in Cut Cantaloupe — CARL OLSEN, University of California, Davis, CA, U.S.A.

(P23) Enhanced Thermal Destruction of *S. enteritidis* in Liquid Egg Products Using Lysozyme, Lactoferricin-ß, and EDTA — SARAH LEWIS, Tuskegee University, Tuskegee, AL, U.S.A.

(P24) Effect of Inoculum Cell Phase, Heat Shock, and Osmolytes on the Lag Phase Duration of *L. monocytogenes* Scott A at 6°C — JEFFREY CALL, USDA, Wyndmoor, PA, U.S.A.

(P25) Control of *L. monocytogenes* on Ground Turkey by Irradiation and Modified Atmosphere Packaging — DONALD THAYER, USDA-ARS-ERRC, Wyndmoor, PA, U.S.A.

(P26) Fat Content, Storage Temperature and Background Microflora Influence the Growth of *L. monocytogenes* in Vacuum-Packaged Ground Beef — RUPINDER PANAYACH, University of Alberta, AFNS, Edmonton, AB, Canada

(P27) Acid Adaptation of *L. monocytogenes* Offers Cross-Protection against an Activated Lactoperoxidase System — SADHANA RAVISHANKAR, University of Georgia, Athens, GA, U.S.A.

(P28) The Effects of Varying Thermal Processing Schedules on *L. monocytogenes* and Indicative Microorganisms in Blue Crab (*Callinectes sapidus*) Meat — JENNIFER SMITH, Virginia Tech, Blacksburg, VA, U.S.A.

(P29) Sensitivity of Strains of *L. monocytogenes* to Temperature and Lysozyme in Liquid Egg Products — YIBEI ZHANG, Tuskegee University, Tuskegee, AL, U.S.A.

(P30) Evaluation of ISSC Interim Control Plan for Limiting *Vibrio vulnificus* Growth in Oysters — DONGJIN SHIN, University of Florida, Gainesville, FL, U.S.A.

(P31) Inhibition of *Clostridium botulinum* by Phosphate-based Salts in Media and Process Cheese Spread — KATHLEEN GLASS, University of Wisconsin, Food Research Institute, Madison, WI, U.S.A.

(P32) Prevalence of *Bacillus* Diarrhoeal Enterotoxin – Producing Organisms in Dairy Products — JILL GEBLER, Murray Goulburn Co-op Co. Ltd., Yarram, Vic, Australia

MONDAY AFTERNOON

(S5) Basic Dairy Field Workshop — Part 2

1:30 Troubleshooting Quality Problems on Dairy Farms — PAUL DERSAM, Alden, NY, U.S.A.

2:00 Dairy Farm Waste Management — ROBERT BURNS, University of Tennessee, Knoxville, TN, U.S.A.

2:30 Milk Hauling — ROGER NORDTVEDT, Land O'Lakes, Inc., Arden Hills, MN, U.S.A.

3:15 Proper Dairy Etiquette — NEAL LINEBAUGH, Dairy Farmers of America, Strongsville, OH

3:45 Dairy Field Person's Pocket Guide — CHARLES PRICE, FDA, Chicago, IL, U.S.A.

4:15 Panel Discussion

(S6) Farm to Table: Ecology of Pathogens Associated with Poultry

1:30 *Salmonella* in Poultry — MARK BERRANG, Russell Research Center, Athens, GA, U.S.A.

2:00 An Assortment of Other Foodborne Pathogens in Poultry — DON CONNER, Auburn University, Auburn, AL, U.S.A.

2:30 *Clostridium perfringens* in Poultry — STEVE CRAVEN, Russell Research Center, Athens, GA, U.S.A.

2:30 *Clostridium perfringens* in Poultry — JAMES LINDSAY, University of Florida, Gainesville, FL, U.S.A.

3:00 Break

3:15 Indicator Organisms to Some Foodborne Pathogens in Poultry — SCOTT RUSSELL, University of Georgia, Athens, GA, U.S.A.

3:45 *Campylobacter* in Poultry — SIMON SHANE, Louisiana State University, Baton Rouge, LA, U.S.A.

4:15 Hong Kong Flu in Poultry — DAVID SWAYNE, Southeast Poultry Research Laboratory, Athens, GA, U.S.A.

Microbiological Methods — Technical Session — (1:30 p.m.–4:15 p.m.)

T13 Characterization of the Antibiotic Resistance Locus in *S. typhimurium* DT 104 — LANCE BOLTON, USDA-ARS-PMS, Athens, GA, U.S.A.

T14 Response Surface Models for Effects of Previous pH, Temperature, and pH on Lag Time and Growth Rate of *S. typhimurium* — THOMAS OSCAR, USDA-ARS, Princess Anne, MD, U.S.A.

T15 Use of an Autobioluminescent *S. hadar* to Monitor the Effect of Decontamination Methods — DERRICK BAUTISTA, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

T16 Evaluation of a PCR-TaqMan™ Assay for Detection of *E. coli* O157:H7 and *Salmonella* from Ground Beef — LALIT BOHRA, Kansas State University, Manhattan, KS, U.S.A.

T17 Development of a PCR Assay for the Detection of *Listeria* spp. in Food Production Environments — MARK BARBOUR, Qualicon, Inc., Wilmington, DE, U.S.A.

T18 *Campylobacter* Recovery and Enumeration from Broiler Carcasses — ERIC LINE, USDA-ARS-RRC-PMSRU, Athens, GA, U.S.A.

T19 A Rapid and Specific Fluorogenic PCR-Based System for the Detection of Shiga Toxins Producing *E. coli* from Different Food Samples — MICHAEL HO, Perkin Elmer Applied Biosystems, Foster City, CA, U.S.A.

T20 *In vitro* Pathogenicity Assay of *Bacillus cereus* Using Hybridoma Cells — DEBORAH HOYT, University of Arkansas, Fayetteville, AR, U.S.A.

3:00 Break

T21 Comparison between Automated Ribotyping and RAPD Analysis for 44 Different *Bacillus cereus* Isolates from the Dairy Industry — ANNIKA ANDERSSON, SIK Institute of Food & Biotechnology, Gothenburg, Sweden

T22 Use of Automated Ribotyping to Trace Sources of *Pseudomonas* in a Ready-to-Eat Food Product — PATRICK GUSTAVSSON, SIK Institute of Food & Biotechnology, Gothenburg, Sweden

(S7) The Leading Edge of Foodborne Disease Surveillance

1:30 Coordination of Local, State/Provincial and National Surveillance Systems for Foodborne Disease — JOHN GUZEWICH, USFDA, Washington, D.C., U.S.A.

2:00 Pulsed-field Gel Electronic Surveillance Network for *E. coli* O157:H7 — TIMOTHY BARRETT, CDC, Atlanta, GA, U.S.A.

2:30 Active Surveillance for Foodborne Disease: The U.S. FoodNet Surveillance Program — DREW VOETSCH, CDC, Atlanta, GA, U.S.A.

3:00 Break

3:15 The Canadian Information Highway for the Surveillance of Foodborne, Waterborne and Enteric Disease — Information in Real Time — PAUL SOCKETT, Health Canada, Health Protection Branch, Ottawa, Ontario, Canada

3:45 The Enteric Disease 4-Year Study in England and Wales — PAUL SOCKETT, Health Canada, Health Protection Branch, Ottawa, Ontario, Canada

4:15 Panel Discussion

(S8) A Symposium on Fresh-Cut Produce: Field Sanitation, Packaging, Microbiology, Control, Programs, and Regulations — Part 2

1:30 The Food Safety Programs of a Fresh-Cut Produce Processor, LARRY BELL, Fresh Express Farms, Salinas, CA, U.S.A.

1:55 The Role of Outside Laboratories in Developing Food Safety Programs for Produce Companies, JENA ROBERTS, DFL Laboratories, Modesto, CA, U.S.A.

2:20 UFFVA Efforts in Developing Produce Safety Guidelines, STACY ZAWEL, United Fresh Fruit and Vegetable Association, Alexandria, VA, U.S.A.

2:45 A Discussion of the FDA and USDA Food Safety Guidelines for the Produce Industry, LEEANNE JACKSON, Washington, D.C., U.S.A.

3:10 Break

3:25 The Development and Implementation of Food Safety Guidelines by IFPA and the Western Growers Association for the Produce Industry, EDITH GARRETT, IFPA, Alexandria, VA, U.S.A.

3:55 Discussion of the USDA Qualification Through Verification (QTV) Program, ERIC FOREMAN, USDA, Washington, D.C., U.S.A.

4:20 Panel Discussion

General Food Microbiology — Poster Session — (3:00 p.m.–6:00 p.m.)

P33 Development of Hybridoma Cell Line for the Production of Monoclonal Antibodyx to Residual Herbicide Atrazine — DUCK-HWA CHUNG, Gyeongsang National University, Chinju, Kyoungnam, Korea

P34 Partial Characterization of Aflatoxin B_1 Removal by Crude Extract from *Flavobacterium aurantiacum* — RONALD SMILEY, The University of Tennessee, Knoxville, TN, U.S.A.

P35 Screening of T-2 Toxin Producing Fungi from Agricultural Commodities in Korea by ELISA Method — DUCK-HWA CHUNG, Gyeongsang National University, Chinju, Kyoungnam, Korea

P36 Monte Carlo Simulation of Milk Spoilage as Influenced by Temperature and Initial Population — DONALD SCHAFFNER, Rutgers — The State University of New Jersey, New Brunswick, NJ, U.S.A.

P37 Predictive Model to Determine the Effects of Milkfat, pH, and Temperature on the Thermal Inactivation of *L. monocytogenes* — AMY TINKEY, Purdue University, West Lafayette, IN, U.S.A.

P38 Microbiological Quality and Safety of Ready-to-Eat Street Foods in Johannesburg City — FRANCINA MOSUPYE, University of the Witwatersrand, South Africa

P39 Efficacy of Lactate-Based Compounds as Bread Preservatives — TRACEY PATTISON, University of the Witwatersrand, South Africa

P40 Effect of Chemical Sanitizers on Bacterial Cell Morphology — ALEX VON HOLY, University of the Witwatersrand, South Africa

P41 Relative Hydrophobicity and Charge of Planktonic and Adhered Cells of *Enterococcus faecium* — NELIO ANDRADE, University of Minnesota, St. Paul, MN, U.S.A.

P42 Bacteriocidal Activity of Sanitizers against *Enterococcus faecium* Attached to Stainless Steel as Determined by Plate Count and Impedance Methods — NELIO ANDRADE, University of Minnesota, St. Paul, MN, U.S.A.

P43 Characterization of Two Bacteriocins Produced by Atypical *Enterococcus* Species — MARLENE JANES, University of Arkansas, Fayetteville, AR, U.S.A.

P44 Development of Whey Beverage Using Lactic Acid Bacteria — Y. K. JHA, G. B. Pant University of Agriculture and Technology, Pantnagar, India

P45 Comparison of Diluents and Media for Recovering *Zygosaccharomyces rouxii* in High-Sugar Foods — YONGSOO JUNG, University of Georgia, Griffin, GA, U.S.A.

P46 Effect of Heating Extract of *Angelica acutiloba* and *Glycyrrhiza uralensis* on Growth of Intestinal Microorganisms — KOOK-HEE KANG, Sungkyankwan University, Seoul, Korea

P47 Effect on Selected Pathogens of Exposure to Naturally Occurring Volatile Compounds — ABIGAIL VILLALBA, University of Kentucky, Lexington, KY, U.S.A.

P48 Growth of *Alicyclobacillus acidoterrestris* in Acid Products — ISABEL WALLS, National Food Processors Assn., Washington, D.C., U.S.A.

P49 Effect of Sugar and Citric Acid on the Quality of Canned Lychee — MING WU, University of Science and Technology, Pingtung, Taiwan, U.S.A.

P50 Model for the Implementation of HACCP in the Food Industry of Developing Countries — JAIRO ROMERO, Association Colombiana Cien, Bogota, Colombia

P51 Developing HACCP Training Materials for Food Service Employees — HEA-RAN ASHRAF, Southern Illinois University, Carbondale, IL, U.S.A.

P52 Indicative Microbial Quality of Gulf Coast Shucked Oysters Prior to Implementation of FDA Seafood HACCP Regulation — CUSTY FERNANDES, Mississippi State University, Pascagoula, MS, U.S.A.

P53 Biogenic Amine Analysis and Characterization of Histaminogenic Bacteria from Frozen Albacore — JORGE BARROS-VELÁZQUEZ, University of Santiago de Compostela, E.P.S., Lugo, Spain

P54 The Effect of Refrigerated Storage on the Safety and Quality of Raw Oysters (*Crassostrea virginica*) — TATIANA LORCA, Virginia Tech., Blacksburg, VA, U.S.A.

P55 Antimicrobial Spray of Poultry Carcasses: A Pilot Plant Study — ZHONGPING YANG, University of Arkansas, Fayetteville, AR, U.S.A.

P56 Microbiological Changes during Swine Carcass Dressing — SAMUEL PALUMBO, USDA, Wyndmoor, PA, U.S.A.

P57 Fate of *Arcobacter* spp. to Environmental Stresses of Temperature, pH and NaCl Levels — ELAINE D'SA, University of Georgia, Athens, GA, U.S.A.

P58 Antibiotic Resistance of Bacteria Isolated from Slaughtered and Retail Chickens in South Africa — THUREYAH MANIE, University of the Western Cape, Bellville, South Africa

P59 Comparison of Two Molecular Techniques for Epidemiological Tracing of *Campylobacter jejuni* — NORMAN STERN, USDA-ARS-RRC-PMSRU, Athens, GA, U.S.A.

P60 Phenotyping and Genotyping of Foodborne *Campylobacter* from Recurrent Disease — ANA JIMENEZ, University of Santiago de Compostela, E.P.S., Lugo, SPAIN

P61 Detection and Distinction of *C. jejuni* and *A. butzleri* in Contaminated Food Products by Multiplex PCR — DEBRA WINTERS, University of Arkansas, Fayetteville, AR, U.S.A.

P62 Reduction in Microbiological Counts of Beef Variety Meats Exposed to Various Decontamination Treatments — ROBERT DELMORE JR., Colorado State University, Fort Collins, CO, U.S.A.

P63 Effect of Environmental and Substrate Factors on Survival and Growth of *Helicobacter pylori* — XIUPING JIANG, University of Georgia, Griffin, GA, U.S.A.

TUESDAY MORNING — AUGUST 18, 1998

(S9) Current Perspectives on the Use of Antibiotics in Animal Production Systems

8:30 U.S. Food and Drug Administration Position of Approval of Existing and New Animal Drugs — SHARON THOMPSON, USFDA, Rockville, MD, U.S.A.

9:00 Veterinary Perspective on the Use of Antibiotics in Animal Production Systems — PAULA FEDORKA-CRAY, USDA-ARS, Athens, GA, U.S.A.

9:30 Significance and Sources of Antimicrobial-resistant Nontyphoidal *Salmonella* Infections in Humans in the United States: The Need for Prudent Use of Antimicrobial Agents, Including Restricted Use of Fluoroquinolones, in Food Animals — FREDERICK ANGULO, CDC, Atlanta, GA, U.S.A.

10:00 Break

10:15 Update on *Salmonella* DT 104 — JOHN THRELFALL, Public Health Laboratory Service, London, England, U.K.

10:45 Industry Perspective on the Use of Antibiotics in Animal Production Systems — RICHARD CARNEVALE Animal Health Institute, Alexandria, VA, U.S.A.

11:15 Panel Discussion

Food Safety Education/Safety & Quality of Produce — Technical Session (8:30 a.m.–11:30 a.m.)

T23 Pasteurization Process for Dairy Products — JOHN STAUFFER, Stauffer Technology, Greenwich, CT, U.S.A.

T24 Evaluation of the Food Safety Network as an Educational Tool — SARAH GRANT, University of Guelph, Guelph, Ontario, Canada

T25 An Evaluation of Food Safety Network (FSnet) as a Risk Analysis Tool — AMANDA WHITFIELD, University of Guelph, Guelph, Ontario, Canada

T26 The Provision and Evaluation of Daily Electronic Information Summaries to Identify Public and Scientific Animal Agricultural Issues Warranting Risk Analysis Activities: the Animal Network — JANIS HAZLEWOOD, University of Guelph, Guelph, Ontario, Canada

T27 Food Safety and Water Sanitation in Cambodia and China — EWEN TODD, Health Canada, Ottawa, Ontario, Canada

T28 Comparison of Chemical Treatments to Eliminate *E. coli* O157:H7 on Alfalfa Seeds — PETER TAORMINA, University of Georgia, Griffin, GA, U.S.A.

10:00 Break

T29 Sensitivity of *E. coli* O157:H7 to Storage in Frozen Apple Juice — SHERYL YAMAMOTO, University of California, Davis, CA, U.S.A.

T30 Effect of Brief Blanching Treatments on the Microflora of Fresh Cucumbers — FREDERICK BREIDT, JR., USDA-ARS, North Carolina State University, Raleigh, NC, U.S.A.

T31 Allyl Isothiocyanate as a Preservative in Non-Acidified, Refrigerated, Pickled Vegetables — BRIAN SHOFRAN, Oklahoma State University, Stillwater, OK, U.S.A.

T32 Deposition of Salmonellae from Soil and Blossoms into Internal Tissue of Tomatoes — DONALD CONNER, Auburn University, Auburn, AL, U.S.A.

T33 Outgrowth of *Bacillus coagulans* in Various Tomato Purees as Affected by pH and Acidity — ROCELLE CLAVERO, National Food Processors Association, Washington D.C., U.S.A.

(S10) Pest Management as We Approach 2000

8:30 Integrated Pest Management Technology Update — JIM SARGENT, Copesan Services, Inc., Brookfield, WI, U.S.A.

9:00 Ants — A Pest to Detest — KIM KELLEY TUNIS, McCloud Pest Control, Indianapolis, IN, U.S.A.

9:30 Understanding Rodent Behavior for a Better Control Program — TED BRUESCH, Lipha Tech, Inc., West Bend, WI, U.S.A.

10:00 Break

10:15 Heat Treatment as an Alternative to Chemical Fumigation for Pests — OLE DOSLAND, Copesan Services, Inc., Brookfield, WI, U.S.A.

10:45 Pest Management — A View from the Client Perspective — MARTY GUSHWA, Nestlé U.S.A., Inc., Glendale, CA, U.S.A.

(S11) Viral and Parasitic Foodborne Disease Associated with Produce: Epidemiology, Detection, and Control

8:30 Detection of *Cyclospora* in Foods — PALMER ORLANDI, FDA, Washington, D.C., U.S.A.

9:00 *Cryptosporidium* in Foods — Epidemiology, Detection and Typing — To be announced

9:30 Epidemiology of a 1997 Outbreak of Hepatitis A Virus Associated with the Consumption of Frozen Strawberries — YVAN HUTIN, U.S. CDC, MS G37, Atlanta, GA, U.S.A.

10:00 Break

10:15 Detection and Thermal Inactivation of Hepatitis A Virus in Foods — SYED SATTAR, University of Ottawa, Ottawa, Ontario, Canada

10:45 Surface Inactivation of Hepatitis A Virus on Strawberries Using Chlorine — MARK SOBSEY, University of North Carolina, Chapel Hill, NC, U.S.A.

Microbiological Methods — Poster Session – (10:00 a.m.–1:00 p.m.)

(P64) Resazurin as an Indicator of Growth in a New Medium for Measuring the Aerobic Plate Count in Food — CATHERINE SMITH, IDEXX Laboratories, Westbrook, ME, U.S.A.

(P65) Rapid Detection (1 to 4 h) of Total and Thermotolerant Coliforms on Carcasses — GRO ØFJORD, Colifast Systems, ASA, Lysaker, Norway

(P66) Development of an Impedance Selective Method for the Enumeration of Lactic Acid Bacteria — FABIEN DUBOEUF, bioMérieux Vitek, Inc., Hazelwood, MO, U.S.A.

(P67) A Rapid Method for the Detection of Gram Negative Organisms in Pasteurized Dairy Products — ANNE DAVIES, Celsis-Lumac, Evanston, IL, U.S.A.

(P68) Practical Application of ATP-bioluminescence for the Estimation of Microbial Populations in Pork — MARK CARTER, Celsis-Lumac, Evanston, IL, U.S.A.

(P69) Evaluation of Methods Used for Enumeration of Thermophilic and Mesophilic *Bacillus* Spores in Milk Powder — EDEN BELLENSON, Cal Poly State University, San Luis Obispo, CA, U.S.A.

(P70) Rapid Detection *Staphylococcus aureus* Using a Membrane Biosensor — JIANMING YE, University of Rhode Island, W. Kingston, RI, U.S.A.

(P71) Detection of *Clostridium botulinum* Type A Toxin in Culture Media and Food Systems by an Improved Colony Immunoblot Procedure — MICHELE PALMERTREE, University of Georgia, Athens, GA, U.S.A.

(P72) Rapid Detection of Cytolethal Distending Toxin Genes in *Campylobacter* Isolates by Polymerase Chain Reaction — AYSEGUL EYIGOR, University of Kentucky, Lexington, KY, U.S.A.

(P73) Improved Enrichment Protocol for Rapid Detection of Low Levels of *Salmonella* in Foods — MADELINE VELAZQUEZ, University of Minnesota, St. Paul, MN, U.S.A.

(P74) Automated One-Day, Two-Step Detection of *S. enteritidis* in Eggs — WEI TAN, Wayne State University, Detroit, MI, U.S.A.

(P75) Evaluation of a Novel 24-Hour Timed Release Enrichment System for the Rapid Isolation of *Salmonella* from Foods — PETER STEPHENS, OXOID Ltd., Basingstoke, Hampshire, U.K.

(P76) Development of an Immunoassay for Detecting *Salmonella* on Chicken Carcasses — ROBERT HOLTSLANDER, Health Canada, Guelph, Ontario, Canada

(P77) A Polymerase Reaction Procedure for the Detection of *S. enteritidis* — PIETER GOUWS, University of the Western Cape, Bellville, South Africa

(P78) Isolation and Simultaneous PCR Detection of *E. coli* O157:H7 and *Salmonella* spp. from Enrichment Cultures of Foods and Other Samples — PINA FRATAMICO, USDA, Wyndmoor, PA, U.S.A.

(P79) Detection of *Salmonella* in Dairy Samples Using BIND® — ELIZABETH EHRENFELD, IDEXX Laboratories, Cape Westbrook, ME, U.S.A.

(P80) Selective Enrichment Procedures for the Bacterial Ice Nucleation *Salmonella* Detection (BIND®) System to Detect Salmonellae in Environmental Drag Swab Samples from Poultry Houses — CHUN-MING CHEN, IDEXX Laboratories, Inc., Westbrook, ME, U.S.A.

(P81) Automated One-Day Screening Method to Detect Low Levels of *L. monocytogenes* in Milk — HUI PENG, Wayne State University, Detroit, MI, U.S.A.

(P82) *Vidas Listeria* Assay: Environmental Surface Challenge Study — DEBORAH MCINTYRE, R-TECH Laboratories, St. Paul, MN, U.S.A.

(P83) Evaluation of an Automated Immunoassay for the Detection of *Listeria* in Foods — THOMAS ARMSTRONG, bioMérieux Vitek, Inc., Hazelwood, MO, U.S.A.

(P84) Evaluation of Different Selective and Differential Media for Direct Quantitation of *E. coli* O157:H7 from Irradiated Hamburger Meat — ANANTA DESSAI, Tuskegee University, Tuskegee, AL, U.S.A.

(P85) Development of a Homogeneous PCR Assay for the Detection of *E. coli* O157:H7 in Food Samples — SUSAN TSENG, Qualicon, Inc., Wilmington, DE, U.S.A.

(P86) Inhibitory Effect of Gamma Irradiation and Efficacy of Plating Media for Recovering Irradiated *E. coli* O157:H7 — DEOGHWAN OH, Kangwon National University, Chuncheon, Kangwon, Korea

(P87) Effect of Surface Finish on the Cleanability of Stainless Steel — JOSEPH FRANK, University of Georgia, CFSQE, Athens, GA, U.S.A.

(P88) A Comparative Evaluation of Sponging and Excising as Sampling Procedures for Microbiological Analysis of Beef Carcass Tissue — LORENZO WARE, Colorado State University, Fort Collins, CO, U.S.A.

(P89) Shipping, Storage and Sampling-Sponge Effects on Bacterial Numbers Detected from Pork Carcass Skin and Fat Surfaces — JOHN SOFOS, Colorado State University, Fort Collins, CO, U.S.A.

(P90) Recovery of *E. coli* Pure Culture Suspensions from Sponges Following Shaking or Stomaching — MINDY KAIN, Colorado State University, Fort Collins, CO, U.S.A.

(P91) Survival of *Salmonella* During 4°C Storage in Sponge Bags Hydrated with Different Media — SCOTT RUEGER, Kansas State University, Manhattan, KS, U.S.A.

TUESDAY AFTERNOON — AUGUST 18, 1998

(S12) General Session — Life in a Fish Bowl: Essentials for Communications During a Food Safety Crisis

1:30 Introduction

1:40 To be announced — SUSAN CONELY, USDA-FSIS, Washington, D.C., U.S.A.

2:10 Trade Association Risk Communication: Learning to be Proactive — JENNY SCOTT, National Food Processors Assn., Washington, D.C., U.S.A.

2:40 Components of a Publicity Credible Crisis Communications Plan — DOUGLAS POWELL, University of Guelph, Guelph, Ontario, Canada

3:10 Panel Discussion

IAMFES Business Meeting

WEDNESDAY MORNING — AUGUST 19, 1998

(S13) Bringing Science to the Restaurant Inspection

8:30 Introduction – HILDA CHASKA ADAMS

8:35 The Reality of Cooling Foods in Restaurant Setting — GERALD BARNES, Multnomah County Health Dept., Portland, OR, U.S.A.

9:05 Recipe-Based HACCP — PETE SNYDER, Hospitality Institute, St. Paul, MN, U.S.A.

9:35 Tools for the Sanitarian — DANIEL MAXON, Clark County Health District, Las Vegas, NV, U.S.A.

10:05 Break

10:20 Teaching Science to the Operator — GREIG WARNER, Multnomah County Health Dept., Portland, OR, U.S.A.

10:50 Implementing a HACCP System — FRANK BRYAN, Lithonia, GA, U.S.A.

11:20 Panel Discussion

(S14) Computerized Process Control and Record Keeping in the Dairy Industry

8:30 Introduction – JOSEPH SCHLESSER

8:40 Plant Modernization with Computerized Process Control — ROBERT COUTLEE, Dean Foods Technical Center, Rockford, IL, U.S.A.

9:10 Proper Maintenance and Calibration of Electronic Instruments — WILLIAM WILSON, Anderson Instruments Co., Fultonville, NY, U.S.A.

9:40 HACCP-Based Monitoring in the Dairy Plant — KENNETH ANDERSON, Harold Wainess and Associates, Northfield, IL, U.S.A.

10:10 Break

10:25 Acquisition, Storage and Review of Safety Data from a Commercial System for High Temperature, Short Time Pasteurization System — JOSEPH SCHLESSER, USDA-NCFST, Summit, IL, U.S.A.

10:55 Regulations for Computerized Process Control and Recordkeeping — STEVEN SIMS, USDA, Washington, D.C., U.S.A.

11:25 Panel Discussion

(S15) Factors Affecting Bacterial Attachment to Meat Surfaces

8:30 Mechanisms of Bacterial Attachment to Meat Surfaces: An Overview — JAMES DICKSON, Iowa State University, Ames, IA, U.S.A.

8:55 The Role of Biofilm Formation/Colonization on Meat Surfaces — TOM MCMEEKIN, University of Tasmania, Hobart, Tasmania, Australia

9:20 Methods for Preventing Bacterial Attachment to Meat Surfaces — JUDY ARNOLD, Russell Research Center, Athens, GA, U.S.A.

9:45 Real Time Visualization of Bacteria on Meat Surfaces — GREGORY SIRAGUSA, USDA-ARS, Clay Center, NE, U.S.A.

10:10 Break

10:25 Direct Microscopic Observation of Tissue-Pathogen Interactions — JOSEPH FRANK, University of Georgia, Athens, GA, U.S.A.

10:50 Effect of Sampling Methodologies and Bacterial Recovery from Meat Surfaces — WARREN DORSA, John Morrel & Co., Cincinnati, OH, U.S.A.

11:15 Question & Answer Session

(S16) ILSI North America-Sponsored Research Update

8:30 Effect of Diet and Rumen Microenvironment on the Proliferation and Fecal Shedding of *E. coli* O157:H7 in Calves — CATHY BROWN, University of Georgia, Athens, GA, U.S.A.

9:00 The Effect of Feed Withholding and Parenteral Oxytetracyline Injection on *E. coli* Floral Stability and Prevalence of *E. coli* O157:H7 — DALE HANCOCK, Washington State University, Pullman, WA, U.S.A.

9:30 Differentiation of Shiga-like Toxin Producing *E. coli* (SLTEC) that are Pathogenic for Humans from Those that are Nonpathogenic — CARLTON GYLES, University of Guelph, Guelph, Ontario, Canada

10:00 Break

10:15 Molecular Tools for Identification of Serotype 4b Strains and for Detection of the "Epidemic Clone" of *Listeria monocytogenes* — SOPHIA KATHARIOU, University of Hawaii at Manoa, Honolulu, HI, U.S.A.

10:45 Polymerase Chain Reaction (PCR) Assay for the Detection of Viable *Cryptosporidium* in Foods — HEIDI SCHRAFT, University of Guelph, Guelph, Ontario, Canada

11:15 A Quantitative Risk Assessment Model for *Listeria monocytogenes* and *Escherichia coli* — CHARLES HAAS, Drexel University, Philadelphia, PA, U.S.A.

11:45 Quantitative Risk Assessment for *Listeria monocytogenes* in Raw Milk Cheese and Verotoxigenic *Escherichia coli* in Ground Beef Hamburgers and Fermented Sausages — ANNA LAMMERDING, Health Canada, Guelph, Ontario, Canada

WEDNESDAY AFTERNOON

(S17) Symposium of Sensory Characteristics of Dairy Foods

1:30 Introduction – TOM GILMORE

1:40 Principles and Pitfalls of the Sensory Evaluation of Dairy Foods — JOHN BRUHN, University of California-Davis, Davis, CA, U.S.A.

2:10 Fluid Milks — ELLEN SPEAR, EMS Associates, Corpus Christi, TX, U.S.A.

2:40 Cottage Cheese — ROBERT BRADLEY, University of Wisconsin, Madison, WI, U.S.A.

3:10 Break

3:25 Hard and Specialty Cheeses — MARK BATES, Washington State University, Pullman, WA, U.S.A.

3:55 Frozen Dairy Desserts — ROBERT MARSHALL, University of Missouri, Columbia, MO, U.S.A.

4:25 Profiles of Nutrients in Frozen Dairy Desserts — There is More than Sensory Pleasures — CHRISTINE BRUHN, University of California, Davis, CA, U.S.A.

4:45 Sensory Evaluations

(S18) Food Worker Hand Hygiene: A Factor in Foodborne Illness

1:30 The Role of Hands in Transmission of Foodborne Illness — BERT BARTLESON, Olympia, WA, U.S.A.

2:00 Handwashing and the Final Rule on Pathogen Reduction — JOHN DAMARE, Compounds Reg. Branch, FSIS, Washington, D.C., U.S.A.

2:30 Foodworker Hand Disinfectants: Products, Uses and Regulatory Consideration — MICHAEL DOLAN, GoJo Industries Inc., Cuyahoga Falls, OH, U.S.A.

3:00 Break

3:15 Field Experience with Automated Handwashing — NOEL SEGAL, Forestville, MD, U.S.A.

3:45 Gloves and Pathogen Control on Hands — DWANE CHARBONNEAU, Procter and Gamble, Mason, OH, U.S.A.

4:15 Panel Discussion

(S19) Microbiological Issues Associated with Pork

1:30 Use of Risk Assessment for Preharvest Control of Zoonotic Parasites in Swine — RAY GAMBLE, USDA-ARS, Beltsville, MD, U.S.A.

2:00 Occurrence of *Salmonella* in Swine — PAULA FEDORKA CRAY, USDA-ARS-RRC, Athens, GA, U.S.A.

2:30 Association and Incidence of *Arcobacter*, *Helicobacter*, and *Campylobacter* in Pork — IRENE WESLEY, USDA-ARS, Ames, IA, U.S.A.

3:00 Break

3:15 Results of FSIS's Microbiological Baseline Surveys of Market Hog Carcasses and Raw Ground Pork Sausage — ANN MARIE MCNAMARA, USDA-FSIS-OPHIS, Washington, D.C., U.S.A.

3:45 FoodNet — Active Surveillance Related to Pork — DREW VOETSCH, CDC, Atlanta, GA, U.S.A.

4:15 Beyond Microbiology: Applying Our Studies to Effective Food Safety Interventions — ANNE PETERSON, Oakton, VA, U.S.A.

(S20) Risk Management of Food from Farm to Fork

1:30 Risk Management of Food from Farm to Fork — DON SCHAFFNER, Rutgers University, New Brunswick, NJ, U.S.A.

2:00 "Eating Out: Will the Risk Manage Us or Will We Manage the Risk?" — FRANK YIANNAS, Walt Disney World Co., Lake Buena Vista, FL, U.S.A.

2:30 A Consumer's Perspective of Acceptable Food Risk — CAROLINE SMITH DEWAAL, Center for Science in the Public Interest, Washington, D.C., U.S.A.

3:00 Break

3:15 A Food Manufacturer's Perspective of Food System Risk Management — DANE BERNARD and JENNY SCOTT, National Food Processor's Assoc., Washington, D.C., U.S.A.

3:45 Food System Risk Management: The European Perspective — S. H. W. NOTERMANS, Bilthoven, The Netherlands

4:15 The Role of HACCP as a Regulatory Tool for Risk Management — MICHAEL TAYLOR, King and Spalding, Washington, D.C., U.S.A.

GENERAL INFORMATION

IAMFES 85th ANNUAL MEETING AUGUST 16-19, 1998 NASHVILLE, TENNESSEE

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

■ Meeting Information

Register today to obtain valuable information on advancing food protection worldwide through the most contemporary methods of food microbiology, processing, safe handling, and current regulatory aspects of food safety. Registration fee includes all technical sessions; symposia; poster presentations; a Cheese and Wine Reception; admittance to the exhibit hall; and a program and abstract book containing general program information and abstracts of symposia, technical papers, and posters. Appropriate dress for the Meeting is business casual.

■ Registration Information

Please mail the registration form with payment today. Registrations post-marked after July 15, 1998 must pay the late registration fee. Checks should be made payable to: IAMFES, Inc., 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, U.S.A. For faster service, use your credit card and call 800.369.6337, or fax the completed registration form with credit card information to 515.276.8655.

■ Refund/Cancellation Policy

Requests for cancellations must be received in writing no later than July 31, 1998 (registration fee less a $50 processing charge will be refunded). Cancellations received after July 31, 1998 will not receive a refund, but the registration may be transferred to a colleague with written notification.

■ New Membership Fees

$ 75.00 *Dairy, Food and Environmental Sanitation*

$ 120.00 *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection*

$ 37.50 *Student Membership with *Dairy, Food and Environmental Sanitation* or *Journal of Food Protection*

$ 60.00 *Student Membership with *Dairy, Food* and *Environmental Sanitation* and *Journal of Food Protection*

**Full-time student verification required.*

SHIPPING CHARGES: OUTSIDE THE U.S.
SURFACE RATE – $ 22.50 per journal title
AIRMAIL – $ 95.00 per journal title

TICKET INFORMATION

■ Cheese and Wine Reception (August 16, 1998)

Share in what has become an IAMFES tradition for Annual Meeting attendees and guests. The Cheese and Wine Reception begins immediately following the Ivan Parkin Lecture on Sunday evening in the IAMFES exhibit hall. Enjoy conversation with exhibitors, colleagues, and friends.

■ Monday Night Social Event Hot Country Night — (August 17, 1998)

There's no time like a good time, and the Wildhorse Saloon is just the place to find it. The evening includes dinner, music, dancing, and a few surprises. Children ages 14 and under must be accompanied by an adult.

■ Awards Banquet — (August 19, 1998)

The IAMFES Annual Meeting concludes with an evening of recognition for deserving food safety professionals. A reception opens the evening outside the banquet hall. Dinner is served in an elegant setting prior to the award presentations. Additional tickets are available. Business attire is requested for this special evening.

■ Other Events

Grand Ole Opry — Saturday, 8/15
IAMFES Golf Tournament — Sunday, 8/16
Music City Sites — Sunday, 8/16
Historic Nashville — Monday, 8/17
Jack Daniel's Distillery — Tuesday, 8/18
Children's Banquet — Wednesday, 8/19

HOTEL INFORMATION

For reservations, call 800.327.6618 and identify yourself as an IAMFES attendee to receive a special rate of $116 per night, single or double.

Renaissance Nashville Hotel
611 Commerce Street
Nashville, Tennessee 37203
Phone: 615.255.8400; Fax: 615.255.8163

CHILD CARE

Adult supervised activities for children ages 4 to 12 will be available Monday through Wednesday, 8:30 a.m. to 12:00 p.m. and 1:30 p.m. to 5:00 p.m. A pre-registration fee of $20.00 per day for each child is required; snacks will be provided. The room is subject to a minimum attendance. Participants will be notified if cancellation is necessary by July 24, 1998.

REGISTRATION FORM

❒ Please register me for the IAMFES 85th Annual Meeting – Nashville, Tennessee – August 16-19, 1998

FOR OFFICE USE
Member # _____ First initial _____ Last name _____
Registration # _____ DFES

First Name (please print — will appear on badge) M.I. Last Name

Title Employer

Mailing Address (Please specify: ❒ Home ❒ Work)

City State/Province Country Postal/Zip Code

Telephone # Fax # E-mail

❒ Please indicate here if you have a disability requiring special accommodations.

Status (Please check applicable boxes)

❒ 20 Yr. Member ❒ 30 Yr. Member ❒ 50 Yr. Member ❒ Past President ❒ Speaker ❒ Honorary Life Member ❒ Sustaining Member

REGISTER BY JULY 15, 1998 TO AVOID LATE REGISTRATION FEES

REGISTRATION:	MEMBERS	NONMEMBERS	AMOUNT
Registration (Awards Banquet included)	$ 230 ($280 late)	$335 ($385 late)	
Student IAMFES Member	$ 35 ($ 45 late)	Not Available	
Retired IAMFES Member	$ 35 ($ 45 late)	Not Available	
One Day Registration: ❒ Mon. ❒ Tues. ❒ Wed.	$ 115 ($140 late)	$150 ($170 late)	
Spouse/Companion (Name): _____	$ 35 ($ 35 late)	$ 35 ($ 35 late)	
Children (15 & Over, Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	
Children (14 & Under, Names): _____	FREE	FREE	
Child Care (Ages 4 to 12): ❒ Mon. ❒ Tues. ❒ Wed.	$ 20 per child/per day		

OTHER EVENTS:			
Grand Ole Opry (Sat., 8/15)	$ 25		
IAMFES Golf Tournament (Sun., 8/16)	$ 80 ($ 95 late)		
Music City Sites (Sun., 8/16)	$ 28 ($ 33 late)		
Historic Nashville (Mon., 8/17)	$ 41 ($ 46 late)		
Hot Country Night (Mon. Night Social, 8/17)	$ 36 ($ 41 late)		
Children's Rate (14 & Under)	$ 21 ($ 26 late)		
Jack Daniel's Distillery (Tues., 8/18)	$ 29 ($ 34 late)		
IAMFES Awards Banquet (Wed., 8/19)	$ 40 ($ 45 late)		
Children's Banquet (Wed., 8/19)	$ 20 ($ 25 late)		

JOIN IAMFES TODAY AND SAVE!!! (Attach a completed membership application) _____

TOTAL AMOUNT ENCLOSED _____
(CHECK PAYABLE TO IAMFES — U.S. FUNDS DRAWN ON U.S. BANK)

International Association of Milk, Food and Environmental Sanitarians
6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2863, U.S.A.
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655; E-mail: iamfes@iamfes.org

Credit Card Payments:

❒ VISA ❒ MasterCard ❒

Card # _____

Exp. Date _____

Name on Card _____

Signature _____

Total Amount Enclosed $ _____

EXHIBITORS DO NOT USE THIS FORM

The Workshops

August 15, 1998 – Nashville, Tennessee

WORKSHOP I — Proper Cleaning and Uses of Stainless Steel in the Food and Beverage Industries

This workshop will discuss the proper uses and cleanability of stainless steel as related to the food and beverage industries. Discussions will include guidelines for the use in sanitary services including metallurgy, physical and mechanical properties, and corrosion resistance of stainless steel commonly used in the food and beverage industries. Also included will be proper procedures for quality welding of stainless steel equipment; manual and automatic shielded metal arc, tungsten metal arc and gas metal techniques; and the influence of welding, forming and post-fabrication cleaning on corrosion. Other topics include the significance of the surface finish on cleanability and product purity; various surface cleaning and sanitizing steps needed in order to obtain clean surfaces; metal ion contamination after cooking; and health and environmental effects of nickel.

WORKSHOP PRESENTERS:

Richard Avery, Nickel Development Institute and Avery Consulting Associates, Inc.

Mr. Avery is a consultant for the Nickel Development Institute. His industrial experience includes several years with Inco Alloys International in Huntington, WV. His specialty is the fabrication and joining of stainless steels and nickel alloys. He has authored over 20 articles on welding and metallurgy.

Roger Covert, Nickel Development Institute and Covert Consulting, Inc.

Mr. Covert is a consultant for the Nickel Development Institute. He has been involved with the properties and applications of metals for almost 50 years. He retired as Vice President of Marketing from International Nickel, Inc. after 30 years of working in a variety of technical and marketing areas. Special interests for Mr. Covert were metallic corrosion, nickel electroplating, and material selection.

WHO SHOULD ATTEND:

Quality Control Managers, Sanitation Inspectors, Plant Engineers, Plant Design Engineers, Plant Managers, Regulatory Officers or anyone interested in expanding their knowledge and understanding of the applications for stainless steel in the food and beverage industries.

WORKSHOP II — ICMSF's Proposal for the Management of the Microbiological Safety of Foods

The International Commission on Microbiological Specifications for Foods (ICMSF) is a nonprofit, scientific advisory body established in 1962. ICMSF membership consists of microbiologists from more than 10 countries. Since its founding, ICMSF has had a profound impact on the field of food microbiology by addressing such issues as methods development, sampling plans, microbiological criteria, and Hazard Analysis and Critical Control Points.

The ICMSF has recommended six steps for the management of microbiological hazards in foods in international trade. These same principles can be applied to food in domestic trade. The steps incorporate existing Codex documents that can be applied in a logical sequence. This workshop will discuss the six steps for management of the microbiological safety of foods. The relationships of acceptable or tolerable risk, food safety objectives, and performance criteria will be discussed in detail. Examples of how to establish FSOs based on risk assessments, and industry's development of performance criteria to assure FSOs are met will be presented. A significant portion of the workshop will be dedicated to the application of HACCP, GMP/GHP and microbiological criteria to assure performance criteria are met.

WORKSHOP PRESENTERS:

Russell S. Flowers, Ph.D., Silliker Laboratories Group, Inc.

Dr. Flowers is President of Silliker Laboratories Group, Inc. and a leading researcher, lecturer, and writer on the "Development of Rapid Methods for the Detection of Foodborne Pathogens." He has authored numerous article, seminars, and presentations.

R. Bruce Tompkin, Ph.D., ConAgra Refrigerated Prepared Foods

Dr. Tompkin joined ConAgra in 1997 as Vice President of Product Safety of ConAgra Refrigerated Prepared Foods. He began his career with Swift & Company in 1964 as a research microbiologist moving up to Vice President of Product Safety.

Robert L. Buchanan, Ph.D., Food and Drug Administration

Dr. Buchanan is a Senior Scientist with the Food and Drug Administration's Center for Food Safety and Applied Nutrition and a member of the U.S. Public Health Service's Senior Biomedical Research Service. Prior to this appointment, Dr. Buchanan was a senior investigator with USDA-ARS in Philadelphia, PA.

WHO SHOULD ATTEND:

Microbiologists, Quality Assurance and Control Managers, HACCP Coordinators and Team Members, Food Safety Managers, Food Safety Auditors, Risk Management Coordinators or anyone interested in learning more about ICMSF and its Proposal for the Management of the Microbiological Safety of Foods.

1998 IAMFES Workshops
• Registration Form •

❑ **WORKSHOP 1: Proper Cleaning and Uses of Stainless Steel in the Food and Beverage Industries**

❑ **WORKSHOP 2: ICMSF's Proposal for the Management of the Microbiological Safety of Foods**

Renaissance Nashville Hotel, Nashville, Tennessee — Saturday, August 15, 1998

First Name (will appear on badge) PLEASE PRINT Last Name

Title Employer

Address City State/Province Zip/Postal Code

Area Code & Telephone Fax E-mail

Charge Card Payments: VISA · MASTERCARD · AMERICAN EXPRESS

Account #: _____

Name on Card: _____

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Signature: _____

For further information, please contact IAMFES at 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@iamfes.org.

Refund/Cancellation Policy

Registration fees, minus a $50 processing fee, will be refunded for written cancellations post-marked by July 31, 1998. **No refunds will be made for cancellations post-marked after July 31, 1998,** however, the registration may be transferred to a colleague with written notification to IAMFES. **NOTE:** IAMFES reserves the right to cancel workshops if minimum enrollment is not met by July 15, 1998.

· REGISTRATION ·

WORKSHOP 1: Proper Cleaning and Uses of Stainless Steel in the Food and Beverage Industries

	Before 7/15/98	After 7/15/98
IAMFES Member	$180	$210
NonMember	$245	$275

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

WORKSHOP 2: ICMSF's Proposal for the Management of the Microbiological Safety of Foods

	Before 7/15/98	After 7/15/98
IAMFES Member	$295	$325
NonMember	$360	$390

TOTAL AMOUNT ENCLOSED: $ _____
(U.S. Funds on U.S. Bank)

Tours and Special Events
of the IAMFES 85th Annual Meeting

Saturday, August 15, 1998 — 5:00 p.m. - 9:30 p.m.
The Grand Ole Opry
Registration: $25

Experience a true Southern tradition with a night at the world famous Grand Ole Opry. With your reserved seating at the Opry you can sit back and relax or jump in and clap along as renowned musicians, singers and comedians delight you with their talents. You never know who you'll see at the Grand Ole Opry.

Sunday, August 16, 1998 — 6:00 a.m. - 1:30 p.m.
IAMFES Golf Tournament
Registration: $80 (Late $95)

Join your colleagues for a great round of golf. Board the bus to travel to the Hermitage Golf Course located near President Andrew Jackson's stately Hermitage along the banks of the Cumberland River. Enjoy a continental breakfast before teeing off in the IAMFES BEST-BALL golf tournament. After your game, join us for prizes while eating lunch. Golf, breakfast, lunch and transportation all included! Tournament is open to golfers of all skill levels. To request a golf registration form, call IAMFES at 800.369.6337 or 515.276.3344.

Sunday, August 16, 1998 — 9:00 a.m. - 1:00 p.m.
Music City Sites
Registration: $28 (Late $33)
Lunch on your own

Don't miss this exciting tour of downtown Nashville, Second Avenue, Tennessee State Capitol, Governor's Mansion, and numerous other points of interest. The tour will also include a drive down the world famous Music Row and a stop at the Country Music Hall of Fame.

Sunday, August 16, 1998
Opening Session — 7:00 p.m.
Ivan Parkin Lecture

Lecture: *Communicating Food Safety to the Consumer* presented by Christine Bruhn, University of California-Davis, Center for Consumer Research, Davis, CA.

Cheese and Wine Reception — (Exhibit Hall)
8:00 p.m. - 10:00 p.m.

Join friends and colleagues for complimentary refreshments while viewing the educational exhibits.

Exhibit Hall Hours

Sunday, August 16 – 8:00 p.m. - 10:00 p.m.
Monday, August 17 – 9:30 a.m. - 1:30 p.m.
3:00 p.m. - 6:30 p.m.*
Tuesday, August 18 – 9:30 a.m. - 2:00 p.m.

**Social Reception – 5:00 p.m. - 6:30 p.m.*

Monday, August 17, 1998 — 9:00 a.m. - 3:00 p.m.
Historic Nashville
Registration: $41 (Late $46)
Lunch included

This historic view of Nashville begins with a stop in Centennial Park and a tour of the Parthenon. You will then enjoy a wonderful buffet lunch at the Hermitage, the beloved home of President Andrew Jackson. Following lunch you will tour the Hermitage and its grounds.

Monday, August 17, 1998 — 6:00 p.m. - 9:00 p.m.
Hot Country Night
Registration: $36 (Late $41)
Children's Rate (14 & Under) $21 (Late $26)

There's no time like a good time, and the Wildhorse Saloon is just the place to find it. The evening includes dinner, music, dancing, and a few surprises. Children ages 14 and under must be accompanied by an adult.

Tuesday, August 18, 1998 — 9:00 a.m. - 4:30 p.m.
Jack Daniel's Distillery
Registration: $29 (Late $34)
Lunch on your own

Settle back as you wind through the beautiful Tennessee countryside to Shelbyville, home of Tennessee walking horses and the Walking Horse Museum. Then you will travel on to Lynchburg where you will step back in time on the historic square. You'll have a chance to stroll around the square and grab a bite to eat before your entertaining tour of the world famous Jack Daniel's Distillery.

Wednesday, August 19, 1998
IAMFES Annual Awards Banquet
Reception: 6:00 p.m. - 7:00 p.m.
Banquet: 7:00 p.m.
Registration: $40 (Late $45)

Wednesday, August 19, 1998
IAMFES Children's Banquet
Time: 6:30 p.m. - 9:30 p.m.
Registration: $20 (Late $25)

Child Care

Adult supervised activities for children ages 4 to 12 will be available Monday through Wednesday, 8:30 a.m. to 12:00 p.m. and 1:30 p.m. to 5:00 p.m. A pre-registration fee of $20.00 per day for each child is required; snacks will be provided. The room is subject to a minimum attendance. Participants will be notified if cancellation is necessary by July 24, 1998.

NOTIFICATION OF PROPOSED AMENDMENTS TO THE IAMFES BYLAWS

to be Voted on at the IAMFES Business Meeting Held at the IAMFES Annual Meeting in Nashville, Tennessee August 18, 1998 — 4:00 p.m.

A proposal to amend the IAMFES Bylaws has been received and will be voted on at the IAMFES Business Meeting on August 18, 1998 in Nashville, Tennessee. The Business Meeting will begin at 4:00 p.m.

The following amendments relate to changing the name of the Program Advisory Committee to the Program Committee:

Proposal #1: To change Article II, Section 5., D. to read as follows:

To plan the Annual Meeting in cooperation with the Affiliate Local Arrangements Committee and the Program ~~Advisory~~ Committee.

Proposal #2: To change Article V., Section 1 to read as follows:

Standing Committees of IAMFES shall consist of the following: Program ~~Advisory~~ Committee, *Journal of Food Protection* Management Committee, Journal of *Dairy, Food and Environmental Sanitation* Management Committee and Past Presidents' Advisory Committee.

Proposal #3: To change Article V., Section 1, A. to read as follows:

The Program ~~Advisory~~ Committee shall consist of a chair, vice-chair and other individuals appointed by the Executive Board. These appointments shall be for 3-year terms on a rotating basis with balanced representation from education, government and industry.

Rational: For each of the three changes above, the only change is to remove the word "Advisory" from the title of the Program Advisory Committee, thus making it the Program Committee. For many years, the Program Advisory Committee truly served in an advisory role in assisting the Executive Board while developing the Annual Meeting program. In more recent years, the Program Advisory Committee has performed the duty of developing the Annual Meeting Program while keeping the Executive Board informed of their progress. It was suggested that the time has come to remove "Advisory" from the Committee's name giving it the credit it deserves by naming it the Program Committee.

ComingEvents

JULY

·**10, HACCP Train the Trainer for the Foodservice Sector,** held in Guelph. In this living laboratory, you'll see and practice the adult learning techniques you'll need to develop your own HACCP training plan, making your training interactive, increasing learning retention, and reducing anxiety. For further information, contact GFTC at 88 McGilvray St., Guelph, Ontario, N1G 2W1 or Phone: 519.767.5036; Fax: 519.836.1281

·**10-11, 18th International Workshop on Rapid Methods and Automation in Microbiology,** at Kansas State University, Manhattan, KS. Hands-on experiments, demonstrations, lectures, colloquium, scientific poster sessions and competition will occur. For scientific content, contact: Daniel Y. C. Fung, Director; Phone: 785.532.5654; Fax: 785.532.5681; E-mail: dfung@oz.oznet.ksu.edu. For registration information, contact: Janice Nikkel, U.S. Phone: 800.432.8222; Outside the U.S. 785.532.5575; Fax: 785.532.5637; E-mail: ksucon@dce.ksu.edu.

·**21-22, Food Product Safety for Packaging Suppliers Seminar,** Embassy Suites, Kansas City. The course is designed to show packaging suppliers how to develop an effective product safety program that consistently meets the demands of customers. The goal is to provide a working knowledge of how to develop and manage product safety programs, quality systems, preventive pest control, and HACCP. For further information, contact AIB Food Safety, 1213 Bakers Way, P.O. Box 3999, Manhattan, KS 66505-3999 or Phone: 785.537.4750; Fax: 785.537.1493.

·**26-30, American Dairy Science Association Annual Meeting,** Stateline, NV. This meeting emphasizes production and processing topics presented by leading academic scientists throughout the world. For additional information, call ADSA Headquarters at 217.356.3182.

·**27-31, Laboratory Methods in Food Microbiology,** South Holland, IL. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

AUGUST

·**1, 3, 5, HACCP Workshop,** St. Louis, MO. For further information, contact Christine VerPlank or Vorrie Strong, ASI Food Safety Consultants, 7625 Page Blvd., St. Louis, MO 63133; Phone: 800.477.0778; Fax: 314.727.2563.

·**11-13, Food Microbiological Control Food Safety Course.** This course covers demonstration and application of basic microbiology, Good Manufacturing Practices, food code, and sanitation when conducting food inspections at the processing and retail levels. For further information, contact Gary German at Fax:301.594.1966; Voice Mail: 301.594.2263.

·**15, IAMFES 85th Annual Meeting Workshops, Nashville, TN. Workshop I – Proper Cleaning and Uses of Stainless Steel in the Food and Beverage Industries.** Speakers provided by the Nickel Development Institute (NiDI). This workshop will discuss the proper uses and cleanability of stainless steel as related to the food and beverage industries. **Workshop II – ICMSF's Proposal for the Management of the Microbiological Safety of Foods.** Speakers provided by Silliker Laboratories Group, Inc. This workshop will discuss the six steps for management of the microbiological safety of foods. For additional information see pages 396-397 in this issue or contact IAMFES at 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@ iamfes.org.

·**16-19, IAMFES 85th Annual Meeting,** in Nashville, Tennessee at the Renaissance Nashville Hotel. Registration information available in this issue of *DFES* on pages 394-395 or contact Julie Cattanach at Phone: 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@iamfes.org.

·**24-28, The 10th International Conference on Production Diseases in Farm Animals,** Utrecht, The Netherlands. For additional information, contact the Congress Secretariat: Royal Netherlands Veterinary Association, P.O. Box 14031, 3508 SB Utrecht, The Netherlands; Phone: 31 30 251 01 11; Fax: 31 30 251 17 87; E-mail:knmvd@pobox.ruu.nl; Internet: www.knmvd.nl.

SEPTEMBER

·**6-9, InterMopro 98, International Trade Fair for Dairy Products,** in Düsseldorf, Germany. For further information, contact Dusseldorf Trade Shows, Inc., 150 N. Michigan Ave., Suite 2920, Chicago, IL 60601; Phone: 312.781.5180; Fax: 312.781.5188; Web site: www.dtsusa.com/dts/.

·**9-10, Microbiological Concerns in Food Plant Sanitation & Hygiene,** Chicago, IL. For further information contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

·**23-25, Microscopy/Photomicrography Workshop,** sponsored by the American Type Culture Collection. For more information, contact ATCC, Workshop Coordinator, 12301 Parklawn Dr., Rockville, MD 20852; Phone: 301.231.5566; 800.359.7370; Fax: 301.816.4364; E-mail: workshops @atcc.org.

·**25-29, China Brew & Beverage '98,** at China International Exhibition Centre, Beijing, China. For details, contact Rebecca Chan or Ling Chan of Business & Industrial Trade Fairs Ltd., Unit 1223, 12/F Hongkong International Trade & Exhibition Centre, 1 Trademark Dr., Kowloon Bay,

Hong Kong or Phone: 852.2865.2633; Fax: 852.2866.1770, 2866.2076.

OCTOBER

· **5-9, Laboratory Methods in Food Microbiology,** South Holland, IL. For further information contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

· **18-19, Selection and Fabrication of Stainless Steel for Sanitary Service,** Hotel Sofitel, Rosemont, IL. The International Association of Food Industry Suppliers (IAFIS) and the Nickel Development Institute (NiDI) are sponsoring a program on the properties and proper use of handling of stainless steel for equipment for the dairy, food, and beverage industries. For further information, contact Dorothy Brady, Conference Coordinator at Phone: 703.761.2600; Fax: 703.761.4334; E-mail: info@iafis.org.

· **21-23, 18th Food Microbiology Symposium and Workshop,** University of Wisconsin-River Falls, River Falls, WI. The symposium Current "Concepts in Foodborne Pathogens and Rapid Methods in Food Microbiology" will feature international speakers to discuss the latest research and developments regarding foodborne pathogens, regulatory and industry trends, HACCP implementation, predictive microbiology, and validation of laboratory methods. The workshop, "Rapid and Automated Methods in Food Microbiology" will involve demonstrations and discussions of various tests, instruments and kits available for detection and characterization of foodborne organisms, for assessment of food quality and shelf life and rapid hygiene monitoring in food processing facilities. For further information, contact Dr. Purnendu C. Vasavada, Animal and Food Science Dept., University of Wisconsin-River Falls River Falls, WI 54022, U.S.A. or Phone: 715.425.3150; Fax: 715.425.3372; E-mail: Purnendu.C.Vasavada@uwrf.edu.

· **22-23, Introduction to Microbiological Criteria and Sampling Plans,** Ft. Worth, TX. For further information contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

· **26-29, Penn State Foodborne Fungi and Mycotoxins Short Course** at the Berks Campus of the Pennsylvania State University, University Park, PA. For additional information, contact The Pennsylvania State University, 306 Ag Administration Bldg., University Park, PA 16802-2601; Phone: 814.865.8301; Fax: 814.865.7050; E-mail: shortcourse@psu.edu.

NOVEMBER

· **2-6, Aseptic Better Process Control Certification School and Aseptic Symposium,** at North Carolina State University, Raleigh, NC. For further information, contact Lisa Gordon at 919.515.2956; Fax: 919.515.7124; E-mail: lisa_gordon@ncsu.edu.

· **8-12, 1998 International Exposition for Food Processors,** Chicago, IL. For more information, contact Cheryl Clark at Phone: 703.684.1080; Fax: 703.548.6563; E-mail: fpmsa@clark.net.

· **9-11, ASI Food Safety Consultants HACCP Workshop,** held at the Holiday Inn-Downtown Riverfront, St. Louis, MO. For further information, contact ASI Food Safety Consultants, Inc., Vorrie Strong or Christine VerPlank, Phone: 314.725.2555; 800.477.0778; Fax: 314.727.2563.

· **16-18, 1st NSF International Conference on Food Safety: HACCP — Science, Art, and Industry,** Hyatt Regency Albuquerque, Albuquerque, NM. For additional information, contact Wendy Raeder at Phone: 734.769.8010, ext. 205; Fax: 734.769.0109; E-mail: raeder@nsf.org.

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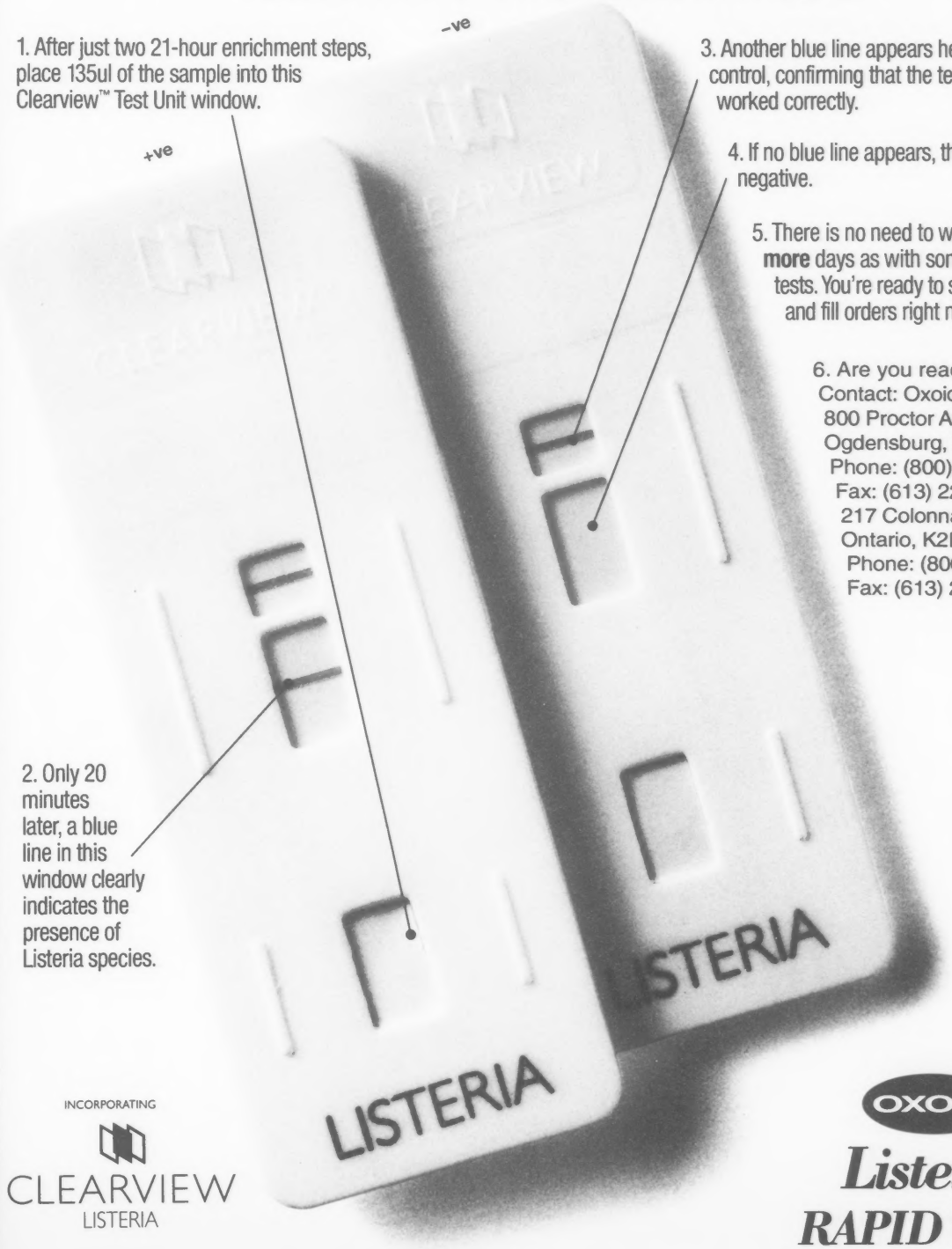

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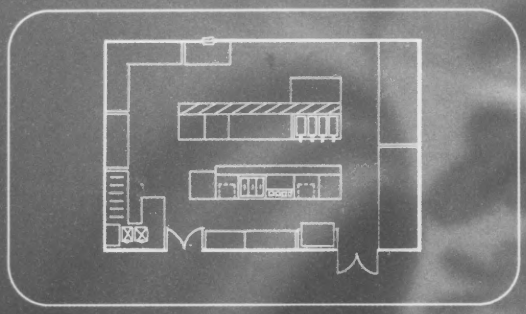

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