MAY 1996•VOL. 16•NO. 5•PAGES 277-360

ISSN: 1043-3546

6200 Aurora Avenue•Suite 200W
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DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. MAY 1996

- **1996 IAMFES Annual Meeting & Exhibitors**
- **Affiliate Officers**

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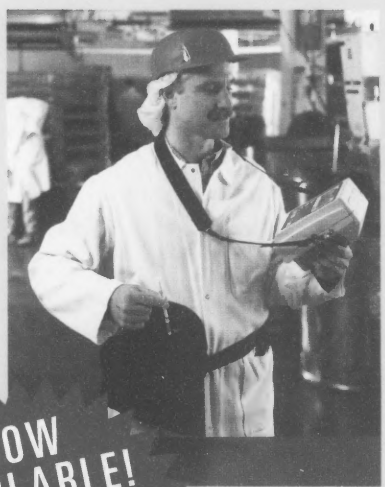

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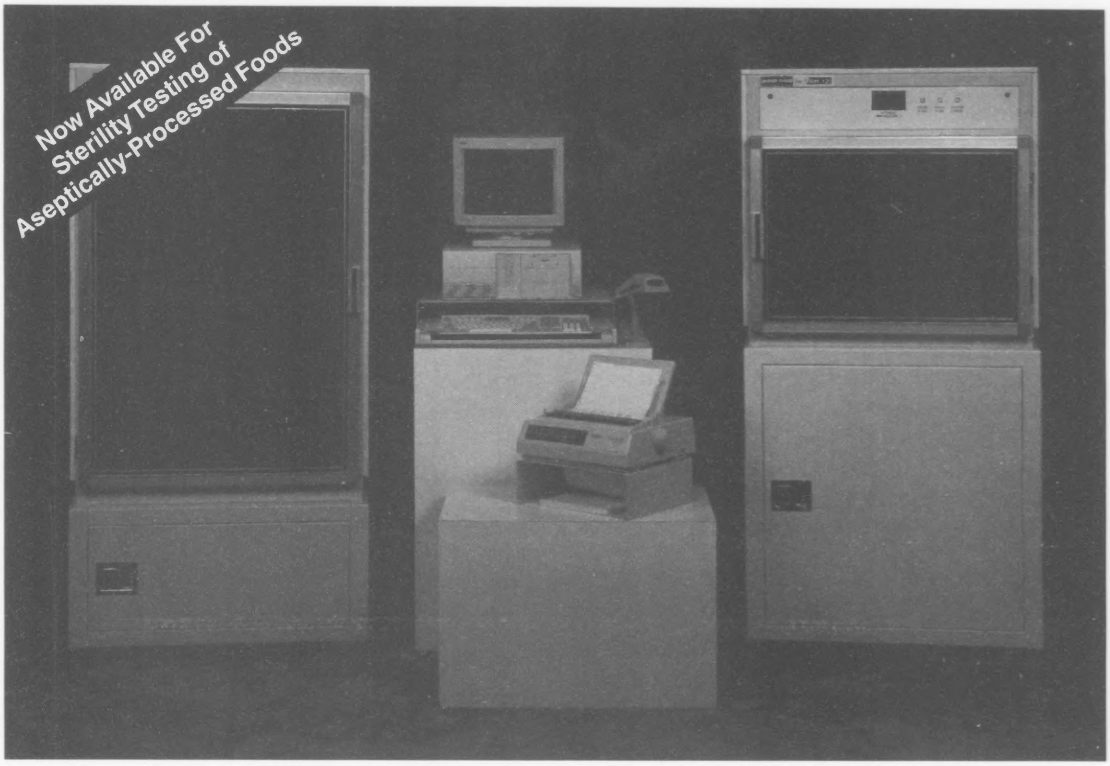
Automated Microbial Detection



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ABOUT THE COVER. . .
Photo courtesy of Seattle-King County Visitors and Convention Bureau. The Space Needle is one of the main attractions in the Seattle area and provides a unique skyline for the city.

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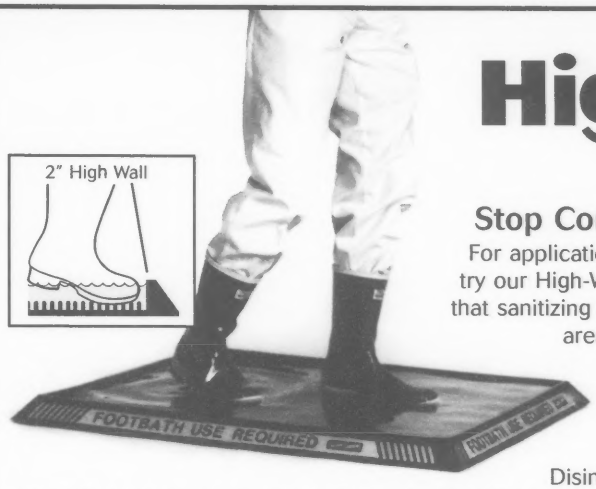

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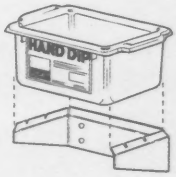

430-2010 Hand Dip Basin
430-2011 Wall Mount Bracket
083-2001 Hand Dip Wall Sign

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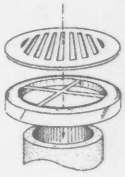
065-2918 Hand Pump



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083-2002 Footbath Sign, 7" x 10"

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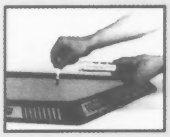

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Dairy, Food and Enviranmental Sanitation (ISSN-1043-3546) is published monthly beginning with the January number by the International Association of Milk, Food and Environmental Sanitarians, Inc. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, IA 50010, USA. Second Class Postage paid at Des Moines, IA 50318 and additional entry offices.

Pastmaster: Send address changes to **Dairy, Faad and Enviranmental Sanitatian,** 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, USA.

IAMFES, Inc., Mailing Address: 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, USA.

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"Instructians ta Cantributars" can be obtained from Michelle Sproul, Publication Assistant, IAMFES, Inc.

Orders far Reprints: All orders should be sent to **Dairy, Faad and Enviranmental Sanitatian,** IAMFES, Inc. Note: Single copies of reprints are not available from this address; address single copy reprint requests to principal author.

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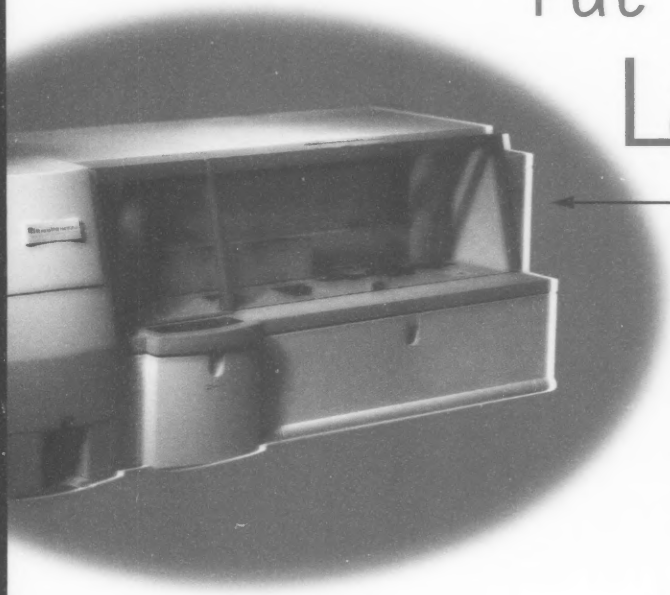

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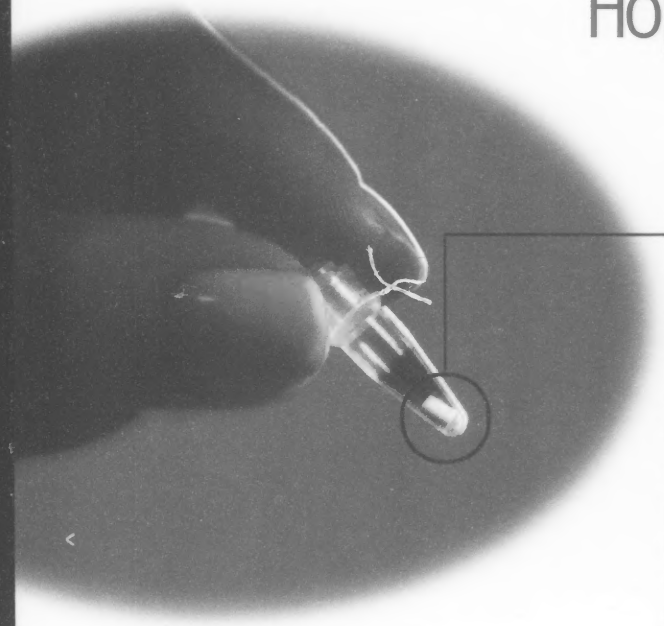

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THOUGHTS

FROM THE PRESIDENT

By F. ANN DRAUGHON,
IAMFES President

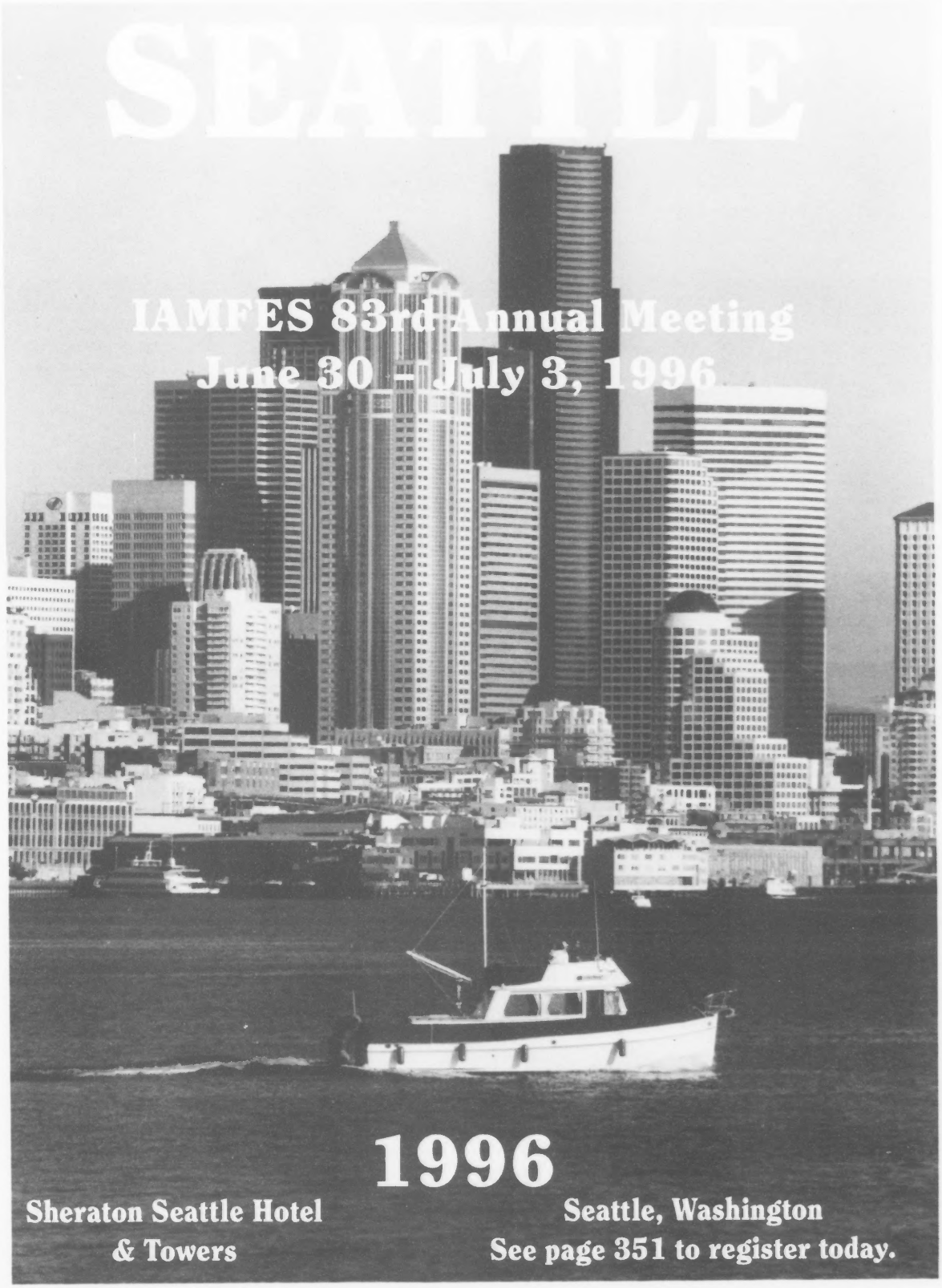
"The Pigmalion Effect"

Believable, positive expectations yield positive results. Unbelievable or negative expectations yield negative results. This phenomenon is called the "Pigmalion Effect." The original Pigmalion was the king of Cyprus, who was also a sculptor. He fell in love with a statue of a woman he had created since it represented the culmination of his desire and expectations. His repeated overtures to the gods finally persuaded Venus to give life to the statue. A more modern version of the Pigmalion is the play by George Bernard Shaw in which Professor Higgins transforms Eliza Dolittle into a believable aristocrat. Even more interesting is the startling finding which is documented in a book by Robert Rosenthal and Lenore Jacobson (*Pigmalion in the Classroom*) that student achievement in the classroom mirrors the teacher's expectations more than the student's abilities. When others believe our image of how things should be, they become self-fulfilling prophecies.

The changes that we have seen in IAMFES over the past years are also a result of this effect. Our mission "to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply" has become a self-fulfilling prophecy. In my years of working in various roles within IAMFES, I have seen a dramatic change in our way of thinking. We have gone from a mind set of "Change is a threat to the growth and stability of IAMFES" to "Without change in IAMFES, there can be no stability or growth."

It is essential that we keep our strategic plan for IAMFES focused and refreshed. To stay excited about our Association we must have goals and causes which we can work toward. All of us must have asked ourselves at one time or another, "why am I a member of IAMFES?" Robert Waterman, Jr. argues that mankind seeks meaning in organizations. Winston Churchill said it even better "when great causes are on the move in the world...we learn that we are spirits, not animals."

As the Annual Meeting time approaches, take a good look at your priorities. Are there committees or PDGs or task forces in which you would like to be involved and take an active role? I know that your time is valuable. Where can you make the greatest contribution and get the greatest satisfaction? Are you involved in your affiliate? If you would like to take a more active role in IAMFES, please write me or one of the group chairs or attend the committee meetings on Sunday at the Annual Meeting and you will be warmly welcomed. Check the mini-directory which came out in February to get the names and addresses you need. If there are issues which need to be addressed by the Board and the Association, then put them on the table. Our strategic planning is a dynamic ongoing process which will continue to focus on several priorities annually. This process must be fed by fresh ideas, concepts and issues to be truly representative of our membership. Progress is a constant challenge, not so much a destination as a road. Talk with others who are active in IAMFES and feel their energy and enthusiasm and think seriously about taking a more personal role in the progress of IAMFES.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IAMFES 83rd Annual Meeting
June 30 – July 3, 1996
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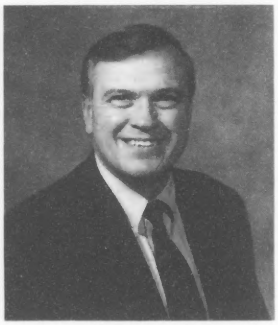
See page 351 to register today.

PERSPECTIVES...

From the Executive Director



By DAVID M. MERRIFIELD,
IAMFES Executive Director

"The IAMFES 1996 Annual Meeting"

A quiz. What do microbiological issues in seafood and wine, increasing dairy product shelf life, meat and poultry safety, the Museum of Flight, risk assessment, a tea symposium, Pike Street Market, and posters all have in common? (Hint: the Seattle Space Needle.)

Give up? The answer is: the IAMFES 1996 Annual Meeting.

I'll bet this quiz was easier than most of those you had in school. I wanted to get your attention and talk about this year's Annual Meeting at the Sheraton Seattle Hotel and Towers, in Seattle, Washington June 30-July 3. We will be offering more this year than ever before.

On Saturday, June 29, we will warm up with two concurrent workshops. Charles Kaspar from the University of Wisconsin-Madison will conduct one workshop titled, "New Methods to Study Old and New Pathogens," where participants learn the latest information about the characteristics, ecology, and epidemiology of familiar foodborne pathogens. The other workshop, "Eat, Drink, and be Wary: Risk Communication," will be run by Douglas Powell from the University of Guelph. Participants will be introduced to the basic concepts of risk communication. Doug will use applied research, case studies, and role playing to substantiate the crucial role of risk communication as a bridge between food science and the consuming public.

Sunday, June 30, will be devoted to registration and Committee/PDG/Task Force Meetings. For guests, there will be an opportunity to participate in the Sample Seattle – A Deluxe City Tour. That evening, the conference will officially kick off with the Opening Session–Ivan Parkin Lectureship. This year our lecturer is the noted Dr. Joseph A. Schwarcz, Professor of Chemistry, Vanier College; Senior Adjunct Professor of McGill University; Science Editor of CJAD Radio; and TV Columnist on The Discovery Channel. His lecture is titled "Sense, Nonsense, and Science." Following the lecture, there will be a cheese and wine reception. This year the Washington Affiliate will be offering as a regional treat the "Oregon Dairy Institute Cheese Tray." I guarantee you will be pleasantly surprised.

In conjunction with the cheese and wine reception, over 70 exhibitors will open their displays featuring new products and ideas. Displays will be open through Tuesday, so plan on spending a good amount of time in the exhibit hall exploring.

Monday, July 1, will be a full day of activities filled with symposia, technical sessions, and posters, with subjects ranging from medical advice and general food safety information for travellers, meat and poultry safety, planning for the 21st century dairy farm to global perspectives on *E. coli* O157:H7 and food microbiology.

That evening you will have a chance to relax at our planned Gala. This year we are going to the Museum of Flight where you will enjoy good food, fellowship, and a museum displaying more than 20 full-sized aircraft and other aviation history and artifacts.

Tuesday, July 2, will be another very full day of education, covering a range and variety of subjects such as dairy product shelf life to communicating food safety risks to the ILSI sponsored general session on ensuring a safe global food supply. That evening is an opportunity to attend a Seattle Mariners baseball game.

We end our activities Wednesday, July 3, with more technical and educational sessions covering, among other things, microbiological issues in seafood and wine, dairy foods safety and quality, surveillance of foodborne and waterborne disease, and strategies for safe meats. That evening, we will conclude the meeting with our annual awards banquet where we will recognize those who have contributed greatly to food safety and sanitation. We will also feature a supervised kid's pizza banquet during the awards banquet so your whole family can enjoy the evening.

Education, lectures, exhibitors, fellowship, tours, gala, and banquets! Truly something for everyone. Register now for the IAMFES Annual Meeting; forms are located in the back of this issue. You might even want to extend this great educational opportunity beyond the meeting and spend a few extra days over Independence Day in Seattle. You deserve it!

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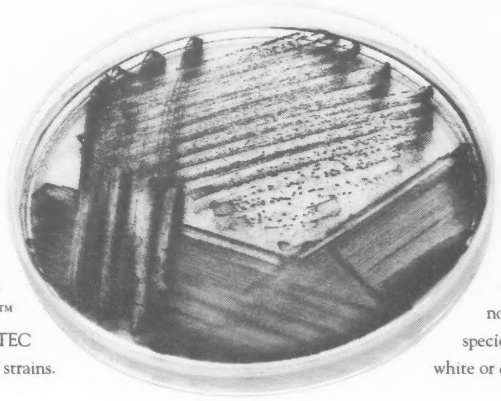

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Dairy, Food and Environmental Sanitation, Vol. 16, No. 5, Pages 290-293

Cutting Boards and Bacteria — Oak vs. *Salmonella*

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SUMMARY

Salmonella enteritidis inoculated in broth onto oak cutting boards rapidly became unrecoverable. Similar results were obtained with whole boards, wood chips, wood dust, and blocks of pressed wood dust. The effect was apparently physical (perhaps due to adhesion and drying), rather than chemical, in that wood extracted with various solvents showed undiminished activity, and cellulose, as chemically pure filter paper, was similarly effective.

INTRODUCTION

There has been a recent increase in public concern over the presence of *Salmonella* spp. in the food supply *(4, 6)*. This in turn has led to renewed interest over the relative safety of such kitchen mainstays as wooden cutting boards, which, being porous, are presumably more prone to cross-contamination from meat and other juices. Plastic boards are generally supposed to be more sanitary than the traditional wood boards and are recommended by the (USDA) U.S. Department of Agriculture *(5, 7)*, as they appear easier to clean and present less opportunity for cross-contamination. There is, however, a general lack of quantitative data to support this widely held belief.

Ak et al. *(1)* found that oak and other wooden cutting boards generally yielded fewer bacteria than did plastic after contamination. Galluzzo *(3)* reported similar findings when studying the effect of various sanitizing agents on the recovery of bacteria from surfaces of plastic and oak. The inability to recover bacteria applied to the surfaces of wood blocks led Ak et al. *(2)* to assay wood for antibacterial substances. They found little effect of wood solids on bacterial viability.

The objective of this study was to investigate the reasons for the apparent disappearance of bacteria on the surface of wooden cutting boards. We report here recovery of *Salmonella* from experimentally contaminated wooden boards and reconstructed or pressed boards as functions of time and solvent extractions. The antibacterial effects of oak extracts and recovery of bacteria from a pure filter-paper system were also investigated.

MATERIALS AND METHODS

Bacteria

The bacteria used in these experiments were *Salmonella enteritidis*, subspecies *choleraesuis* ATCC 1307, obtained from the American Type Culture Collection. Media were lactose broth and Hektoen enteric agar (Difco Laboratories, Detroit, MI). All inoculations were with a 24-h culture (37°C) from lactose broth.

Inoculation and sampling of solid and reconstructed oak boards

The surfaces of oak blocks were contaminated by swabbing with a measured amount of inoculum. Following drying under ambient conditions, bacteria were recovered by swabbing the surface of the board with lactose broth. A wood plane was also used to remove 0.2 g of shavings from the wood surface. Shavings were then extracted by swirling in a Vortex mixer (plane-Vortex) or by chopping in a blender with added broth (plane-blender). In the case of reconstructed (pressed) oak discs made from oak shavings, the inoculum was deposited directly onto the disc surface from a pipet, with care to cover the surface uniformly. Because they

were made from shavings, the inoculated discs could be readily crumbled up and transferred directly into dilution tubes.

Production and extraction of oak shavings

Oak shavings generated using a power saw were screened over a #30 mesh U.S.A. Standard Testing Sieve (Fisher Scientific Co., Pittsburgh, PA). Samples (6 g) of shavings were then extracted at room temperature for 24 h with 120 ml of distilled water, acetone, ethyl alcohol, or petroleum ether. Flasks were continually agitated using a magnetic stirrer. The contents of each flask were filtered through Whatman #1 paper, rinsed with another 50 ml of solution, and dried overnight in a forced-air oven.

Production and reconstruction of oak discs

Samples (4 g) of extracted or unextracted oak shavings were placed in a 2.25-in. (ca. 5.72 cm) diameter Carver Press (Fisher Scientific) die assembly and compressed under 2,000 lb/in^2 pressure for 30 s. Pressed discs were removed from the assembly and stored in a desiccator until inoculation.

Testing for antibacterial activity in oak

Two experimental procedures were used to determine if there were antibacterial substances in wood that were contributing to the low recovery rates. First, 50 g of chips (1 cm^3) were extracted with 100 ml of distilled water for either 1 or 24 h. Extract (2 ml) was added to 20-ml of lactose broth in tubes and inoculated with *S. enteritidis*. Lactose broth tubes were incubated at 37°C and plated on Hektoen agar at various time intervals for enumeration.

The effect of oak powder and oak chips on *S. enteritidis* growth was also tested by adding 10% (wt/wt) oak shavings (sieved over a standard #30 mesh screen) and 10% (wt/wt) small oak chips to lactose broth as above and, then inoculating with *S. enteritidis*. Lactose broth was used as a control.

Table 1. Effect of recovery method on recovery of *Salmonella enteritidis* I h after application to cutting boards

S. enteritidis applied (CFU/block)	Board material	Recovery method	*S. enteritidis* (CFU/block)
1.8×10^5	Plastic[a]	Swab	7.1×10^4
	Oak	Swab	2.4×10^2
		Plane + Vortex	7.1×10^1
		Plane + Blender	<10
2.4×10^5	Oak	Swab	<10
		Plane + Blender	<10

[a]The plastic board surface was dried at room temperature with a fan.

Table 2. Growth of *Salmonella enteritidis* at 37 C in lactose broth with 10% distilled water oak extract

Sample	log CFU/ml at incubation time (h)			
	0	6	12	24
Lactose broth	6.3	8.1	8.2	8.3
Broth + 1-h extract	6.25	7.65	8.2	8.3
Broth + 24-h extract	6.3	7.6	8.3	8.3

Testing for antibacterial activity in filter paper

Whatman #1 filter paper was cut into 4 by 0.5 in. (ca. 10.2 by 1.3 cm) strips, which were then inoculated with 0.2 ml of inoculum and allowed to air dry at room temperature. Time to dryness was approximately 30 min. Another set of strips was air dried more rapidly by applying room temperature forced air from a lab blower setup. These strips dried in approximately 9 min.

RESULTS

Recovery method

There was a low level of recovery (99.9% disappearance) from oak using the swab test, and a high recovery (39%) from the plastic board (Table 1). Because of the low recovery from oak, a surface planing method followed by Vortex milling or by chopping was evaluated as a means of recovering bacteria presumably trapped in the surface of the boards. Recovery by this technique was again very low, and the method was discontinued due to the difficulty in planing oak.

Antibacterial activity in oak

Oak leachates had no apparent effect on bacterial growth (Table 2). There was slightly lower initial growth observed in the first 6 h; however, cell counts increased to the control level by 12 h.

Some reduction in cell counts was noted when oak shavings were added directly to the culture medium (Table 3). There was a lag in the first 6 to 12 h, followed by near recovery in 24 h. An equivalent amount of oak chips had a lesser effect on growth.

Recovery from pressed oak powders

Salmonella recovery from pressed wood chips was very low (3.6×10^4 CFU per block after 5 min at room temperature, versus 3.6×10^5 CFU per block inoculated). Although the entire disc could be crumbled up and transferred directly into the dilution tube, thereby presumably enhancing recovery, the rate of recovery decreased with time, with more than 99.99% disappearance (i.e., no detectable bacteria) after 1, 2, and 4 h.

Recoveries from discs made from exhaustively extracted oak shavings were again low (type 4). The type of chemical used in the extraction of the shavings before formation of the discs did not appear to affect results.

Recovery from filter paper

The reductions in bacterial numbers from oak surfaces and oak powders and the lack of antimicrobial activity highlighted the need to test bacteria on a simpler cellulose system such as filter paper. This would eliminate the possibility of antibacterial agents affecting results and would presumably allow for greater extraction than with oak shavings, as the entire piece of filter paper could be placed directly into the dilution tube and partially disintegrated by the swirling action of the Vortex mixer. *Salmonella* disappearance from filter paper was very rapid, with over 99.99% not recoverable after an hour (Table 5).

The experiment was repeated using a 1-h drying time and two drying rates. The significance of the drying rate on the fate of bacteria was highlighted by the apparently more rapid disappearance of bacteria from filter paper when strips were exposed to forced air.

DISCUSSION

This study was intended to shed some light on the mechanism of disappearance of *Salmonella* from the type of oak cutting boards used in the home kitchen. It had previously been found that bacteria could not be readily recovered from inoculated wood sur-

Table 3. Growth of *Salmonella enteritidis* at 37 C in lactose broth with oak chips or shavings

Sample	log CFU/ml at incubation time (h)			
	0	6	12	24
Lactose broth	4.9	6.7	8.2	8.2
Broth + chips	4.4	5.3	8.2	8.4
Broth + shavings	4.1	4.1	4.1	6.5

Table 4. Recovery of *Salmonella enteritidis* applied at 6.4×10^5 CFU per block from reconstructed oak discs made from chemically extracted shavings after 1 h at room temperature

Extraction fluid	*S. enteritidis* recovered (CFU/block)
None (control)	2.4×10^5
None (dried control)	7.5×10^2
Water	1.0×10^2
Ethanol (95%)	1.8×10^2
Acetone	6.6×10^2
Petroleum ether	3.5×10^2

Table 5. Effects of drying rate and time at room temperature on recovery of *Salmonella enteritidis* from Whatman #1 filter-paper strips

S. enteritidis applied (CFU/paper strip)	Drying rate	Drying time	Level recovered (CFU/paper strip)
6×10^5	Slow	10 min	2.5×10^2
		1 h	<10
		2 h	<10
		4 h	<10
7.6×10^6	Slow	1 h	$3.4 (\pm 1.0) \times 10^{2a}$
	Fast	1 h	$1.3 (\pm 0.4) \times 10^{2a}$

[a]Data are the mean CFU/paper strip ± standard error.

faces by means of simple swabbing; yet they were recoverable in high numbers on supposedly safer plastic boards. This appeared to be an important area for further investigation.

The study, which ranged from examining various extraction techniques such as surface planing of oak followed by Vortex mixing or chopping in a blender, to extractions from reconstituted wood made from raw and chemically extracted wood powders, and finally attempts to recover bacteria from a pure cellulose system, showed that the mechanism of disappearance is probably physical and not chemical. This disappearance may be a combination of both an adhesion and drying effect on the bacteria.

We believe these results further confirm that oak cutting boards may be inherently safer than implied in the popular literature if the boards are properly cleaned and sanitized and used in a typical kitchen environment where they might be expected to air dry overnight and "recharge" between uses. This study raises many other questions regarding the viability of the unrecoverable bacteria and the sanitary properties of cutting boards under repeated heavy or industrial use, when the board becomes saturated with moisture and loses some of its adhesion or drying capacity.

ACKNOWLEDGMENTS

This study was supported by the Shepton High School Science Club of the Plano School District, in Plano, Texas, and by Mrs. R. Wussow and Mr. J. Dean, science teachers. The laboratory analyses were done in the laboratory of Eagle Snacks, Inc., under the supervision of Dr. S. Galluzzo.

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Dairy, Food and Environmental Sanitation, Vol. 16, No. 5, Pages 296-298

Labneh (Concentrated Yogurt): A Traditional Fermented Dairy Product in Jordan

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INTRODUCTION

The preservation of milk by fermentation in various countries in the Middle East goes back to the domestication of animals. There are many different fermented products, but yogurt and yogurt-based foods are the most popular fermented dairy foods in this area of the world. Labneh (concentrated yogurt), sometimes known as yogurt-cheese, is one of the yogurt-based foods that are consumed widely in Jordan and the Middle East. Labneh is usually consumed with bread as a part of a main meal or as a snack. The processing steps for this product mainly involve extraction of whey (Figure 1) *(1, 2, 6)*. The resulting product is a semisolid mass. For longer-term storage, the product is usually shaped into balls, soaked in olive oil, and then stored at room temperature for up to a year.

CHARACTERISTICS AND PREPARATION

Chemical composition

The composition of labneh has been studied by several researchers *(6, 7, 8, 10)*. This product has twice the level of solids of fluid milk (22 to 25%) and it usually contains 8.00 to 11.00% fat, 3.50 to 4.90% lactose, 8.20 to 10.40% protein, and has a pH of 3.90 to 4.20 *(6)* (Table 1). It may be produced from ewe's, goat's, or cow's milk. The Jordanian standard for labneh specifies that labneh must have the following characteristics: Acidity < 2.5%, salt < 1.5%, fat < 9%, and solid nonfat > 23% *(1, 2)*.

Processing

A large proportion of labneh is produced by a traditional method which is based on straining of yogurt through cloth bags. This method is considered to be slow and non-hygienic. New techniques have been tried for the production of labneh, such as the use of a mechanical separator, a nozzle separator and/or ultrafiltration *(6, 8)*. The annual production of labneh in Jordan has not been reported; however, it is estimated that the annual production at the University of Jordan dairy plant is 51,000 kg. (Ibrahim, 1993, personal communication). Practically, about 25 to 30% of yogurt is concentrated to labneh. Labneh yield is usually related to the chemical composition of the milk, the microbiological quality of the yogurt, and the manufacturing method.

Microbiological quality

Limited data on the microbiological quality of labneh are available. Mustafa *(3)* indicated that the microbiological quality of labneh varies according to the source of milk. The microbiological examination revealed that yeasts were the major contaminants for this product *(3, 6, 7)*. The presence of yeasts in dairy foods is common *(4, 5)*. Yeasts have been isolated from many products such as yogurt, cottage cheese, and other dairy products *(4, 5)*. It is believed that yeasts are indigenous to labneh since this product has a low pH. The predominant yeast species are *Saccharomyces cerevisiae* and *Kluyveromyces marxianus (12)*. The other yeast species that have been isolated from labneh were *Geotrichum candidum*, *Trichosporom cutaneum*, *Candida blankii*, and *Debaromyces hansenii (3, 6, 7)*. Yeasts isolated from labneh are considered to be psychrotrophic in nature *(12)*.

The problem of contamination might be attributed to many factors such as the yogurt culture or the yogurt being already contaminated by yeasts. Also poor plant sanitation and poor hygienic practices can also be a source of contamination. There-

Figure 1. Steps followed in the production of typical labach.

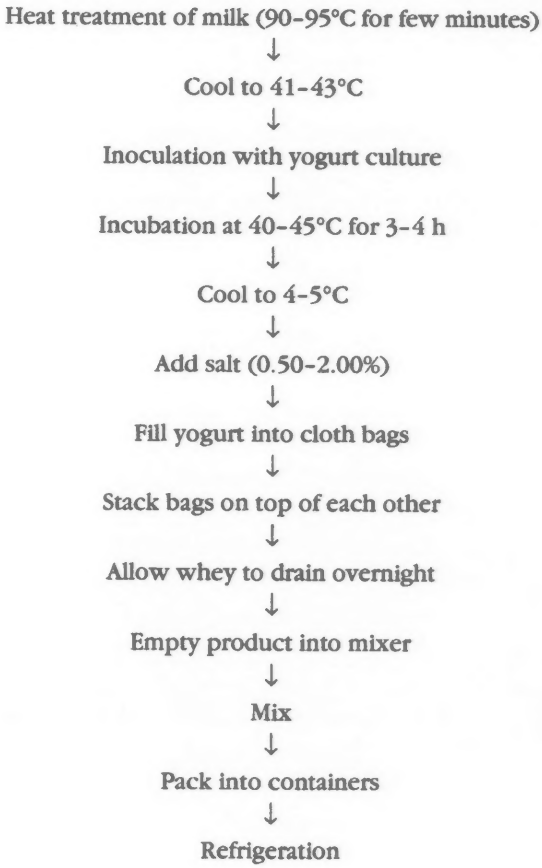

Table 1. Percentage chemical composition of labneh

	Tamime et al. *(8)*	Salji *(6)*	Salji et al. *(7)*	Veinoglou et al. *(11)*
Total solids	24.23	24.61	23.44	22.40
Protein	8.225	10.43	9.270	8.240
Fat	11.04	8.140	8.340	10.70
Ash	0.690	1.070	1.330	-
Lactose	4.275	4.910	3.510	-
Titratable acidity	1.455	-	-	-
pH	4.175	4.010	3.860	4.050

fore, it is important to develop a hazard analysis and critical control points (HACCP) system for such traditional products. This system is a systematic way of analyzing the potential hazards in labneh processing and identifying the points in operations which are critical to product safety. It is believed that good sanitation and strict hygienic rules should increase the shelf life of labneh.

Many methods have been tested to prolong the shelf life of labneh, Tamime and Crawford *(9)* investigated the use of heat treatment and addition of potassium sorbate. Mild heat treatment in combination with potassium sorbate (0.1%) extended the shelf life and improved the quality of labneh.

Product development

Nutritional qualities of labneh have been shown to be beneficial because of an improved protein digestibility compared with fluid milk. Enhancement of the therapeutic and nutritional properties of labneh may also be achieved through the use of *Bifidobacterium bifidum/longum* and *Lactobacillus acidophillus* in yogurt starter cultures.

Labneh is a popular dairy product in Jordan; it could have promising appeal in western countries with greater quality consistency and appropriate marketing efforts. The development of markets for labneh could possibly be achieved by a consumer education program which would emphasize the many uses for labneh in the diet. Labneh can be used either as a dip, a topping, or as a spreadable cheese. Labneh can also serve as an alternative for sour cream for people who cannot afford the calories. We believe that certain traditional products from other areas of the world might become popular in the USA or other areas when food companies and consumers realize their potential use and acceptance.

Acknowledgments

We gratefully acknowledge the financial support of the Dean of Scientific Research at the University of Jordan (Grant # 6-6-93).

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Dairy, Food and Environmental Sanitation, Vol. 16, No. 5, Pages 300-304

Limitations of Bimetallic-Coil Thermometers in Monitoring Food Safety in Retail Food Operations

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SUMMARY

This article discusses the limitations of bimetallic-coil thermometers for measuring food temperatures for safety in retail food operations. Under most circumstances, because of the way they are designed, bimetallic-coil thermometers are unreliable and inaccurate food-temperature-measuring devices to use to assure the safety of most foods in retail food operations.

To illustrate the problems encountered using a bimetallic-coil thermometer to measure food temperature in typical foodservice holding situations, an experiment was performed at a restaurant in St. Paul, Minnesota. A bimetallic-coil thermometer was modified by soldering 30-gauge iron-constantan thermocouples at the tip, middle, and upper portion of the thermometer. The thermometer with thermocouples was placed in various foods. The temperatures of three thermocouples and the dial readings from the bimetallic-coil thermometer were read and recorded.

When the data are examined, it is evident that bimetallic-coil thermometers may give a precise indication of food temperature if the temperature of the food is uniform within 1°F (ca. 0.56°C) throughout the food system (e.g., in a stirred kettle of soup). However, when bimetallic-coil thermometers are used to assess the temperature of most foods in foodservice operations, they do not give an accurate indication of food temperature.

INTRODUCTION

Today, there is more concern than ever about the safety of food. Raw food is contaminated with a great variety of pathogens *(1)*, and food handlers and preparers in retail food operations have been given the full responsibility by the government for making the food safe by controlling the multiplication of pathogens and/or inactivating them with heat. Bimetallic-coil thermometers, commonly called stem or pocket thermometers, have been used for many years by the foodservice industry to measure food temperature and judge food safety. However, as data presented in this paper show, these temperature-measuring devices do not always give accurate assessments of food temperatures.

The purpose of this paper is to show that bimetallic-coil thermometers have serious limitations, especially when these devices are used for microbiological hazard control monitoring to determine if critical control limits have been met for the pasteurization of thin foods such as hamburgers and other ground-meat patties. These devices should not be used to judge the safety of hot or cold food holding or cooling. The bimetal-

lic-coil thermometer is the temperature-measuring device recommended in the 1976 FDA Food Service Sanitation Manual *(2)* and is used by most regulatory authorities to monitor food safety. While the thermocouple-thermometer has been added as an approved temperature-measuring device in the 1995 FDA Food Code *(3)*, the bimetallic-coil thermometer is also listed as an approved food-safety-monitoring device.

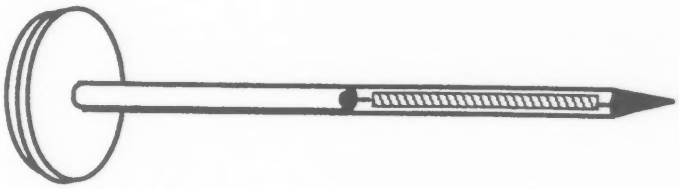
Both the 1976 and 1995 FDA food codes provide no rules or instructions to describe or define the area or point in the food where temperature should be measured to ensure an accurate determination of safety. The implication is that the coldest point is to be found in hot food and the warmest point is to be found in cold food. Because of the construction of bimetallic-coil thermometers, accurate temperatures ± 2°F (ca. 1.1°C) can only be measured in constantly stirred food where the temperature of the food volume varies by less than 1°F (ca. 0.56°C) over the tip to 3 inches up the stem.

Construction of bimetallic-coil thermometers

Bimetallic-coil thermometers contain a temperature-sensing bimetallic coil that extends up the stem of the unit from 2 to 2.5 in. (ca. 5.1 to 6.4 cm). Figure 1 is a cutaway of the typical construction of a bimetallic-coil thermometer.

The temperature registered on the dial of the bimetallic-coil thermometer is the average of food-contact temperatures along the length of the bimetallic coil. In order for the unit to indicate temperatures with an accuracy of ± 2°F, it is necessary that the temperature of the food in contact with the part of the stem housing the coil to beyond the length of the coil vary less than ± 1°F, and that the thermometer be calibrated in a water bath with a temperature accuracy of 0.1°F *(5)*. It is also necessary to wait at least 20 s to read the temperature to assure that the coil has come to equilibrium. In air or in a food that is not dense, such as rice, the time should be at least 1 min to allow for equilibrium.

Figure 1. Construction of a bimetallic-coil thermometer.



Calibration of bimetallic-coil thermometers

Most bimetallic-coil thermometers are calibrated before leaving the manufacturing facility. According to one company, for their best bimetallic-coli thermometers, the needles on the scale of the dials must accurately register three temperatures: the high and low limits, and the center of the temperature scale. For example, to calibrate a 0 to 220°F (ca. −17.8 to 122°C) thermometer, the thermometer is placed into a 100 ± 0.1°F (ca. 37.8 ± 0.56°C) bath monitored with a National Institute of Standards and Technology traceable standard thermometer. The bimetallic-coil thermometer is then adjusted to accurately display 100°F. The thermometer is checked again in a bath at 0°F (ca. −17.8°C) (lower end of scale) and a bath at 200°F (ca. 111°C) (higher end of scale). If a thermometer is more than 2°F off the limits, it is rejected. By using this calibration procedure, an accuracy and stability of 1% is guaranteed across the thermometer's temperature span (in this case, 2°F between 0 and 200°F).

After a stem thermometer has been used for even a short period of time such as one day, or has been dropped, it must be checked for accuracy and recalibrated, if necessary. Bimetallic-coil thermometers, because of the way they are constructed, get out of calibration very easily. These thermometers can be recalibrated in about 10 to 15 min to 32°F (0°C) using a slush ice-water bath (60% crushed ice, 40% tap water). To perform a calibration in this slush ice-water bath, the use of distilled water is not required. According to the National Institute of Standards and Technology, the temperature of the ice-water bath will be within a few hundredths of a degree of 32°F, under a wide range of water hardness. ***Note:*** Only crushed ice should be used to make the ice-water bath. Water cooled with ice cubes should not be used because ice cubes do not cool a container of water uniformly, and there can be a 2 to 3°F (ca. 1.1 to 1.7°C) or greater temperature nonuniformity in the container.

The stem of the thermometer must be immersed at least 3 in. (ca. 7.6 cm) into the slush ice, and the thermometer should be stirred through the ice-water mixture 3 or 4 times. It is best to wait at least 1 min for the coil to reach a temperature equilibrium. Then, by holding the nut on the back of the dial with pliers, the thermometer head can be twisted until the pointer and 32°F on the dial coincide. ***Note:*** The accuracy of this recalibration procedure will depend on the individual assigned to do this task. There is a possibility of human error. Also, there is no guarantee that the temperature of the thermometer is accurate at 150 or 200°F (ca. 83.3 or 111°C), unless a temperature bath accurate to ± 0.5°F (ca. ± 0.27°C) is used as calibration medium each time the thermometer is recalibrated.

A crude temperature check can be made by dipping the stem of the thermometer into boiling water. However, because of barometric pressure, the temperature at which water boils is not always at 212°F (100°C). Therefore, boiling water cannot be regarded as a good recalibration medium. To attempt to calibrate a thermometer in boiling water, a covered container of water, just at the boiling point, should be used. The influence

of barometric pressure on the boiling temperature of water must be taken into account. For every 1,000 ft (304.8 m) of altitude above sea level, the temperature at which water boils will be reduced approximately 1.8°F (ca. 0.99°C). If the atmospheric pressure for the day is low, about 2°F should be subtracted from the known boiling temperature of water at the specified altitude. If the barometric pressure is high, about 2°F should be added to the recognized boiling temperature.

Use of bimetallic-coil thermometers to measure food temperatures

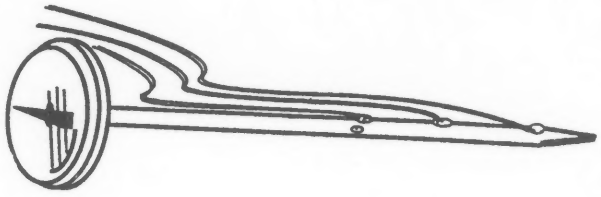
To measure food temperatures with the same accuracy as manufacturers claim and the FDA requires, the temperature across the bimetallic coil must be essentially as accurate as the calibration bath (± 0.5°F). Some manufacturers put a dimple on the stem at the upper point of the coil. Bimetallic-coil thermometers with dimples must be inserted into food at least 0.5 in. (ca. 1.27 cm) beyond the dimple. Bimetallic-coil thermometers manufactured by other companies have no dimple. In this case, one must guess where the coil is and insert the thermometer into the food at least 3 in. (ca. 7.6 cm). In both cases, at least 20 s must be allowed for the thermometer coils to reach equilibrium before the thermometer readings are made.

In typical foodservice and food-production facilities, it is almost impossible to find food with a temperature uniformity of greater than 1°F over this 2.5 to 3 in. stem distance. Thus, temperatures registered by bimetallic-coil thermometers are, at best, an average of the temperature across the stem. Accuracy of readings will always depend on the precision and frequency of recalibration of each thermometer.

Demonstration of bimetallic-coil thermometer inaccuracy in a restaurant

To illustrate the problems encountered with using a bimetallic-coil thermometer to measure food temperature in typical foodservice holding situations, the following experiment was performed at a restaurant in St. Paul, Minnesota.

Figure 2. Modification of bimetallic-coil thermometer with thermocouples.



A Taylor Model (Fletcher, NC) 6215 BiTherm® bimetallic-coil thermometer with a 2-in. (ca. 5 cm) glass face and 6-in. stem was modified by soldering 30-gauge iron-constantan thermocouples at the tip, at the dimple 1.5 in. up the stem, and halfway in between the tip and dimple, 0.75 in. from the tip. ***Note:*** This is a conservative distance because some bimetallic-coil thermometers average temperature over 3 in. from the tip. Figure 2 illustrates the configuration of the thermocouple attachment.

The thermometer was calibrated in slush ice at 32°F before beginning the experiment. The thermocouples were all within 0.5°F of the reading on the thermometer dial at 32°F.

To measure the temperature of foods, this modified thermometer was inserted vertically into the foods.

The thermocouple output was recorded by an Electronic Controls Design, Inc. (ECD) (Milwaukie, OR) Model 50 5-channel thermocouple printing recorder. The thermometer was placed in various foods. The temperatures of the three thermocouples and the dial readings from the bimetallic-coil thermometer were read and recorded.

RESULTS

Table 1 shows the results of temperature measurement in various foods. For example, when the temperature of Item #1, spaghetti sauce, 3.5 in. deep in a 12 by 20 by 4 in. pan, was measured, the dial on the coil thermometer indicated the temperature of the spaghetti sauce to be 112°F. The thermocouple at the dimple indicated a temperature of 102°F; at the center of the stem, 114°F; and at the tip, 119°F. As shown in the final column of the table, this is a range of 17°F (ca. 9.4°C) across the 1.5 in. of the bimetallic coil.

The temperatures of spaghetti sauce in a 5-gallon (ca. 18.9-liter) tilt kettle and in a pan in the steam table were also measured. The final column of the table indicates that the temperature range across the bimetallic coil was only 3°F (ca. 1.6°C) for spaghetti sauce in the 5-gallon tilt kettle, but was 95°F (ca. 1.6°C) for the pan of spaghetti sauce in the steam table. The surface temperature of uncovered spaghetti sauce in a steam table was about 110°F, and the bottom temperature was close to the temperature of boiling water. The average temperature of the spaghetti sauce in the steam table was indicated to be 155°F.

In the case of Item #7, pesto sauce in a cold holding unit, a $^{1}/_{16}$ in. (ca. 0.16 cm) grounded junction thermocouple probe was also used to measure the range of sauce temperatures within the container. The top layer of sauce was 60°F and the temperature of sauce at the bottom of the pan was 35°F. Thus, the pesto sauce had a total temperature range of 25°F (ca. 13.9°C). The bimetallic-coil thermometer reading was 43°F (ca. 6.1°C).

DISCUSSION

By examining the data presented in the table, it is evident that bimetallic-coil thermometers may give a precise indication of food temperature if the temperature of the food is very

Table 1. Bimetallic-coil thermometer readings and temperature range from thermocouple readings

Food Item	Thermocouple Temperatures (°F)			Bimetallic-Coil Thermometer	Range Difference (°F) in Bimetallic Coil Thermometer[a]
	Top	Middle	Tip	(dial reading), (°F)	
1. **Spaghetti sauce** 3.5 in. deep in12 by 20 by 4 in. pan (sitting on table)	102	114	119	112	17.0
2. **Spaghetti sauce** in 5-gallon tilt kettle (hot holding)	149	150	152	149	3.0
3. **Spaghetti sauce** 2 in. deep in10 by 2 by 2.5 in. pan (in steam table)	110	155	205	155	95.0
4. **Tetrazini sauce** in a 7 in. diameter, 7 in. high plastic insert (in 38°F refrigerator)	83	94	97	89	14.0
5. **Salad dressing** in a 6 by 6 by 6 in. insert (in cold rail)	45.6	43.5	42.1	43	3.5
6. **Mozzarella cheese** in a 6 by 6 by 6 in. insert (in cold rail)	54.2	50.9	48.9	51	5.3
7. **Pesto sauce** in a 6 by 6 by 6 in. insert (in cold rail)	49.4	44.6	39.5	43	9.9
8. **Rice**, approx. 1 in. deep in a12 by 20 by 2.5 in. pan (in steam table)	127	49	163	149	36.0

[a]As indicated by largest difference in thermocouple readings.

uniform throughout the food system, as is the case with a stirred kettle of soup. However, when bimetallic-coil thermometers are used to assess the temperature of most foods in food-service facilities, they will not give an accurate indication of food temperature. It is virtually impossible for bimetallic-coil thermometers to give accurate indications of the temperature of solid foods in salad bars and steam tables. These types of temperature-measuring devices should never be used to judge the pasteurization of thin foods such as hamburgers, pork chops, or chicken being cooked on a grill or griddle, or in a fryer or oven. If the temperature measurement used to assess the adequacy of pasteurization (cooking) is inaccurate by 5°F, the destruction of microorganisms may be changed by about 300% *(6)*.

The 1976 FDA Food Service Sanitation Manual *(2)*, which is still being used as a guideline by some regulatory agencies for judging the safety of food, requires in §4-205 that bimetallic-coil thermometers be used to measure food temperatures. The 1976 FDA code also indicates that cooking many foods such as hamburger patties to 140°F is adequate to assure food safety. Many regulatory agencies in the United States still base their food-safety requirements on the 1976 FDA recommendations, and use bimetallic-coil thermometers to measure food temperature. Foodborne illness incidents involving *Escherichia coli* O157:H7 have proved that destruction of pathogens at 140°F is very slow and requires a specified period of time. The USDA D-value (10 to 1 reduction) for salmonellae at 140°F is 103 s *(7)*. For a minimal 3-D (1,000 to 1) reduction, this is 309 s, or about 5 min. If the temperature of a ground beef patty is at 138°F, 493 s or 8.2 min at this temperature is required for a 3-D (1,000 to 1) salmonellae inactivation.

The FDA has made provisions for the use of electronic thermocouples as temperature-measuring devices in the 1995 Food Code *(3)*. However, the 1995 code still allows the use of bimetallic-coil thermometers for verifying the accuracy and adequacy of temperatures necessary for the pasteurization of thin foods like hamburgers.

An important point in food-safety law is that citing a government document, as in a case of using 140°F to kill *Salmonella* or *Escherichia coli* O157:H7 in hamburger to prevent

foodborne illness or disease, is no defense if the government document is incorrect. Retail food operators must seek, know, and use correct safety information and procedures.

Most educational material used to train foodservice operators in the United States is based on the 1976 FDA Food Service Sanitation Manual *(2)*. Therefore, many operators and regulatory officials cannot demonstrate to cooks and other food-production personnel how to measure food temperatures with a thin-tipped thermocouple. Measuring the temperature of foods with a thin-tipped thermocouple is necessary in order to assure that food temperature is sufficient for adequate pasteurization. It must always be assumed that raw government-inspected food is contaminated 100% of the time with dangerous pathogens *(1)*. Adequate temperatures for specified periods of time are necessary to destroy pathogenic organisms in the government-inspected raw food in the United States.

Owners and managers of food-production facilities in the U.S. should show "due diligence" as defined by the Food Safety Act 1990 of the United Kingdom *(4)*. In England, if a person in charge of a food-production facility or food-vending operation is determined to be involved in a foodborne illness incident, this person is considered to be the defendant in matters of litigation. As the defendant, this individual must be able to prove that all reasonable precautions were taken and *due diligence* was used to avoid the offense. Considering the problems with the use of a bimetallic-coil thermometer to measure food temperature and assure its safety, it is doubtful that the operator would be able to prove *due diligence* if the bimetallic-coil thermometer is used to assess temperatures of food produced by the facility.

If food temperature is to be measured accurately to validate safety, it is essential that the limitations of bimetallic-coil thermometers be recognized. When these limitations are understood, it becomes conclusively evident that thermocouple thermometers are the only temperature-measuring devices that are sufficiently accurate to measure food temperature at any point on the surface or within food to confirm food safety in terms of the hottest and coldest point in a food item. These thermocouple thermometers have a very thin grounded probe, equal to or less than 0.062 in. (ca. 0.157 cm) in diameter. Thin-tipped thermocouples can measure temperatures at a point as small as 0.010 in. in 2 to 3 s.

CONCLUSION

Under most circumstances, bimetallic-coil thermometers are unreliable and inaccurate food temperature-measuring devices to use to assure the safety of most food in retail food operations. The use of these temperature-measuring devices can lead to inadequate pasteurization of food and hence, consumer illness. The ultimate result may be very costly lawsuits.

In a typical food product such as a casserole of food on a hot holding table, the temperature of food from the tip of the thermometer or bottom of the pan to the upper part of the thermometer at the surface of the pan of food can vary by 100°F (205°F at the tip of the thermometer or bottom of the pan, and 105°F at the food surface). The thermometer will read 155°F. In a salad bar, typical food temperatures may vary by 20°F from the bottom of the container of food to the surface (35 to 55°F), and the thermometer will read 45°F.

Because of these problems, inspectors who use a bimetallic-coil thermometer to assess food temperatures should state exactly how the thermometer was inserted into the food, where it was inserted into the food, and then state that the temperature indicated on the dial was the average temperature of the food measured between the tip and 3 in. up the stem. The total accuracy of bimetallic-coil thermometers will be no better than 1% (2°F) plus the variation in the calibration procedure. It is obvious from this discussion that bimetallic-coil thermometers cannot be expected to give accurate indications of food temperature, except in stirred liquid foods, such as some soups and sauces, where the food temperature can be made uniform by stirring.

The fact that the FDA provides inadequate information about temperature-measuring devices and how temperatures should be measured does not provide a defense in cases of litigation. The responsibility for correct food-temperature information and measurement rests solely with owners and managers. When owners and persons in charge accept the responsibility of managing and operating a retail food facility, they must know the most accurate way to measure food temperatures in order to control the growth of pathogenic microorganisms and ensure their destruction.

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Dairy, Food and Environmental Sanitation, Vol. 16, No. 5, Pages 306-309

Reprinted from *Reinventing Food Regulations*, Part III–January 1996

Regulatory Reform Recommendations

REGULATORY REFORM FOR SUBSTANCES ADDED TO FOOD

One of the missions of FDA and of FSIS is to ensure that foods do not become adulterated by added substances. FDA has primary jurisdiction over the additives themselves; it provides premarket review and regulations on the safety of substances for specific uses. FSIS further regulates the use of substances added to meat and poultry to prevent adulteration of products under its jurisdiction.

FDA scientists review data packages (petitions) submitted by manufacturers of GRAS (Generally Recognized As Safe) substances, as well as manufacturers of new food additives, which are by law considered unsafe until shown to be safe for the intended use. FDA's review process is often protracted; the food industry believes that review takes too long. FDA acknowledges that it needs to improve its review performance. FDA's reform proposal aims to achieve reform without jeopardizing food safety or the independence, integrity, and credibility of the review process.

FSIS has had an additional, largely redundant premarket approval process for ingredients used in meat and poultry products. FDA and FSIS jointly propose to reform premarket review of food additives for meat and poultry uses so that only one rulemaking is required.

Reform of FDA's Food-Additive Petition Review

Background: Congress charged the FDA with ensuring the safe use of direct (such as new sweeteners) and indirect (such as components of plastic bottles that can get into food) food additives when it passed the Food Additives Amendment of 1958 and the Color Additive Amendments of 1960. These amendments to the Federal Food, Drug, and Cosmetic Act require that such additives undergo premarket evaluation to establish that their intended use will be safe.

Proposal and Justification: FDA's plan for comprehensive reform has the following elements:

(a) **establish and meet** deadlines for action on petition reviews (performance goals);

(b) **reduce** pending-petition inventory;

(c) **test and institute** new approaches to review; and

(d) **implement** management reforms within the food additive review program.

In order to meet its petition-review deadlines, FDA must first reduce the petition backlog, improve the review process, and complete planned management reforms.

Performance Goals: FDA will establish time frames and performance goals for the review of direct and indirect food additive petitions. The time frames that will be established will ensure expeditious Agency reviews and decisions on petition approvals.

Reduce Pending Inventory: FDA intends to reduce the inventory of 290 pending petitions by (a) assigning additional staff to petition review, with an emphasis on reducing the pending petition inventory; (b) establishing a mechanism for outside scientific review of a number of pending indirect additive petitions; and (c) establishing contracts for evaluation by third parties of data, such as toxicity studies, from a number of pending direct additive petitions. For both (b) and (c), FDA will render the final safety decision and notify the petitioner that either the petition is approvable or why the data do not support such a finding. The goal is to reduce the number of pending petitions so that new petitions may be evaluated more expeditiously.

New Approaches to Petition Review: (a) FDA has begun to implement a "Threshold of Regulation" approach for non-carcinogenic, indirect food additives. This approach allows FDA to determine that an indirect additive's migration into food is likely to be so trivial that the substance does not need to be listed in a food additive regulation. Under this approach, such indirect additives would receive expeditious, abbreviated review by FDA, thereby avoiding submission and review of food additive petitions. More than 100 such "Thresh-

old of Regulation" letters have been issued to date. (b) FDA has implemented a policy in which firms developing food products through biotechnology consult early with FDA to identify potential safety and regulatory issues for their products. Such early consultation allows FDA to keep abreast of biotechnological developments, and to identify early the products raising safety issues that need to be resolved.

Management Reforms: Management reforms will include (a) increased use of in-house special review teams to expedite review of routine petitions, and for attention to and resolution of complex petitions; and (b) increased use of and consultation with experts from other FDA units, other agencies, and FDA's Food Advisory Committee to resolve complex scientific issues. In addition, FDA is working with the Federation of American Societies for Experimental Biology (FASEB) on criteria that the scientific community would agree justify the use of an alternative model to ensure the safety of non-traditional food ingredients, such as fat substitutes.

Impact: The proposed solutions will address several major complaints about food additive review procedures and response times. The food ingredient industry will benefit from increasingly shorter review times, will be able to market more new and innovative products faster, and will become more competitive in foreign markets. U.S. consumers will benefit from faster access to the new approved food products and ingredients. FDA will make better use of its limited resources.

Implementation and Timeline: The reforms have already begun to be implemented. Management reforms began in late 1992. New petition-review staff were re-assigned in August 1995 in an effort to reduce the petition inventory. Timeframes, resource, and process options will be set forth early in 1996 to ensure expeditious agency response to incoming petitions. Contracts to implement the third-party review components of the petition-review reform proposals will be established by June 1996. The final rule codifying the agency's new threshold of regulation policy was published in the **Federal Register** on July 17, 1995. The current consultation procedure for genetically engineered plant varieties was first used in 1994.

FDA's Premarket Notification for GRAS Substances

Background: Many substances that are added to foods, such as new sweeteners, are "food additives" under the law, and must be approved for safety by FDA prior to marketing. Other food ingredients, such as sugar, are not considered to be food additives under the law and need not be preapproved by FDA. Although food firms can market the latter by independently determining that they are "Generally Recognized As Safe (GRAS)," firms often request that FDA "affirm" that the ingredient is GRAS (thus gaining Federal agreement that the ingredient will be considered safe under the law if widely marketed).

In the early 1970s, FDA established a formal GRAS-affirmation petition process in response, in part, to industry requests. This system is now viewed by both industry and FDA as too inefficient and time-consuming. To illustrate: FDA receives an average of 4 to 8 GRAS affirmation petitions per year and acts on an average of 1 to 2 per year. In large part because of their low priority—these substances are nearly always affirmed as safe, and are being marketed while FDA reviews the petition—GRAS petitions can take between 6 and 10 years to review, which has led to a backlog of about 80 GRAS petitions.

Proposal and Justification: FDA proposes to establish a notification procedure by which companies would use a greatly simplified process to notify FDA of their independent GRAS determinations. FDA would have up to 90 days in which to review each notification submission and to inform the petitioner if a problem with the status of the substance is identified. After that period, companies could market the new food ingredient with the understanding that FDA is aware of the company's determination of the substance's GRAS status, that FDA does not take issue with that determination, and that FDA is aware of the company's marketing of that substance.

Impact: Industry would realize significant savings through elimination of the time and expense associated with assembling large and complex GRAS-petition packages and through elimination of significant administrative costs. These savings could range from thousands to hundreds of thousands of dollars, depending on the food ingredient involved. For the FDA, this reform would result in a net savings of 4 to 5 staff persons per year. These resources could be allocated to other, higher priority areas.

Implementation and Timeline: FDA intends to propose the necessary changes in its regulations by May 1996.

Premarket Approval of Substances Used in the Preparation of Meat and Poultry Products (FSIS and FDA)

Background: FDA has the responsibility for determining that substances used as food ingredients are safe. FDA implements this authority under the Federal Food, Drug, and Cosmetic Act, which requires premarket approval, by regulation, of all food and color additives. FSIS has separate authority under the meat and poultry inspection statutes to regulate those ingredients that are used in meat and poultry products. As a consequence, FSIS adopted a regulatory procedure that, like FDA's, requires petition and rulemaking on each substance before it may be used in a product under its jurisdiction. FSIS promulgates such regulations after determining (a) that FDA has already

found the requested use of the substance to be safe and (b) use of the substance will not cause inspected products to be found adulterated or misbranded. This has resulted in a sequential, duplicative rulemaking process for substances used in meat and poultry that generates significant costs and delays over and above those attributable to FDA's premarket approval process.

Proposal and Justification: FDA and FSIS intend to amend their regulations and enter into a Memorandum of Understanding (MOU) under which the two agencies will work cooperatively so that only one rulemaking—FDA's—is required for substances to be used in meat and poultry products. FDA intends to change its regulations to require petitioners to state at the time of petitioning for additive approvals whether they are seeking approval of meat or poultry product uses. FSIS intends to change its regulations to specify that FDA regulations permitting meat or poultry product uses constitute prior approval by FSIS, as well as FDA. Under the MOU, FDA and FSIS would conduct their reviews concurrently when any petition to FDA includes a new meat and poultry use of a substance, and will consult to ensure the FDA regulation of the meat and poultry use is appropriate to ensure suitability under FSIS's inspection statutes.

Impact: This initiative should provide for a simpler, quicker, and more coherent Federal approval process for meat and poultry uses of food and color additives. It clarifies and harmonizes FDA and FSIS responsibilities, and results in more logical, comprehensive Federal regulation of food and color additives. It also will eliminate unnecessary, burdensome restrictions on the use of GRAS substances in meat and poultry products; encourage product/process innovations; and reduce costs to the government. It will result in no diminution of FSIS food safety oversight and consumer protection authority or activity under its inspection laws.

Implementation and Timeline: Notices of Proposed Rulemaking have been completed for both FDA and FSIS regulations and both proposals should be published in the same issue of the Federal Register in the near future. The MOU also has been drafted and will be published as an appendix to the FSIS proposed rule

FOOD STANDARDS OF IDENTITY

Background: Before current labeling laws, consumers had to base purchasing decisions primarily on the appearance of the product. Emerging food technology made it increasingly easy for some food manufacturers to produce cheaper traditional-looking products by substituting lower quality, less economically desirable ingredients for higher quality, more valuable ones. Consequently, Congress authorized FDA and FSIS to establish "standards of identity." These standards define a food's composition and prescribe minimum levels of valuable ingredients, such as milkfat in dairy products and meat in meat food products, or maximum levels for cheaper ingredients, such as fillers or water. Food standards are like "time-honored recipes" for hundreds of foods such as mayonnaise, cheeses, breads, fruit juices, corned beef, and hot dogs.

FDA has 285 specific food standards of identity that occupy about 270 pages in the Code of Federal Regulations. Most of these standards of identity were promulgated by formal rulemaking, which can involve often cumbersome evidentiary hearings. Because of a 1990 change in the law, however, most food standards now can be promulgated by notice and comment rulemaking, without the burden of evidentiary hearings. Formal rulemaking is still required for the amendment or revocation of existing standards for dairy products.

FSIS has about 74 standard of identity regulations. It has many more informal "standards," or labeling policies, that have evolved as a consequence of the reviews of product labels required for prior approval.

Although Congress' main concern when food standards were established was to protect consumers from economic deception, many food processors have come to view them as beneficial for commercial reasons, **viz.**, as establishing a level playing field, providing certainty as to the identity of products and preempting inconsistent State standards. They also continue to have strong support among consumer organizations.

The marketplace is and must be dynamic to meet changing consumer demands. For example, milkfat, once a desirable indicator of quality in dairy products, is no longer as desirable, and new lowfat and nonfat dairy products have become available to meet the demand. To keep pace with consumers' demands, FDA has recently established a new general standard of identity which would allow manufacturers to modify the composition of traditional standardized food, provided they meet minimum nutritional requirements and bear informative labeling. Thus, the processors are not prevented from reformulating products to meet such shifting consumer demand. FSIS will soon propose a similar rule for products under its jurisdiction. Nonetheless, many manufacturers continue to consider standards of identity to be overly prescriptive regulations that inhibit innovation, and result in less competition and fewer product choices in the marketplace.

Although standards of identity are intended for use primarily by manufacturers and not consumers, they do specify what a food contains and what the consumer is entitled to receive when a food is purchased by its common or usual name. In addition to specifying a name, the standards may require additional labeling to provide consumers with additional information about that product.

Proposal and Justification: FDA and FSIS propose to explore alternatives to the present food standards that will promote innovation and increase efficiency. The Agencies will seek comments on a broad range of options from eliminating food standards to simplifying many of the detailed requirements of the food standard regulations, including eliminating many of the procedural requirements and test methods that may hinder industry's ability to produce the food efficiently. Adoption of international standards, discussed elsewhere in this document, is a promising possibility.

Impact: The impact of this proposal will vary depending on the option chosen. Eliminating or simplifying food standards would benefit industry by permitting it flexibility to develop products using innovative ingredients to meet consumers' dietary preferences as well as allow the food industry to use more efficient procedures for producing their products. Complete elimination of all food standards, however, may place a greater burden on industry because, in the absence of Federal standards, states may decide to impose their own individual standards. Consumer groups may argue that eliminating food standards will invite the same economic deception that led to their creation more than a half century ago.

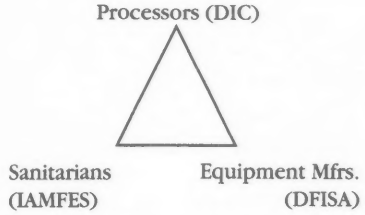
As part of FDA's recently promulgated nutrition labeling regulations, in order to give processors the flexibility to develop products with better nutritional profiles, FDA now allows the use of nutrient content claims in conjunction with the names of standardized foods (e.g., "low fat," "no fat," etc). As long as the product meets the requirements for the nutrient claim, it may, to the extent noted by the claim, deviate from the regulatory requirements for the standardized food. This change is a major break with the past approach to food standards of identity, when any product appearing to be the standardized product had to comply with the standard. FSIS soon will publish a notice of proposed rulemaking to permit the same use of nutrient content claims in conjunction with the standardized name of meat and poultry products.

Implementation and Timeline: Early in 1996, each of the two Agencies intends to publish an ANPR in the Federal Register seeking comment on how to simplify food standards. In addition, FSIS expects to publish in the near future a Notice of Proposed Rulemaking on the use of nutrient content claims in conjunction with standardized product names. In a related rulemaking, FDA proposed the direct elimination of a small number of specific food standards of identity on October 13, 1995.

MARK OF COMPLIANCE

The 3-A Symbol Story

The 3-A Sanitary Standards Symbol Administrative Council, known throughout the industry as the "**3-A Symbol Council**," was organized in 1956. Its purpose is to grant authorization to use the **3-A Symbol** on equipment that meets 3-A Sanitary Standards for design and fabrication.



A Modern Concept

The modern concept of the 3-A program was established in 1944 when the Dairy Industry Committee (DIC) was formed. DIC is one of the three industry segments involved in the preparation of 3-A Sanitary Standards. These industry segments are:

- **Processors,** represented by DIC
- **Equipment Manufacturers**, represented by DFISA
- **Sanitarians**, represented by IAMFES

Use of the Symbol

Voluntary use of the **3-A Symbol** on dairy equipment:

- assures processors that equipment meets sanitary standards
- provides accepted criteria to equipment manufacturers for sanitary design & fabrication
- establishes guidelines for uniform evaluation and compliance by sanitarians.

3-A Sanitary Standards Symbol Administrative Council

3020 Bluff Road

Columbia, SC 29209-3502

803-783-9258 phone **803-783-9265 fax**

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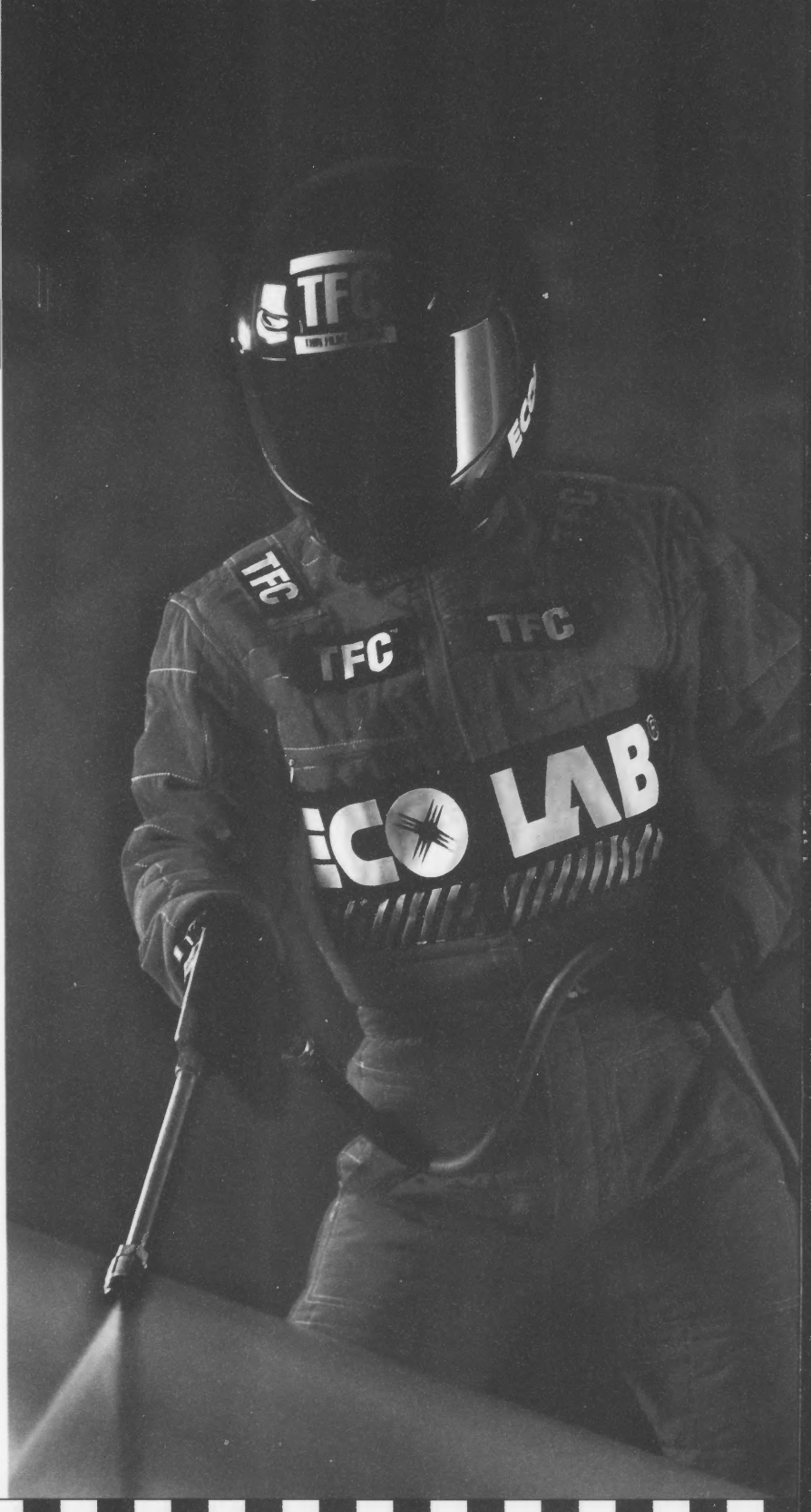

John J. Guzewich

Guzewich Elected Secretary

Robert Sanders, Chairperson of the IAMFES Teller's Committee has announced that Jack (John) J. Guzewich has been elected incoming Secretary of the Association. Mr. Guzewich will take office following the Awards Banquet at the 1996 Annual Meeting and will succeed through chairs, serving as the Association's President in 1999-2000.

Jack has been chief of the food protection section in the Bureau of Community Sanitation and Food Protection of the New York State Department of Health since 1983. From 1991-1993 he served as director of training for the Center of Environmental Health. In his twenty-five year career he has also worked as assistant director of the Bureau of Food Protection, health program administrator coordinating nursing home inspections, regional sanitation, and public health sanitation. He is in the process of being appointed as assistant professor in both the Epidemiology and the Environmental Health and Toxicology Departments in the Graduate School of Public Health, State University of New York at Albany.

Jack developed, and has directed, the department's foodborne disease surveillance program and launched the use of HACCP in their food service program. As training director he led a team that conducted a training needs assessment for all environmental health staff in the state. He then led the development of master training plans for the curriculum and lecture outlines for the Basic Environmental Health course.

In 1971, Jack became a member of IAMFES. He has served on the IAMFES Program Advisory Committee and Committee on Communicable Diseases Affecting Man where he participated in the development of all the procedure booklets available through IAMFES.

Jack is a member of other professional organizations including the New York Society of Professional Sanitarians. He has authored 16 scientific publications, presented numerous papers, lectured at several state and federal training courses, testified at Congressional Subcommittees, and mentors graduates students.

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UpDates

Ron Case

Papetti's of Iowa Food Products, Inc. Names Ron Case as Director of Technical Services and Quality Assurance

Papetti's of Iowa Food Products, Inc., one of the leaders in the egg processing industry, is pleased to announce the addition of Ron Case to their management team of experienced professionals in Lenox, Iowa as Director of Technical Services and Quality Assurance. He brings over twenty years experience with Kraft Foods, Inc. in quality systems, laboratory technical management, R & D and regulatory and industry relations. Mr. Case will oversee all aspects of quality assurance including customer satisfaction, production, laboratory testing, and management programs.

World Dryer Appoints Michael Cherevaty

David Ring, Vice President, Sales & Service for World Dryer Corporation, has announced the appointment of Michael Cherevaty as the Western U.S. Regional Sales Manager.

Mike's new position encompasses sales activities for the complete World Dryer and Electric-Aire product lines, including hand sanitation equipment. Cherevaty's duties include managing manufacturers multi-line representatives, handling national accounts, creation of product demand, conducting sales meetings, rolling out new products, and promotions to World Dryer reps and distributors.

Educational Foundation Awards 500,000th SERVSAFE Certificate to WAWA Employee

Eleanor Harvey, a customer service leader at a Wawa Food Market located in Elmer, New Jersey, was awarded the 500,000th SERVSAFE Certificate by The Educational Foundation of the National Restaurant Association in a ceremony held at Widener University in Chester, PA.

The SERVSAFE certification is awarded to individuals who complete The Educational Foundation's Serving Safe Food course, which trains and certifies foodservice professionals in the proper preparation and handling of food. The SERVSAFE program is accepted in more than 95 percent of all regulatory jurisdictions that require manager training and/or testing. Wawa, Inc. trains all of its managers and assistant managers in the SERVSAFE program, and all associates also take a recertification course every two years. Wawa is the first convenience store chain to have 100 percent of its units participating in the Industry Council on Food Safety. In order to participate in the Industry Council, each unit must have at least one manager on staff who has been trained and certified in the SERVSAFE program.

Also attending the ceremony were The Educational Foundation's Marovec; Nicholas Hadgis, FMP, chairman of The Foundation's certification governing board and chairman of the Widener University school of hotel and restaurant management; Ted Andrews, Manager, quality assurance for Wawa, Inc.; Don Price, executive vice president of Wawa, Inc.; Mark McClure, regional training manager, Wawa, Inc.; and Widener University SERVSAFE instructor John Mahoney.

The Educational Foundation is the educational arm of the National Restaurant Association and has been providing food safety training to the foodservice industry for more than 20 years. In the past five years, The Educational Foundation has seen a 300 percent increase in certification through their SERVSAFE training program.

Bailey Controls Names Charles Brez Vice President of Sales

Bailey Controls Company has appointed Charles J. Brez Vice President of Sales.

A native of St. Louis, Missouri, Brez joined Bailey in 1992 as General Manager of the Process Systems Business Segment, then was promoted to Vice President and General Manager. He was previously associated with ABB Simcon where he was Vice President of Sales and Marketing. Much of his career was at Monsanto Chemical Company, which in-

cluded an assignment with Fisher Controls Company.

He has an extensive background in industrial process automation, including enduser, engineering and construction, and vendor experience.

Brez, who currently resides in Chagrin Falls, Ohio, received both his B.S. and M.S. degrees in Electrical Engineering from St. Louis University. He is a member of the Instrument Society of America and the Board of Directors of United Way Lake County, Ohio.

Bailey Controls is a unit of Elsag Bailey Process Automation N.Y., a Netherlands-based global supplier of process automation systems, field instrumentation and professional services for the electric power, oil and gas, steel, chemicals and pharmaceuticals, mining and minerals, food and beverage, pulp and paper and water and wastewater industries.

COWW Elects New Officers

COWW Dairymen, Inc., at its recent meeting in San Diego, elected California dairyman Jeffery Poston as its 1996 Chairman. Mr. Poston is also chairman of the California Milk Advisory Board. He succeeds Bernie Faber, past chairman of the Oregon Dairy Products Commission.

Other officers elected were: as vice chairman, Don Sipple, Chairman of the Wisconsin Milk Marketing Board; and as secretary-treasurer, Marvin Rempel, Chairman of the Oregon Dairy Products Commission. Additional directors are: Bill Van Leeuwen, California Milk Advisory Board, Ralph Duyck of the Oregon Dairy Products Commission, Robert Golob and Rudy Zurcher of the Washington State Dairy Products Commission, and Connie Seefeldt of the Wisconsin Milk Marketing Board.

COWW is a joint marketing group whose sole business is to engage in, various joint advertising, research, and promotion functions on behalf of its member states. Its membership comprises the producer dairy marketing organizations of California, Oregon, Washington and Wisconsin. Together they represent about 36% of the nations milk production.

Hosokawa Micron Group Announces Strategic Acquisitions in the Confectionery Market

Hosokawa Micron International Inc. (HMII) announced plans to expand their presence in the confectionery and specialized food industry with the acquisition of two companies to complement the current Hosokawa - Bepex Hutt product line.

The acquisitions of Kreuter and Ter Braak were completed. These companies will operate as separate entities within the Hosokawa Micron Group serving the confectionery market. These strategic moves now put the Hosokawa Micron Group in the enviable position as a single source provider of systems worldwide for this important market segment.

Kreuter GmbH, located in Hamburg, Germany, is a sales and manufacturing operation with strong recognition in the confectionery, bakery and ice cream industries throughout the world. The company specializes in cooling tunnels, coating and tempering machines. They also provide auxiliary equipment for coating lines.

Ter Braak is ranked as a leading sales, development, design, and manufacturing company of process machinery used for the mass preparation and processing of confectionery products. Based in Rotterdam, the Netherlands, the company specializes in pre-mix preparation equipment for preheating, dissolving, cooking, mixing, aerating and cooling of sugar confectionery syrups and masses.

The Hosokawa Micron Group is a worldwide provider of both stand alone equipment and integrated systems for powder processing, environmental protection, thermal processing and plastics processing with more than 30 operating units and annual sales of approximately $500,000,000 worldwide.

New Financial Controller at G&H Products Corp.

Bob Schuck has joined G&H Products Corp. as the new Financial Controller, managing the Finance and Information Systems departments. Bob comes to G&H from Tetra Laval Food in Greenwood, Indiana. He brings with him several years of senior financial management experience within the Tetra Laval Group, including management of financial departments.

G&H Products Corp. is a full line supplier of the most advanced stainless steel pumps, valves and measuring and control equipment. State of the art technology is used to develop our broad range of high quality equipment. G&H is a part of the worldwide market leader, the LKM Group, a division of Alfa Laval.

Captive Plastics Appoints New East Coast Sales Manager

Robert Richey has joined Captive Plastics, Inc. as East Coast Sales Manager. Richey brings over 16 years in packaging sales experience from Brockway Glass, Continental Plastic Containers, American National Can, Berlin Packaging, and Fenton, Weber & Jones.

Captive Plastics, Inc. is a manufacturer of plastic packaging for the personal care, pharmaceutical, food and chemical industries. Captive Plastics offers in-house engineering, tooling, molding, decorating and assembly of products.

IAMFES & DPC Members Cooperate to Produce Dairy Guideline

Members from the International Association of Milk, Food and Environmental Sanitarians and The Dairy Practices Council directed by lead author, Chris Newcomer, developed DPC's latest guideline entitled, "Controlling the Quality and Use of Dairy Product Rework." The new guideline sets specific controls for when and how certain dairy products can be reprocessed.

Chris Newcomer, New-Tech Consulting, Inc., chaired the DPC subcommittee for the dairy product rework guideline. Mr. Newcomer received assistance in the development of this guideline from Ken Anderson, Robert Darrah, and Harold Wainess; all fellow members of IAMFES.

The Dairy Practices Council is a nonprofit organization whose objectives are to assist the dairy industry with improved sanitation and regulatory uniformity through the production and dissemination of educational guidelines.

Copies of this guideline will be available after May 1 from The Dairy Practices Council, P.O. Box 866, Barre, VT 05641-0866. All of The Dairy Practices Council guidelines are available in a three volume complete set, through the International Association of Milk, Food and Environmental Sanitarians.

Smoother Ice Cream Comes from Brain Scanner

What do brain scans have to do with how your ice cream tastes? University of Minnesota scientists have adapted brain scanning technology to improve food quality and safety. The breakthrough promises cost savings for Minnesota's food and agricultural processing industries.

Researchers with the university's Minnesota Agricultural Experiment Station have learned how to use magnetic resonance imaging (MRI) technology to monitor structural changes within low-moisture substances. MRI monitoring allows scientists to learn precisely how a substance's internal structural composition changes as external conditions change.

The research team, led by Roger Ruan, first had to overcome the problem of moisture. "MRI works most easily with high-moisture substances such as the human body, which is high in fluids," Ruan says. The use of MRI technology in food research had been restricted previously to foods at least 25 percent moisture, such as fruits and vegetables. By developing a unique, rapid imaging sequence and redesigning the MRI hardware, Ruan's team was able to produce usable, 3-D images of ice cream containing cookies and nuts with a moisture content as low as 10 percent.

So why choose ice cream as a test subject? Ruan says ice cream offered the greatest challenge to his team.

Ice cream is a particularly delicate product. Expose it to a warm, moist environment and ice crystals begin to form within the ice cream, degrading its taste and texture. Without MRI, samples of ice cream must be cut open to look for the chemical changes that precede ice crystal formation. Unfortunately, the chemical structure of the frozen product changes the instant it is cut open. Consequently, ice cream processing industry scientists who want to improve product quality never get an accurate look at conditions inside the block of ice cream.

"MRI allows us to see everything, even the chemical composition," Ruan says, "and the product isn't harmed in any way, so it can be tested again later on."

Thus, scientists can accurately simulate the conditions a pint of ice cream goes through on its path from the production line to storage, to your supermarket, and to your home.

The techniques and technology developed by Ruan's team can be applied to other foods as well. Ruan says MRI will solve a lot of the mysteries and problems associated with products ranging from cheese to pizza to cake.

"MRI will allow us to determine the exact fat content, for example, and carry out on-line product monitoring to assure safe, high quality foods."

Non-Food Uses - While not as appetizing as ice cream, Ruan's team also worked on the process of wet-milling corn. Improving this century-old process would be welcome news to many Minnesota companies and farmers. Starch-based products such as corn syrup and ethanol are produced by first steeping, or soaking, corn in a water solution for 24 to 48 hours at 50°C. The corn kernels absorb moisture and become softer for later.

Ruan's team used MRI technology to observe how quickly and efficiently corn kernels absorbed moisture under a variety of conditions. "The steeping process is complex," Ruan says, "so traditional trial-and-error methods are time-

consuming and expensive. Using MRI helps us quickly identify the chemical and biochemical changes that occur in the kernel." Additional experimentation with the MRI technology is needed to improve the steeping process.

The research was funded by a variety of sources, including the Minnesota Agricultural Experiment Station and the National Science Foundation.

ISO 9002 Registration Proves PRISM has "Gold Medal" Standards

PRISM Integrated Sanitation Management announced that it has received ISO 9002 Registration (International Organization for Standardization, Geneva, Switzerland), for its innovative Gold Medal pest elimination program, the first such program in North America to be awarded this registration.

"We are pleased to be the first pest management company in North America to be recognized by the ISO for our Gold Medal Protection Program, specifically developed for Integrated Pest Management in companies that manufacture, transport and serve food. This now sets a new standard for all pest control companies," said Dr. Zia Siddiqi, Technical Director of the North America Service Businesses.

PRISM and PCO are leaders in the elimination of pests using the latest techniques and technologies, with the minimum use of pesticides. Their expertise covers a broad range of industries from food processing and manufacturing to brewing, baking, hospitality, warehousing, packaging and transportation. ISO sets the basic rules for quality management systems, thereby setting the international standard for companies who wish to work with clients employing the same high quality standards in management and manufacturing. The Gold Medal Protection program is based on the IPM (Integrated Pest Management) guidelines, a standard that minimizes the use of pesticides, with surveillance reports patterned on the F.D.A. (Food & Drug Administration) protocols.

New CSA/NSF Joint Certification Service Provides One-Stop Shopping

The Canadian Standards Association (CSA) of Etobicoke and NSF *International* (NSF), with world headquarters in Ann Arbor, have signed an agreement to provide "one-stop shopping" for joint certification services in connection with product safety, efficiency, performance and health safety standards on a global scale.

The agreement provides for combining the unique strengths, expertise and identity of each organization while servicing a growing worldwide customer base.

This new customer-friendly service will help meet the growing needs in the United States and Canada for electrical and plumbing products to also meet the recognized health standards of NSF.

The reverse is also true for CSA's customers. The new service not only offers convenience to NSF and CSA customers, but also the potential of lower costs through coordinated testing and follow-up inspection/audit services.

"One-stop shopping" is available immediately through both CSA and NSF. The new service is targeted to benefit all manufacturers of drinking water additives (chemicals and systems components), drinking water treatment units, plumbing systems components, swimming pool and food service equipment.

NSF and CSA are private, not-for-profit, independent, third-party organizations offering consensus standards, testing and certification. NSF and the Quality Management Institute (QMI), a division of CSA, also offer quality and environmental management systems registration services to ISO international standards.

At One Time a Target of Environmentalists, the Drink Box Wins Presidential Award for Sustainable Development

Once banned in the State of Maine, in a stunning turnaround the drink box today was recognized for its earth-friendly profile by receiving the coveted Presidential Award for Sustainable Development. Presented by Vice President Gore to the Aseptic Packaging Council and drink box manufacturers Combibloc, Inc. and Tetra Pak Inc., the award recognizes the aseptic packaging industry for demonstrating "extended responsibility through a product's life cycle and outstanding contribution to a sustainable future."

The aseptic packaging industry is one of 15 programs or initiatives selected by President Clinton from a group of 33 finalists. The finalists were among over 300 entries from nonprofits, government, industry, and community groups, which were submitted to the President's Council on Sustainable Development and reviewed by a panel of well-known environmentalists, industry leaders, and Cabinet members.

Dr. Ruben Rausing invented the aseptic package in 1969, believing that "a package should save more than it costs." His creation, the drink box, is a lightweight, energy efficient example of minimal packaging (typically 96 percent product to 4 percent packaging by weight) that is being recycled in a growing number of communities across the country. In addition,

aseptic packaging retains flavor and nutrients, and allows traditionally perishable products (like real milk) to stay unrefrigerated and shelf-stable for up to six months.

The Aseptic Packaging Council (APC) is a trade association representing the major U.S. manufacturers of drink boxes–Combibloc, Inc. of Columbus, Ohio, and Tetra Pak Inc. of Chicago. Founded in 1989, the APC's primary mission is to inform the American public about the product benefits and environmental attributes of aseptic packaging.

Salt Institute Simplifies World Wide Communication

Faster information response and desire for a broader public outreach have prompted the Salt Institute to post a World Wide Web site on the Internet. Its address: **http://www.saltinstitute.org**.

Its on-line presence will help the Salt Institute communicate better with its membership and the public at large. "We receive thousands of public inquiries through phone and mail... it is impossible for us to respond directly to all of them. Our Web site provides a self-accessed source of information for students, researchers, nutritionists and highway maintenance engineers," explained Richard L. Hanneman, President of the Salt Institute. The web site contains a variety of useful features including a feedback form so visitors can ask specific questions or make informational requests directly to the Institute through the Web site. The site will be updated at least weekly.

The Web site will also post organizational activities, including meeting notices and details on legislative initiatives for the Institute's membership. This information, however, will be in a "Members Only" section not available to the general public.

The Salt Institute is the world's foremost source of authoritative information about salt and its more than 14,000 known uses. A non-profit association representing North American and international salt producers, the Institute was founded in 1914 dedicated to promoting better understanding of all aspects of salt production.

AFFI Supports USDA Rule to Simplify Ingredient Approval Process for Meat and Poultry

In comments filed with the U.S. Department of Agriculture (USDA), the American Frozen Food Institute (AFFI) applauded a proposed rule designed to streamline the approval process for ingredients used in meat and poultry products.

AFFI commended USDA's Food Safety and Inspection Service (FSIS) for "undertaking an initiative aimed at improving the efficiency for obtaining authorization to use substances in meat and poultry products."

AFFI also said it supported "the provisions of the proposed rule that would allow the use in meat and poultry products of those substances listed by FDA [Food and Drug Administration] as approved direct and secondary direct food additives, sources of radiation, interim-listed food additives and sanctioned substances."

According to AFFI, this "would introduce greater efficiency in obtaining authorization for new ingredient approvals because it would eliminate the current duplicative requirement of obtaining authorization from both FDA and FSIS."

However, AFFI also expressed its concern that the proposed rule fails to harmonize the FDA and FSIS systems, and may actually impose unnecessary submission requirements for generally recognized as safe (GRAS) ingredients.

AFFI suggested that in order to harmonize the FSIS and FDA systems and eliminate the unnecessary submission requirements, FSIS should revise the final regulation by eliminating the requirement that GRAS substances be listed in the Code of Federal Regulations before they can be used in meat and poultry products.

According to AFFI, this could be accomplished by stating that "no substance may be used in the preparation of any product, for any purpose, unless its use is authorized ... as a direct food additive, a secondary direct food additive or a prior-sanctioned substance, or it is a generally recognized as safe substance."

Fluid Milk Strategic Thinking Project Provides First Round of Recommendations to Industry

The members of the Fluid Milk Strategic Thinking Project offered their first set of recommendations to the milk industry on how to improve fluid milk sales with suggested changes in label claims/terms and freshness dating, and an improvement in the appearance of skim milk.

The Fluid Milk Strategic Thinking Project is working to develop practical business solutions for the fluid milk industry to adopt measures that will increase milk's overall competitive position versus other beverages. Milk processors, dairy farmers, industry suppliers, and staff of the Milk Industry Foundation (MIF) and MilkPEP, representing processors, along with

staff of Dairy Management, Inc. (DMI) and its affiliated state/regional organizations, representing producers, formed five task forces in early 1995 to identify and overcome barriers to increased fluid milk consumption. The project is being guided jointly by the MIF, DMI, and MilkPEP, the processor-funded fluid milk consumer education program currently underway.

The recommendations presented to the industry were developed through research conducted and information gathered by three of the project's five task forces.

"The genesis of this important project was research which uncovered consumer barriers to drinking milk that were not currently being addressed in any of the advertising, public relations or education programs of processor or producer programs," said E. Linwood Tipton, president and CEO of the MIF. "The Fluid Milk Strategic Thinking Project focuses on issues related to the **product itself, packaging and the marketplace**, which negatively impact milk sales and which have not previously been given any attention in industry programs."

Last fall, five task forces were named to overcome barriers to consumption:

- **Appearance of Skim Milk** – addressing the appearance of skim milk and its effect on the consumption of the product. This committee also addresses the nomenclature for skim milk.
- **Consumer Perception of Freshness of Milk** – evaluating the ability to introduce fluid milk products with extended shelf-life without adversely affecting consumer acceptance or perception of the products' freshness.
- **Points of Availability** – addressing the need to make milk and milk-based beverages more available in key distribution channels such as convenience stores, vending machines and food service.
- **Packaging** – examining ways to make milk packaging more competitive with other beverages in terms of size, shape, graphics, portability, ease of opening and resealability. This also includes research into the most compelling product terms and claims on package in order to drive volume.
- **Product Variety** – exploring how to add variety and "news" to the dairy case via new co-branded and licensed products.

The specific recommendations offered focus on

- delivering meaningful consumer benefits for milk;
- consumer perceptions of freshness dating and how extending the dates would affect purchasing behavior;
- and whether a "whiter" skim milk would help grow category sales.

Further recommendations are expected from the other task forces over the next several months.

The Fluid Milk Strategic Thinking Project is working to develop practical business solutions for the fluid milk industry to adopt measures that will increase milk's overall competitive position versus other beverages. The project is being guided jointly by the MIF, DMI, and MilkPEP, the processor-funded fluid milk consumer education program currently underway. For more information on the Fluid Milk Strategic Thinking Project, please call Jeff Tripician at 202-737-4332.

Agreement Facilitates Business Among U.S. Manufacturers and Chinese Processors

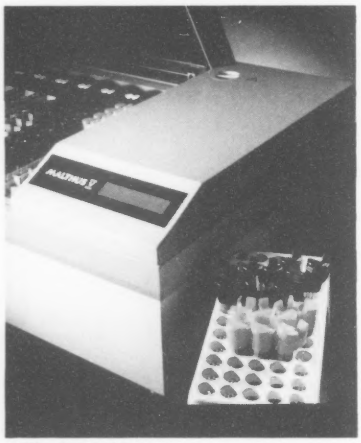
The Food Processing Machinery & Supplies Association (FPM&SA) recently signed an "Agreement of Mutual Cooperation" with the China National Food Industry Association.

The agreement will give FPM&SA members greater access to the burgeoning Chinese marketplace by providing increased opportunity for trade and information exchange. The China National Food Industry Association is the preeminent organization representing all of China's food processing entities.

"One of the most valuable services we can provide is to facilitate dialogue between manufacturers and potential customers they might not otherwise reach," said Lynn Christensen, Director of International Programs. "We're proud to serve as the link between our members and the Chinese food industry."

As part of the three-year agreement, the China National Food Association will bring a delegation to the International Exposition for Food Processors (IEFP) at San Francisco's Moscone Center, October 20-23, 1996. IEFP, the western hemisphere's largest processing machinery show, is sponsored by the Food Processing Machinery & Supplies Association.

Industry**Products**



Malthus Diagnostics, Inc.

System V, Automated Microbial Growth Analyzer In Benchtop Size

Malthus Instruments Ltd (U.K.) has established a subsidiary, Malthus Diagnostics, Inc., in North Ridgeville, Ohio to provide sales and service support for the Malthus System V, their conductance based automated microbial growth analyzer. This versatile bench top analyzer can perform a variety of tests including total counts, yeast and molds, coliforms, and tests for specific pathogens including the first automated AOAC approved method for *Salmonella*. In addition to standard reusable cells, a variety of disposable and semi-disposable cells are available. Sample volumes of up to 100 ml can be accommodated with the Large Volume Cell (LVC) format. Users of the Malthus System V report significant time, labor, and material cost savings compared to traditional plating methods.

Malthus Diagnostics, Inc., North Ridgeville, OH

Reader Service No. 315

Central Foam System Offers Customized Cleaning for Most Processing Plants

Rochester Midland Corporation is an important sanitation chemical source to a broad range of Food Processing Industries. We provide state-of-the-art products and services helping to maintain a cleaner, more sanitary plant environment. Our Central Foam System is a customized cleaning system readily adaptable to most processing plants. It is ready to use and operate at any time and eliminates chemical handling by the clean-up crew. Chemicals are stored and automatically mixed in a central location. Each Foam Station can dispense a foam cleaner and sanitizer. The controlled, pre-set chemical dilution ratio system increases plant cleanliness and reduces chemical cost.

Rochester Midland Corporation, Palisades, NJ

Reader Service No. 316

Fully Automated Microbiology System for QA/QC Labs

The VITEK® automated microbiology system offers QA/QC laboratories streamlined sample handling, unattended operation, and rapid test results–typically in less than eight hours.

Manufactured by bioMérieux Vitek the VITEK® features an extensive menu of tests for many industrial applications, including food processing and pharmaceuticals, and is easily validated. Tests cover a full range of microbial identifications and a variety of growth assays. These include: Gram-Positive Identification, Gram-Negative Identification, Yeast, Bacillus, Anaerobe, Bioburden, Non-fermenter Identification, Neisseria/Haemophilus Identification and a Bioassay test.

A new graphical user interface software can expand your lab's testing capabilities while allowing you to perform tasks with point-and-click ease. A new data management program for VITEK, generates cumulative reports, as well as quality control reports. It manages both VITEK test results and off-line results.

The VITEK® system is backed by a comprehensive support organization providing 24-hour technical and instrument service.

bioMérieux Vitek, Inc., Hazelwood, MO

Reader Service No. 317

Battery Powered Faucet from World Dryer

The Model C-500 Sensamatic Plus Touchless Faucet from World Dryer is battery powered. This design innovation significantly reduces installation costs and time. The C-500 is a chrome plated, cast brass faucet powered by a 6V DC lithium battery with a life of 3 years under normal use.

Touchless faucet activation conserves energy while preventing water waste and vandalism. Additional benefits include enhanced hand sanitation and easy operation for the physically challenged.

A continuous, infra-red reflective beam is emitted from the sensor. The faucet is activated by placing hands under the spout. Tempered water flows until the user's hands are removed; there is a 30 second maximum run time. The sensor then resets for the next user.

World Dryer, Berkeley, IL

Reader Service No. 318

Swab Sampling Systems

An effective swabbing program is instrumental for monitoring conditions leading to contamination. Weber Scientific is the leading supplier of ready-to-use swab and transport systems for the dairy and food industries.

Culturette® features a sterile rayon swab attached to a plastic shaft which is secured to the tube's cap. It can be removed from the transport pack without handling or contaminating the swab tip. A unique ampule keeps the modified Stuart's transport medium hermetically sealed until ready for use. The specimen is taken via the swab, inserted into the Stuart's medium, and transported in the plastic casing to the laboratory. Viability of most microorganisms is preserved for at least 48 hours.

Weber Scientific, Hamilton, NJ

Reader Service No. 319

New System Lowers Down Time for Agitated Vessels

SANIFAB introduces the innovative QC Guide Bearing for use in agitated vessels. This unit is designed specifically to provide easy access for maintenance with minimal downtime, while also providing superior CIP (clean in place) cleaning of the guide bearing for top mounted and supported agitation.

"This new guide bearing will provide clear advantages for operations using top-mounted vessel agitation," said Brian Gehrke, vice president-marketing of SANIFAB. "We see applications in the food, dairy, pharmaceutical, snack food and beverage markets. Anybody who is interested in saving time on maintenance and having better CIP performance should consider acquiring new SANIFAB agitated vessels with this guide bearing, or retrofitting their existing agitated vessels."

Most existing guide bearing designs require extensive disassembly of the drive shaft just to replace the plastic insert bearing, which is subject to high wear. Other designs can be disassembled more easily, but do not provide acceptable CIP performance.

The new SANIFAB design (patent pending) features a removable main center guide bearing composed of a stainless steel cylinder sleeve, a second stainless mounting collar and a replaceable plastic insert. Using a system of welded tabs and machined slots, the assembled unit can be easily removed, the plastic insert can be replaced, and the unit can be realigned and remounted in the vessel with minimal down time. Multiple machined slots on the plastic insert provide superb flow of cleaning solutions between the surfaces of the bearing housing, insert and drive shaft. The unit also provides more convenient guide bearing removal, without the need to disassemble the entire drive shaft.

SANIFAB, Stratford, WI

Reader Service No. 320

G & H Products Corp.

Uniquely Designed Flowmeter Increases Measurement Accuracy

The PD340 magnetic flow meter from G&H Products Corp. is designed for precision flow measurement of conductive liquids. It accurately measures laminar and turbulent flow regardless of the changes in product temperature or viscosity. Because the flow measurement chamber is square, not round, there is a greater product contact area, and flow measurement is achieved with higher accuracy and without the need for re-calibration.

The PD210 display unit is available to provide programming and diagnostic testing for the PD340. It displays total, accumulative total, rate, and meter diagnostic codes and can be used to reprogram the meter. It provides automatic zero-point correction, volumetric measurement in a variety of units, built-in batching control, and accurate recording of laminar or turbulent flow.

The durable construction of the PD340 makes it suitable for installations in harsh environments, in applications with or without suspended solids, where hygienic conditions are essential. The metering tube is constructed of rugged Teflon® coated stainless steel, and is enclosed in a durable Noryl® terminal box.

G&H Products Corp., Kenosha, WI

Reader Service No. 321

AIM – New Multi Antibiotic Test for Use on Broad Matrices

AIM-96, the first test that detects antibiotic drugs at regulatory levels is now available for wide applications in milk, muscle tissue, urine, and serum.

The AIM test developed by Charm Sciences, Malden, MA., is designed to detect the following drugs at "safe" or "MRL" levels in a single assay: Beta-Lactams, Sulfonamides, Tetracyclines, Aminoglycosides, Macrolides.

AIM-96 is a microbial assay that provides a practical and economical system to meet new requirements. For live animal monitoring, urine or serum testing prior to slaughter can assist in selection of a drug free product. Incurred studies have established serum as the best predictive indicator of animal medication level. In these studies serum drug levels range from 4 to 7 times greater than muscle with best coefficient of variance. Simple screening of serum prior to slaughter will allow you to screen a herd of animals for their drug withdrawal status.

AIM reagents are room temperature stable for over 1 year and over 3 years at 4°C. A pre-programmed incubator controls a temperature-time program which includes a fixation step at the end of the incubation for repeatable and stable color results. For high volume testing, monitoring and reporting, workstation and microwell readers are available.

AIM puts a practical integrated monitoring program in place for screening animals for antimicrobial drugs.

Charm Sciences, Malden, MA

Reader Service No. 322

bioMérieux Vitek Offers New Automated Microbiology System

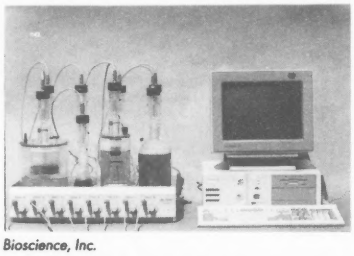
bioMérieux Vitek now makes available the VITEK® 32, a smaller version of its powerful VITEK® automated identification system. The VITEK 32 offers users increased flexibility in their microbiology testing, yet requires less laboratory space. The VITEK 32 boasts a 32-card testing capacity and uses the standard VITEK 30-well test card.

The VITEK 32 is comprised of one instrument module which holds the reader and the filler plus the computer, terminal and printer. The instrument module contains the filler section in the lower half, while the reader section occupies the upper portion with four 8-card trays.

The VITEK 32 utilizes the new Constellation Center workstation computer with graphical user interface software. Tests cover a wide range of microbial identifications plus a variety of growth assays.

bioMérieux Vitek, Inc., Hazelwood, MO

Reader Service No. 323



Bioscience, Inc.

New Anaerobic Bioprocess Test System Offered by Bioscience, Inc.

A new test system for measuring anaerobic bioactivity has been introduced by Bioscience, Inc. This new system integrates with Bioscience's BI-1000 Respirometer System which is designed to measure aerobic bioactivity. The new anaerobic accessories use the measurement and PC data acquisition capabilities of the BI-1000, adding special gas collection modules to each of eight reactor positions. Applications include wastewater and wastewater sludge digestion studies, digester performance evaluations, anaerobic biodegradation studies, kinetic studies and process optimization work.

Precise produced gas volume readings are taken automatically at pre-set intervals. The new anaerobic system expands the range of testing available on the BI-1000 and can reduce labor costs of typical anaerobic process analysis in the laboratory.

Bioscience, Inc., Bethlehem, PA

Reader Service No. 324

GEM Biomedical RMQA™ Rapid Microbiology Quality Assurance System for Industrial Applications

GEM Biomedical, Inc. is pleased to announce the availability of the new RMQA™ Rapid Microbiology Quality Assurance System. This new sample preparation system provides significant time savings when preparing large volumes of liquid product for microbiological analysis.

The RMQA System speeds up liquid product sample preparation with a proprietary cross filtration technology. Contaminant microorganisms can be concentrated and collected from large volumes of liquid product samples in as little as 15 minutes. Potentially interfering product components are removed by the system and viable microorganisms are recovered in a formulation compatible with current detection or identification methods.

The RMQA System is computer driven with instructions that guide

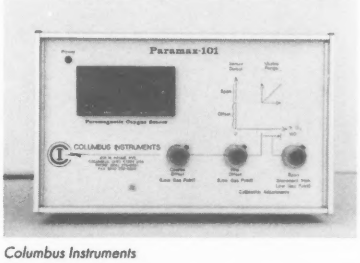
technicians through any required steps. Once loaded onto the system, a sample is processed automatically, thus providing a high degree of walk away capability.

After each sample is processed, the RMQA System runs through a 10 minute sterilization procedure, so cross contamination is eliminated. Typical liquid samples which can be handled by the system include water, beverages, brewing products, personal products, and detergents.

For interested customers, GEM Biomedical will analyze a sample of any liquid product or process water to provide a preliminary assessment of an appropriate analytical protocal.

GEM Biomedical, Inc., Hamden, CT

Reader Service No. 325



Columbus Instruments

Paramagnetic Oxygen Analyzer "Paramax-101"

Highly accurate and stable oxygen analyzer with 0.001% O_2 resolution for environmental and physiological applications operates on the principle of magnetic susceptibility of oxygen gas. It has the ability to be calibrated in a narrow or extended oxygen percentage range. The full range extends from 0 to 100 % O_2, but Columbus Instruments' "Paramax" O_2 Paramagnetic Analyzer can be calibrated in any other point (e.g. 20% O_2) at the center with the span ranging from 19.000% O_2 to 21.000% O_2 when high resolution is required. Four digits display allows precision visual readings of oxygen concentration.

To eliminate environmental influences, the sensor itself has a built-in temperature controlled chamber which is also well shielded from external magnetic fields.

An air sample pump is built in as well as a pressure regulator making Columbus Instruments' "Paramax" O_2 Paramagnetic Analyzer immune to both source gas as well as barometric pressure variations.

Sensor features analog 0-5V or +/-5V outputs.

Current loop 4-20mA for industrial applications as well as RS-232 interface is available where user needs computer interfacing. Companion infrared analyzer is offered for measuring O_2, CO_2 and CH_4 gases.

Columbus Instruments, Columbus, OH

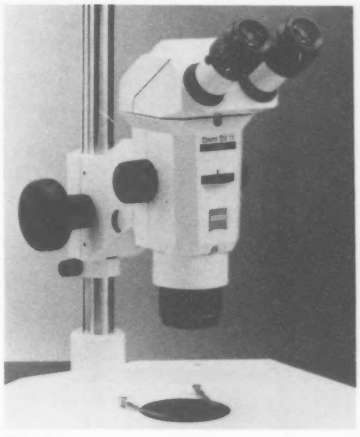
Reader Service No. 326

Stemi SV 11 Apo Stereomicroscope

The New Standard for Stereomicroscopy. The Stemi SV 11 Apo stereomicroscope provides images with a new, unsurpassed degree of brilliance, high contrast, depth of field and color fidelity. It is the new standard for high-performance stereomicroscopy.

Its 1:1 zoom range is one of the widest of all stereomicroscopes. Famous Zeiss optics with plan-apochromatic correction ensure the precise evaluation of minute details at high magnifications and easy orientation at low magnifications.

The heart of this new stereomicroscope are the new high-performance Plan-Apochromat S 1.0× and 1.6× objectives which deliver a total magnification range of 6× to 264 ×. Special efforts have been made to provide long working distances: 80 mm for the 1.0× objective, and 40 mm for the 1.6×



Zeiss, Inc.

objective. There is ample room for illumination and manipulation of the specimen.

Convenience and ergonomics are further attributes of the Stemi SV 11 Apo. A new tube with a 35° viewing angle allows the user to maintain a relaxed posture for long periods of use. In addition to a highly stable stand, the basic configuration includes a combined coarse/fine drive for rapid and precise focusing.

The quality of the illumination has been matched to that of the optical performance of the microscope. Permanently installed polarizers for coaxial incident-light illumination allow the shadow-free and reflection-free observation of smooth, specular surfaces. New is the slit-ring illuminator for incident-light darkfield illumination which guarantees maximum resolution and makes even the finest object structures visible.

The Stemi SV 11 Apo has been designed to fit into the modular system for Zeiss stereomicroscopes. This allows the user to custom design the microscope for specific applications using a wide variety of accessories, including all documentation possibilities.

Carl Zeiss, Inc., Thornwood, NY

Reader Service No. 327

BusinessExchange

Services/Products

See us at the 1996 IAMFES Annual Meeting, Booth No. 501

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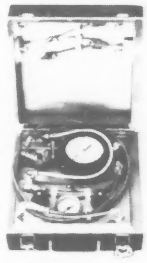
The National Restaurant Association, located in Washington, D.C., seeks a motivated and qualified student for the temporary position of summer Intern. Must be a graduate or undergraduate student in a college biological, environmental, public health or safety program. Must be able to work independently and have basic knowledge of word processing, technical writing, business telephone and office procedures. The position will allow the student hands on exposure and interaction with the National Restaurant Association, Regulatory Agencies and the foodservice industry in the general field of public health and safety. Compensation, $6.00 to $6.50 per hour. Send cover letter and resume to: M. Ose (M/OP), National Restaurant Association, 1200 17th St., N.W., Washington, D.C. 20036.



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1996 IAMFES

Annual Meeting Exhibitors

(as of April 1, 1996)

3-A Sanitary Standard Symbol Administrative Council
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Columbia, SC 29209
Phone (803) 783-9258; Fax (803) 783-9265

3M Microbiology Products
3M Center, Bldg. 275-SW-05
St. Paul, MN 55144-1000
Phone (800) 228-3957; Fax (612) 737-1994

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29 Platts Hill Road
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Aquionics, Inc.
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Erlanger, KY 41018
Phone (606) 341-0710; Fax (606) 341-2302

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Cockeysville, MD 21030
Phone (410) 771-0100; Fax (410) 584-2806

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Fax (206) 487-1476

Biolog Inc.
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Hayward, CA 94545
Phone (510) 785-2591; Fax (510) 782-4639

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Hazelwood, MO 63042-2395
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Fax (314) 731-8678

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Food Processors Institute
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Washington, D.C. 20005
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ComingEvents

JUNE

·**1-12, U.S.–Ukrainian Food Industry Trade & Investment Mission to Ukraine,** Kiev, Lviv, Odessa, Dnipropetrovsk, and Cherkasy. The mission will be of interest to companies involved in the food processing and packaging sector, food distribution agricultural machinery and equipment, and agricultural chemicals. If interested, please contact Mr. Eugene Shaw at (202) 482-3494; fax (202) 482-0304 or Mr. Damon C. Greer at (202) 482-5023; fax (202) 482-5666.

·**2-4, IDDA's 32nd Annual Seminar & Expo; Dairy-Deli-Bake 96,** held at the Minneapolis Convention Center in Minneapolis, MN. For further information, contact IDDA, P.O. Box 5528, Madison, WI 53705-0528; phone (608) 238-7908; fax (608) 238-6330.

·**3-4, Food Irradiation Symposium,** at the Doubletree Hotel in Austin, TX. The two-day symposium will focus on: The dynamics of foodborne illness, obstacles to food irradiation, the background of food irradiation, and consumer and industry acceptance of food irradiation. For further information, contact Dr. Kerri Harris, Institute of Food Science, Texas A & M–College Station, TX or call (409) 862-2036.

·**3-14, Ninth Summer Institute in Environmental Health Sciences**, in Baltimore, MD. The Summer Institute is sponsored by The Dept. of Environmental Health Sciences and the Johns Hopkins University/NIOSH Education Resource Center in Occupational Safety and Health. For additional information, contact Denise Barton at (410) 955-3537; Kay Castleberry at (410) 955-2212; Diane Zerbe at (410) 955-0423 or fax (410) 955-0617.

·**4-5, TAMFES Annual Meeting,** at the Wyndham Hotel in Austin, TX. For further information, contact Kent Roach at 1-800-825-5550.

·**4-6, 4th ASEPT International Conference, Sécurité Alimentaire 96/Food Safety 96, Co-sponsored by IAMFES**. Laval, France, with the ASEPT/EHEDG Symposium 1996. Contact AMGAR–ASEPT–BP49–53020 LAVAL CEDEX–France or call 33-16 43 49 22 22; fax 33-16 43 53 36 53.

·**4-7, FEHA 48th Annual Education Meeting & Trade Show,** Orlando, FL. For additional information, contact B. G. Tennant, R.S., Executive Director, P.O. Box 1495, Pensacola, Fl 32597; office phone (904) 477-1611 or home phone (904) 455-2764.

·**9-11, AFFI's 13th Annual Distribution and Logistics Conference,** in Chicago, IL. The conference will host leading experts in distribution and logistics, give facility tours and provide an opportunity for an industry exchange of ideas on transportation issues. For more information, contact AFFI at (703) 821-0770.

·**10-12, The 18th Mycotoxin Workshop,** organized by the Institute of Mycrobiology and Toxicology, and held in Kulmbach, Germany. Further information available by phone +49-9221-803-221; or fax +49-9221-803-331.

·**11-12, Cross–Connection Control: Survey & Inspection Course,** offered by The University of Florida's Center for Training, Research & Education for Environmental Occupations (UF/TREEO). Participants learn to identify appropriate methods to prevent backflows for isolation and containment. For further information, contact TREEO, 3900 SW 63rd Blvd., Gainesville, FL 32608-3848; phone (904) 392-9570, ext. 112; fax (904) 392-6910.

·**22-26, Institute of Food Technologists 1996 Annual Meeting & FOOD EXPO,** in New Orleans. For further information, contact Leigh Ann Disser, Institute of Food Technologists, 221 N. LaSalle St., Suite 300, Chicago, IL 60601-1291; phone (312) 782-8424; fax (312) 782-8348; e-mail: ladisser@ift.org.

·**25-26, International Symposium on Industrial Applications of Bioluminescence in Microbiology,** at the Beaumont Conference Center. The symposium will feature experts on the application of ATP bioluminescence technology from a range of industrial sectors. These include brewing, chemicals, dairy, food, meat, personal care products, petroleum, pharmaceuticals, soft drinks and water. For further information, contact Dr. Bill Simpson, Cara Technology Limited at int+44(0)1342 836061; or fax +44(0) 1342 836 0161.

·**30-July 3, International Association of Milk, Food and Environmental Sanitarians, Inc. 83rd Annual Meeting,** in Seattle, WA. For additional information, contact Julie Cattanach at (800) 369-6337; fax (515) 276-8655.

JULY

·**9-19, World's Largest International Culinary Event Scheduled to Take Place in the United States.** World Association of Cooks Societies (WACS) has scheduled the World Cooks Tour for Hunger and Culinary Arts Festival. The event will begin at Walt Disney World Resort with a five-day international culinary competition, dubbed the World Culinary Arts Festival. For further information, contact Davin Light, Marketing A La Carte at (407) 539-1459 or

Keith Keogh, World President, World Assn. of Cooks Societies at (407) 560-2054.

• **12-19, Rapid Methods and Automation in Microbiology: International Workshop XVI,** Kansas State University, Manhattan, KS. A mini-symposium will occur on July 12-13. Contact Dr. Daniel Y. C. Fung, Workshop Director for further information, telephone (913) 532-5654; fax (913) 532-5681.

• **22-26, Backflow Prevention Technician Training & Certification**, in Gainesville, FL. Offered by The University of Florida's Center for Training, Research and Education for Environmental Occupations. This course provides guidelines for acceptable practices for annual testing of backflow prevention assemblies used in cross-connection control programs. Individuals wishing to register should call (352) 392-9570, ext. 112.

• **28,-August 10, Health & Environment Conference to China, Mongolia & Russia,** in Beijing, China. The Health and Environment Conference is an opportunity to be part of a commitment to finding a worldwide solution. For additional information, contact Ms. Kathleen S. Sieler, Program Coordinator or Michael D. Wacker, Director of Medical Programs at the Citizen Ambassador Program, S. 110 Ferrall St., Spokane, WA 99202; phone (509) 534-0430; fax (509) 534-5245.

SEPTEMBER

• **2-3, Symposium on Years in the Dairy Industry,** Copenhagen, Denmark. The main objective of this Symposium is to provide a comprehensive view of the role of yeasts, both positive and negative aspects, in the dairy industry. For registration information, contact Prof. M. Jakobsen, The Royal Veterinary and Agricultural University, Dept. of Dairy and Food Science, Rolighedsvei 30, DK-1958 Frederiksberg C Denmark; telephone +45 35 28 32 15; fax +45 35 28 32 14.

• **6-7, International Symposium on the Influence of Codex Standards on International Trade in Dairy Products,** Düsseldorf, Germany. The symposium is intended for: general management, product development, product manufacturing, legislation, exporters/importers, and supervising and food inspection authorities. For additional information, contact Th. Kützemeier (Chair), German NC, Tel.: +49 228 98 24 3-0, fax: +49 228 98 24 3-20.

• **10-12, Producing Safe Dairy Products Workshop,** hosted by The Wisconsin Center for Dairy Research in Madison, WI. Two days will be devoted to discussing the microbiology and control of dairy pathogens; one day will be dedicated to HACCP and other sanitation methods used in dairy plants and food processing systems. For more information, contact Sara Quinones at (608) 262-2217; fax (608) 262-1578; e-mail: quinones@ahabs.wisc.edu, 1605 Linden Dr., Madison, WI 53706.

• **10-14, The 11th International Packaging & Food Processing Machinery and Materials Exhibition,** Jakarta, Indonesia. For further information, telephone +44 (0)171 486 1951; fax +44 (0)171 486 8773 or +44 (0)171 413 8222.

• **11-12, 75th Anniversary of the Vermont Dairy Industry Association,** held at the Ramada Inn, S. Burlington, VT. For further information, contact Mr. Byron Moyer at 116 State St., Drawer 20, Montpelier, VT 05620-2901 or phone (802) 828-2433; fax (802) 828-2361.

• **12-13, HACCP Program Presents Hands-on Workshop,** in Chicago, IL. This workshop provides for an intensive day and a half evaluation of HACCP principles and elements for developing a successful program. Participants evaluate their HACCP plan against those designed by the experts. For additional information or to enroll, contact AIB, 1213 Bakers Way, Manhattan, KS 66502; phone (913) 537-4750; fax (913) 537-1493.

• **15-19, American Association of Cereal Chemists to Hold 81st Annual Meeting,** in Baltimore, MD at the Baltimore Convention Center. The annual meeting includes a technical program, technical and poster sessions, table-top exhibits, new products/services sessions, educational short courses and social events. Annual Meeting registration materials are available after May 1, 1996, from AACC headquarters, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; telephone (612) 454-7250; fax (612) 454-0766.

• **24-26, New York State Association of Milk & Food Sanitarians Annual Conference,** Sheraton Inn, Liverpool, NY. For further information/details, contact Janene Lucia at: (607) 255-2892; fax (607) 255-7619; e-mail: jgg3@cornell. edu.

• **25-27, South Dakota Assn. of Healthcare Organizations 70th Annual Convention**, Rapid City, SD. Please direct all questions or comments to: Bud Jones or Suzanne Paradeis, SDAHO, 3708 Brooks Place, Suite #1, Sioux Falls, SD 57106; phone (605) 361-2281; fax (605) 361-5175.

OCTOBER

• **2-4, International Conference on New Developments in Refrigeration for Food Safety and Quality Call for Papers, Co-sponsored by IAMFES**. Lexington, KY. Conference papers are sought from all areas of food refrigeration. The purpose of this conference is to provide an opportunity for food technologists, food processors, and refrigeration engineers from around the world to exchange current information on the role of refrigeration in the food chain. For further information, contact Food Refrigeration Conference, Univ. of Kentucky, 128 Agricul-

ture Engineering Bldg., Lexington, KY 40546-0276; phone (606) 257-3000 ext. 111; fax (606) 257-5671; e-mail wmurphy@bae.uky.edu.

·**9-10, Iowa Association of Milk, Food and Environmental Annual Conference,** Waterloo, IA at the Starlight Best Western. For further information, contact Janet Burns at (319) 927-3212.

·**15-16, Symposium on Microbial Food Spoilage,** Copenhagen, Denmark. Participants are invited to present posters related to microbial food spoilage. An abstract of maximum one page should be sent before September 1 to: Lene Jensen, Danish Institute of Fisheries Research, Dept. of Seafood Research, Technical University of Denmark, Bldg. 221, DK-2800 Lyngby, Denmark; phone +45 4525 2580; fax +45 4588 4774; e-mail: lej@ffl.min.dk. For further information on registration phone +45 88 33 22; fax +45 45 88 47 74; e-mail: fish@ ffl. min.dk.

·**16-18, 16th-Food Microbiology Symposium and Workshop,** Univ. of Wisconsin, River Falls, WI. The workshop is designed to provide practical demonstrations and discussion of various tests and instruments available for rapid detection, isolation and characterization of foodborne pathogens and toxins as well as prediction of shelf-life and checking hygiene and sanitation in food processing facilities. For further information, contact Dr. Purnendu C. Vasavada, Dept. of Animal and Food Science, Univ. of Wisconsin-River Falls, River Falls, WI 54022 or phone (715) 425-3150; fax (715) 425-3785; internet: purnendu.c.vasavada@uwrf.edu.

·**20-23, The 1996 International Exposition for Food Processors® (IEFP) will host "El Congreso de las Americas,"** at San Francisco's Moscone Center. IEFP attracts visitors from around the world in every segment of the processing industry, including canning and freezing, dairy, beverages, meat, pharmaceuticals and other industry segments. For more information, contact Janet Palmisano, Communications Coordinator at (703) 684-1080.

·**27-29, International Whey Conference,** sponsored jointly by the American Dairy Products Institute (ADPI), the U.S. National Committee of IDF (USNAC), and the International Dairy Federation (IDF) at the Westin Hotel O'Hare, Rosemont, IL. This international conference will bring together manufacturers of whey and whey products, firms manufacturing equipment used in whey processing, business leaders of the industry, and government and university researchers from throughout the world to discuss current topics of interest relating to the production, research, marketing and utilization of whey and whey products. Anyone interested in presenting papers at the conference should contact Dr. Warren S. Clark, Jr., Chief Executive Officer, American Dairy Institute, 130 N. Franklin St., Chicago, Il 60606; phone (312) 782-5455; fax (312) 782-5299.

·**31-Nov. 2, NAMA National Convention and Exhibition,** Cervantes Convention Center, St. Louis, MO. Exhibitors of vending machines, food products and services related to the industry. For additional information, contact Larry Eils at (312) 346-0370.

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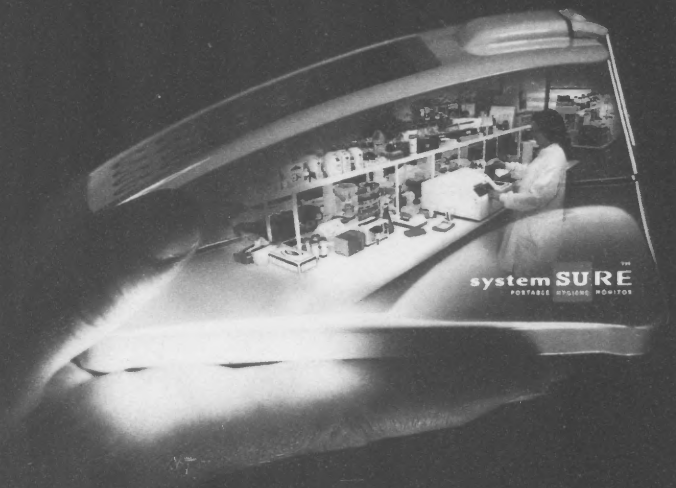

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Preliminary Program 83rd Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc.

In Cooperation with Washington Milk and Food Sanitarians Association

Sheraton Seattle Hotel & Towers, Seattle, WA
June 30 — July 3, 1996

REGISTRATION TIMES

Saturday, June 29	1:00 p.m. - 5:00 p.m.
Sunday, June 30	8:30 a.m. - 7:00 p.m.
Monday, July 1	8:00 a.m. - 4:00 p.m.
Tuesday, July 2	8:00 a.m. - 4:00 p.m.
Wednesday, July 3	8:00 a.m. - 12:00 p.m.

EXHIBIT HOURS

Sunday, June 30 (Following the Opening Session)	8:00 p.m. - 10:00 p.m.
Monday, July 1	9:30 a.m. - 3:30 p.m.
Tuesday, July 2	9:30 a.m. - 3:30 p.m.

IAMFES BOARD MEETING

Friday, June 28	2:00 p.m. - 6:00 p.m.
Saturday, June 29	8:30 a.m. - 1:00 p.m.
Monday, July 1	7:00 a.m. - 9:00 a.m.
Wednesday, July 3	11:30 a.m. - 1:00 p.m.
Thursday, July 4	8:00 a.m. - 12:00 p.m.

COMMITTEE/PROFESSIONAL DEVELOPMENT GROUP/TASK FORCE MEETINGS

SUNDAY, JUNE 30, 1996

7:00 - 10:00 a.m.	Affiliate Council
1:30 - 3:30 p.m.	Applied Laboratory Methods
9:30 - 11:00 a.m.	Audio Visual Library
10:00 - 11:00 a.m.	Baking Industry Sanitary Standards
10:00 - 5:00 p.m.	Communicable Diseases Affecting Man
11:00 - 12:00 p.m.	Constitution & Bylaws
10:00 - 11:00 a.m.	Dairy Quality & Safety (Farm Section)
11:00 - 12:00 p.m.	Dairy Quality & Safety (Plant Section)
1:30 - 3:00 p.m.	Dairy, Food & Environmental Sanitation Management
1:30 - 3:00 p.m.	Education
3:00 - 5:00 p.m.	Food Safety Network
1:30 - 3:30 p.m.	Food Sanitation
11:00 - 12:00 p.m.	Foundation Fund
3:00 - 4:30 p.m.	Journal of Food Protection Management
1:30 - 3:30 p.m.	Meat Safety & Quality
11:00 - 12:00 p.m.	Nominating
10:00 - 11:00 a.m.	Past President's Advisory
10:00 - 12:00 p.m.	Poultry Safety & Quality
4:30 - 6:00 p.m.	Risk Assessment
5:00 - 6:00 p.m.	Program Advisory
1:30 - 2:30 p.m.	Sanitary Procedures
1:30 - 3:30 p.m.	Seafood Safety & Quality
3:00 - 4:00 p.m.	Viral Foodborne

WEDNESDAY, JULY 3, 1996

12:00 - 4:00 p.m.	Program Advisory (members only)

Sunday Evening — July 30, 1996

Opening Session

7:00 **Welcome to the 83rd Annual Meeting** – F. A. Draughon, President of IAMFES and B. Brewer, Co-Chairperson, of the Local Arrangements Committee

7:15 **Introduction of the Ivan Parkin Lecture** – M. Brodsky, President-Elect of IAMFES

7:20 **Ivan Parkin Lecture** – Sense, Nonsense, and Science – Joseph A. Schwarcz, Ph.D., Vanier College, Saint-Laurent, Quebec, Canada

The Ivan Parkin Lecture is sponsored by the IAMFES Foundation Fund and is supported by the Sustaining Members

8:00 **Cheese and Wine Reception** – Held in the Exhibit Hall. An opportunity to greet old friends, make new ones and view the excellent technical displays.

Monday Morning—July 1, 1996

Travellers Advisory—Don't Leave Home Without It!

8:30 Medical Advice and General Food Safety Information for Travellers–**P. SNYDER**, Hospitality Institute of Technology & Management, St. Paul, MN

9:00 Food Safety for Cruises–**D. TURNER**, CDC, Miami, FL

9:30 New Findings in Washroom Microbiology–**C. GERBA**, University of Arizona, Tucson, AZ

10:00 Break

10:20 How Safe is Airline Food–**J. SIMPSON**, Germantown, TN

10:50 Ethnic Food Safety–**G. SWICK**, Marion County General Health District, Marion, OH

11:20 The Safety of Mysterious Ethnic Foods–**J. GANS**, Santa Clara Department of Environmental Health, San Jose, CA

Technical Session—Meat & Poultry Safety

8:30 Ecology of *Salmonella*, *Campylobacter* and *Listeria* in Chicken Production–**S. BAILEY**, N. Stern, and N. Cox, USDA-ARS-RRC-PMSRU, Athens, GA

8:45 Evaluation of a Steam Pasteurization Process in a Commercial Beef Processing Facility–**A. NUTSCH**, R. Phebus, D. Schafer, M. Riemann, R. Wilson, and J. Leising, Kansas State University, Manhattan, KS

9:00 Characterization of *Lactococcus* spp. Isolated from Cooked Modified Atmosphere Packaged Poultry Meat–**R. BARAKAT** and L. Harris, University of Guelph, Guelph, Ontario, Canada

9:15 The Optimization of a Lactic Acid Treatment for the Improvement of the Microbiological Quality and Safety of Poultry Carcasses–**D. BAUTISTA**, N. Sylvester, S. Barbut, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

9:30 Level of *Campylobacter* on the Farm Associated with Levels on Processed Carcasses–**N. STERN**, USDA-ARS-RRC-PMSRU, Athens, GA

9:45 An Effective Procedure for the Detection of *Campylobacter* spp. on Broiler Carcasses by Rinsing Directly with Enrichment Broth–**M. MUSGROVE**, N. Stern, and R. Johnson, USDA-ARS-RRC-PMSRU, Athens, GA

10:00 Break

10:20 Comparison of *In Ovo* Treatments for Reduction of *Salmonella* Colonization in Broiler Chickens–**J. LINE**, N. Stern, S. Bailey, and N. Cox, USDA-ARS-RRC-PMSRU, Athens, GA

10:35 Immobilization of Nisin in an Edible Gel for Reducing Bacteria on the Surface of Beef and in Ground Beef–**C. NETTLES-CUTTER** and G. Siragusa, USDA-ARS, Clay Center, NE

10:50 Statistical Evaluation of a Poultry Process for the Determination of Overall Quality Using Conventional Microbiology and ATP Bioluminescence–**D. BAUTISTA**, S. Barbut, J. Vaillancourt, L. Harris, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

11:05 Environmental Analysis Methods Utilized to Determine the Contamination Source in a Sausage Processing Plant–**S. SHUMAKER** and J. Feirtag, University of Minnesota, St. Paul, MN

11:20 Comparison of F+RNA Coliphage and Coliform Levels as Fecal Contamination Indicators in a Pork Slaughterhouse Environment–**A. MILLER** and B. Eblen, USDA-ARS-ERRC, Philadelphia, PA

11:35 Quantity and Distribution of Airborne Microorganisms in Poultry Processing Environments–**R. LINTON**, K. Lutgring, M. Peugh, A. Heber, and N. Zimmerman, Purdue University, West Lafayette, IN

Planning for the 21st Century on the Dairy Farm

8:30 Large Farm Design from the Owner/Operator Perspective–**D. BANSEN**, Forest Glen Jerseys & Forest Glen Oaks, Dayton, OR

8:55 Large Herd Health Management–**T. FURMAN**, Dairy Services of Arizona, Tempe, AZ

9:20 On Farm Concentration of Milk–**J. OGDEN**, New Mexico Department of Agriculture, Albuquerque, NM

9:45 Dairy Equipment Design Concepts for the 21st Century–**K. SLOANE**, Germania Dairy Automation, Wauhakee, WI

10:10 Break

10:30 Western Milk Hauling Concepts–**A. SAYLOR**, Food and Drug Administration, Washington, D.C.

10:55 ECO-Agriculture-Sustaining the Dairy Cow–**J. LOHMAN**, Sustainable Agri-Services, Sedro Woolley, WA

11:20 Electronic Communication on the Dairy Farm–**R. CADY**, Washington State University, Puyallup, WA

11:45 Farm Uses of Computer Technology–**C. JAMIESON**, Valley Agriculture Software, Tulare, CA

Global Perspectives on *E. coli* O157:H7 and Other Serotypes (Sponsored by ILSI)

8:30 VTEC Overview–**M. NEILL**, Brown University and Memorial Hospital of Rhode Island, Pawtucket, RI

8:40 Australian Views–**P. DESMARCHELIER**, CSIRO, Australia

9:10 Canadian Views–**J. WILSON**, Health Canada and University of Guelph, Guelph, Ontario, Canada

9:35 European Views–**H. KARCH**, University of Wurzburg, Wurzburg, Germany

10:05 Break

10:25 Perspectives on Shiga-like Toxin (SLT) Infections in Argentina–**E. LOPEZ**, Hospital de Ninos, Buenos Aires, Argentina

10:55 The Investigations and Control of VTEC in the UK: An Overview–**N. SIMMONS**, Guy's and St. Thomas' Hospital Trust, London, United Kingdom

11:25 Overview of VTEC in the USA–**P. TARR**, Children's Hospital and Medical Center, Seattle, WA

11:55 Round Table

Posters–General Microbiology Pathogens

- Numerical Methods to Determine Suitability of *Listeria monocytogenes* Ribotype Patterns for Normalization and Matching–**B. TENGE**, K. Jinneman, N. Dang, F. Fry, W. Hill, and M. Wekell, U.S. Food and Drug Administration, Bothell, WA
- Differences in ELISA Reactions of Monoclonal Antibodies EM-6E11 (Genus-Specific) and EM-7G1 (Species-Specific) Against Live and Heat Killed Cells of *Listeria* and *Listeria monocytogenes*–**R. NANNAPANENI**, R. Story, A. Bhunia, and M. Johnson, University of Arkansas, Fayetteville, AR
- Evaluation of Five Methods for Detection of *Listeria* Species in Market Mussel–**D. JEONG**, C. Chung, D. Gu, and E. Nam, Kosin University, Pusan, Korea
- Antimicrobial Agents Incorporated in Edible Films to Control Microbial Growth–**J. GRABER**, M. Schnepf, S. Sumner, S. Cuppett, and C. Weller, University of Nebraska, Lincoln, NE
- Influence of Temperature and Preincubation Temperature on Survival of *Listeria monocytogenes* at pH 4.8–**M. GAY**, K. Davey, and O. Cerf, ASEPT, France
- Significance of Preincubation Temperature and Inoculum Size on Growth of *Listeria monocytogenes*–**M. GAY**, K. Davey, and O. Cerf, ASEPT, France
- Thermal Destruction of *Listeria innocua* in Solid Muscle Beef or Chicken–**J. GOFF**, M. Christie, R. Story, and M. Johnson, University of Arkansas, Fayetteville, AR
- Effect of Some Additives Used in Meat Products on Behavior of *Listeria monocytogenes*–**R. RAYBAUDI** and A. Martinez, Universidad Central de Venezuela, Caracas, Venezuela
- Evaluation of Rapid DNA Extraction Methods for Detection of *Listeria monocytogenes* in Dairy Products Using the TaqMan™ Sequence Detection System–**T. COX**, R. Behari, S. Flood, C. Yamashiro, C. Paszko-Kolva, and R. Cano, California Polytechnic State University, San Luis Obispo, CA
- Survey on *Listeria* spp. Contamination of Korean Market Pork–**C. CHUNG**, D. Gu, and D. Jeong, Kon-Kuk University, Seoul, Korea
- Predictive Modeling of *Listeria* spp. Inactivation in Whole Bovine Milk in a High-Temperature, Short-Time Pasteurizer–**R. MCKELLAR**, P. Punidadas, and S. Liou, Centre for Food and Animal Research, Ottawa, Ontario, Canada
- Survival and Growth of *Listeria monocytogenes* Scott A in Beef and Pork Stored at Different Temperatures–**A. CASTILLO**, N. Martinez-Gonzales, and M. Rodriguez-Garcia, Texas A & M University, College Station, TX
- Disinfection Efficacy Against Pure-Culture and Mixed-Population Biofilms of *Listeria innocua* and *Pseudomonas aeruginosa* on Stainless Steel, Teflon® and Rubber–**F. BOURION**, and O. Cerf, ASEPT, France
- Effect of Temperature and pH on the Growth of *Listeria monocytogenes* on Pork Packaged in CO_2–**P. BODNARUK** and B. Shay, University of Tennessee, Knoxville, TN
- Microbial Competition: Suppression of *Listeria monocytogenes* Growth by *Pseudomonas fluorescens*–**L. BAGI** and R. Buchanan, USDA, ARS, Philadelphia, PA
- Evaluation of a New Rapid Screening Test for *Listeria*–**J. GEBLER**, Murray Goulburn Co-Operative Company, Limited, Victoria, Australia
- Evaluation and Application of *Listeria monocytogenes* Specific Antibodies–**P. SCHUBERT**, K. Kramer, and A. Bubert, MERCK KGaA, Darmstadt, Germany
- Petrifilm™ *Listeria* Count Plate: A Highly Selective Method for the Quantitative Recovery of *Listeria* from Environmental Samples–**G. SANDBERG**, M. Tochacek, and R. Young, 3M Company, St. Paul, MN

- Time to Toxin Production by Nonproteolytic *Clostridium botulinum* as Affected by Environmental Factors–**P. ELLIOTT** and D. Schaffner, Campbell Soup Company, Camden, NJ
- Development of a Twenty-Four Hour Method for the Detection of *Bacillus cereus* Spores in Raw Milk–**J. QUINLAN** and P. Foegeding, North Carolina State University, Raleigh, NC
- Development of a PCR Assay for the Detection of *Bacillus cereus*–**J. CZAJKA** and C. Batt, Cornell University, Ithaca, NY
- Effect of Modified Atmosphere and NaCl Treatment on the Growth of *Yersinia enterocolitica* on Minimally Processed Broccoli Stored at 4°C–**P. BODNARUK** and A. Draughon, University of Tennessee, Knoxville, TN
- Use of a Single Procedure for Selective Enrichment Isolation and Identification of Plasmid-Bearing Virulent Serotypes of *Yersinia enterocolitica* from Ground Pork–**S. BHADURI** and A. Pickard, USDA, ARS, ERRC, Philadelphia, PA
- Enhancement of Recovery by Removal of Blood from Standard *Campylobacter* Culture Protocol–**D. BARK**, C. Abeyta, and B. Jay, U.S. Food and Drug Administration, Bothell, WA
- Multiplex PCR for the Identification and Differentiation of *Campylobacter coli* and *C. jejuni*–**K. HARMON**, Iowa State University, Ames, IA
- Comparison of Selective Media for Primary Isolation of *Campylobacter*s Using Numerical and Graphical Tools to Indicate Optimal Media–**B. TENGE**, C. Abeyta, Jr., J. Hunt, P. Trost, D. Bark, C. Kaysner, and M. Wekell, U.S. Food and Drug Administration, Bothell, WA
- Rapid Detection of *Campylobacter jejuni* in Chicken Products by a Nested PCR–**D. WINTERS**, A. O'Leary, and M. Slavik, University of Arkansas, Fayetteville, AR
- The Measured Heat-Resistance of Non-Proteolytic *Clostridium botulinum* Spores is Increased by Endogenous Lysozyme Activity of Vegetable Extracts–**S. STRINGER** and M. Peck, Institute of Food Research, Norwich, United Kingdom
- Microbiological Quality of Cream-Fillings from Doughnuts Sold at Bulawayo, a Zimbabwean City–**R. OKAGBUE**, Applied Biology and Biochemistry, Byo, Zimbabwe
- Cross Protection by Heat and Cold Shock to Lethal Temperatures in *Clostridium perfringens*–**J. LIMÓN**, N. Heredia, and J. Garcia-Alvarado, UANL, Mexico
- Effect of Heat Shock on Sporulation, Protein Synthesis and Enterotoxin Production of *Clostridium perfringens*–**N. HEREDIA**, J. Garcia-Alvarado, and R. Labbe, UANL, Mexico

Monday Afternoon–July 1, 1996

Food Safety Education

1:30 Using a Computer-Based CD-ROM Tutorial to Strengthen Understanding of Good Sanitary Practices in Retail Food Stores–**R. GRAVANI**, K. Williams, D. Berry, S. Kern, and J. Tauer, Cornell University, Ithaca, NY

1:45 Different Ways to Get Food Safety Information to Clientele Groups–**S. BARNARD**, S. Knabel, and T. Dimick, The Pennsylvania State University, University Park, PA

2:00 Codex Alimentarius: Its Expanded Importance in Food Safety and International Trade–**H. WEHR**, TAS, Inc., Washington, D.C.

2:15 The Management and Technology of Retail Food System Food Safety–**O. SNYDER, JR.**, Hospitality Institute of Technology and Management, St. Paul, MN

2:30 ISO 9000/HACCP/Food Hygiene Practices: Food Safety and Quality for the Food and Beverage Industry–**R. DOUGHERTY**, NSF International, Ann Arbor, MI

2:45 Food Safety Education for Teens–**M. LEE** and B. Lacroix, Ryerson Polytechnic University, Toronto, Ontario, Canada

Technical Session–Sanitation

3:20 A Novel Enzyme-Linked Antibiotic Assay for Rapid Detection of Gram-Negative Bacteria–**V. LEWANDOWSKI**, T. Bridgeman, E. Zottola, and A. Olstein, University of Minnesota, St. Paul, MN

3:35 Quenching and Enhancement Effect on the ATP Bioluminescence Signal Using Different ATP Extractans and Sanitizers–**M. VELAZQUEZ**, H. Chan, A. Kirumira, and J. Feirtag, University of Minnesota, St. Paul, MN

3:50 Characterization of *Alicyclobacillus* Species Isolated from Fruit Juices and Canned Tomatoes–**I. WALLS**, V. Scott, and J. Webster, National Food Processors Association, Washington, D.C.

4:05 Chemical, Microbiological, and Physical Quality of Packaged Ice in Florida–**R. SCHMIDT** and G. Rodrick, University of Florida, Gainesville, FL

4:20 Assessment of the Microbiological Quality of Ready-to-Use Vegetables for Healthcare Food Service in Ontario, Canada–**J. ODUMERU**, S. Mitchell, D. Alves, J. Lynch, A. Yee, S. Wang, S. Styliadis, and J. Farber, Ontario Ministry of Agriculture, Guelph, Ontario, Canada

4:35 The Effect of Lactic Acid Sanitizer Treatment on *Listeria monocytogenes* L-Forms Biofilms on Food and Clinical Contact Surfaces–**S. JASSIM**, A. Hibma, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

Technical Session–General Food Microbiology

1:30 Survival of *Yersinia enterocolitica* during Fermentation and Storage of Yogurt–**R. WILLIAMS**, P. Bodnaruk, and D. Golden, University of Tennessee, Knoxville, TN

1:45 Efficacy of Chlorine and Heat Treatment in Killing *Salmonella stanley* on Alfalfa Seeds, and Growth of the Pathogen during Sprouting and Storage–**C. JAQUETTE**, L. Beuchat, and B. Mahon, University of Georgia, Griffin, GA

2:00 Inhibition of *Listeria monocytogenes*, *Staphylococcus aureus*, and *Bacillus cereus* by the Hop ß Acid Colupulone and Its Derivative, Hexahydrocolupulone–**J. MEYER**, N. Faith, J. Schoeni, J. Luchansky, A. Wong, J. Cerveny, and M. Barney, Oscar Mayer Foods Corporation, Milwaukee, WI

2:15 A Rapid Dot-Blot Immunoassay for the Detection of *Salmonella enteritidis* in Eggs, Poultry and Other Foods–**M. YOSHIMASU** and J. Zawistowski, University of Manitoba, Winnipeg, Manitoba, Canada

2:30 Antimicrobial Properties of Linear Furanocoumarins–**J. ULATE-RODRIGUEZ**, H. Schafer, E. Zottola, and P. Davidson, University of Minnesota, St. Paul, MN

2:45 The Influence of Divalent Cations and Chelators on Aflatoxin B_1 Degradation by *Flavobacterium aurantiacum* –**D. D'SOUZA** and R. Brackett, University of Georgia, Griffin, GA

3:00 Break

3:20 Determination of Nisin Activity Using an HPLC Method–**A. LARSSON** and E. Zottola, University of Minnesota, St. Paul, MN

3:35 Comparison of Methods for Coliform and *Enterobacteriaceae* Counts Among Naturally Contaminated Food and Environmental Samples–**P. MACH** and K. Lindberg, 3M Company, St. Paul, MN

3:50 Evidence for the Occurrence of Plant Specific *Bacillus cereus* in the Dairy Industry–**H. SCHRAFT**, M. Steele, J. Odumeru, W. McNab, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

4:05 Application of Generalized Evaluation Procedure for Comparing Isolation Methodologies for Foodborne *Listeria monocytogenes*–**T. HITCHINS**, Food and Drug Administration, Washington, D.C.

4:20 The Antibacterial Effect of Tea and Tea Concentrates on *Clostridium botulinum*–**P. MCCLURE** and M. Cirigliano, Unilever Research, Sharnbrook, England

Sensory Attributes of Dairy Foods

1:30 Introduction to Sensory Principles–**J. BRUHN**, University of California-Davis, Davis, CA

1:50 Milk Sensory Attributes–**S. BARNARD**, Penn State University, University Park, PA; **E. SPEAR**, Dairy & Food Industry Consultant, Corpus Christie, TX; **M. SMUKOWSKI**, University of Wisconsin, Madison, WI

2:05 Cheddar Cheese Sensory Attributes–**M. BATES**, Washington State University, Pullman, WA; **T. LENSMIRE**, LOL, Lake to Lake, Denmark, WI; **T. DULMAGE**, Crystal Farms Packaging, Lake Mills, WI

2:20 Yogurt Sensory Attributes–**P. JELEN**, University of Alberta, Edmonton, Alberta, Canada

2:35 Ice Cream Sensory Attributes–**R. MARSHALL**, University of Missouri, Columbia, MO; **T. GOTTEMOLLER**, Archer Daniel Midland, Decatur, IL

2:50 Cottage Cheese Sensory Attributes–**R. BRADLEY**, University of Wisconsin, Madison, WI; **T. GRUETZMACHER**, Dean Foods Co., Rockford, IL

3:05 Break

3:25 Sensory Evaluation of the Products

4:50 Open Discussion

Controlling *Escherichia coli* O157:H7and Friends in Meat

1:30 Industrial Perspective–**J. WILLIAMS**, American Meat Institute, Arlington, VA

2:00 Farm Prevalence of EHEC and Production Intervention Strategies–**R. JOHNSON**, Agriculture Canada

2:30 Effect of Carcass Decontamination Procedures on Microflora–**W. DORSA**, USDA, ARS, Clay Center, NE

3:00 Break

3:20 Intervention Strategies in Primary Processing-New Zealand Experience–**P. DESMARCHELIER**, CRISO, Tingalpa, Australia

3:50 Physiological Control of EHEC–**T. ROSS**, University of Tasmania, Australia

4:20 Validation of Processes for Control of *Escherichia coli* O157:H7 in Fermented Sausage–**C. KASPAR**, Food Research Laboratory, Madison, WI

Posters–Methods/Sanitation

- Assessing Microbial Hazards from Chilled/Frozen Foods Exposed to Refrigeration Failure–**R. LACHICA** and R. Worfel, U.S. Army, Natick, MA
- Microbial Quality of Vacuum Packaged Cook/Chill Foods Prepared in a Hospital–**B. LANGLOIS**, K. Akers, S. Bastin, and J. O'Leary, University of Kentucky, Lexington, KY
- Automated Ribotyping-Based Assessment of Diversity in Bovine Mastitis-Causing Microorganisms–**J. BRUCE**, A. Rivas, C. Batt, M. Wiedmann, C. McDowell, R. Gonzalez, and E. Cole, DuPont Experimental Station, Wilmington, DE

- A Comparison of Various Phenotypic and Genotypic Methods for Typing *Enterobacter sakazakii*–**M. NAZAROWEC-WHITE** and J. Farber, Health Canada, Ottawa, Ontario, Canada
- Comparative Recovery of Coliforms from Meat and Milk Using m-ColiBlue24 and Direct Plating–**J. DICKSON**, J. Erdmann, and M. Grant, Iowa State University, Ames, IA
- Rapid Coliform Counts of Raw Milk–**P. TUITEMWONG** and K. Tuitemwong, KMIT Thonburi, Thailand
- Microbiological and Sensory Quality of Milk–**C. HACKNEY**, S. Duncan, H. Williams, and W. Hartman, Virginia Polytechnic Institute and State University, Blacksburg, VA
- Fermented Milk Containing *Bifidobacterium longum* Potentiates Immune Response of the Host–**C. FERREIRA**, M. Moulin, and J. Mezencio, Universidade Federal de Vicosa, Vicosa, Brazil
- Survival and Growth of *Aeromonas hydrophila* and *Listeria monocytogenes* on Raw Cabbage and Celery–**R. DIAZ**, R. Raybaudi, and A. Martinez, Universidad Central de Venezuela, Caracas, Venezuela
- Isolation and Characterization of Lactic Acid Bacteria from Bean Sprouts which Inhibit *Listeria monocytogenes*–**J. FARBER**, Y. Cai, and L. Ng, Health Canada, Ottawa, Ontario Canada
- Occurrence of *Listeria monocytogenes*, *Salmonella* spp., *Escherichia coli* and *Escherichia coli* O157:H7 in Vegetable Salads–**C. LIN**, S. Fernando, T. Huang, and C. Wei, University of Florida, Gainesville, FL
- Growth of *Listeria monocytogenes* on Minimally Processed Broccoli with Antimicrobial Treatment–**R. SMILEY**, D. Grindstead, J. Mount and A. Draughon, University of Tennessee, Knoxville, TN
- Application of ATP-Bioluminescence for Cleaning Validation of Food Processing Equipment–**E. EHRENFELD**, J. Scheld, S. Miller, and C. Carpenter, IDEXX Laboratories, Westbrook, ME
- Application of a Rapid ATP-Bioluminescence Method for Assessing Cleanliness of Milking Equipment–**K. STRUTZ**, C. Fong, and P. Vasavada, University of Wisconsin-River Falls, River Falls, WI
- Monitoring Cleanliness of Food Contact Surfaces Using Rapid ATP-Bioluminescence Method–**C. FOONG** and P. Vasavada, University of Wisconsin-River Falls, River Falls, WI
- A New Medium for the Quantification of Bacteria in Food After 24 Hours–**D. TOWNSEND**, A. Croteau, and A. Naqui, IDEXX Laboratories, Westbrook, ME
- Real Time Monitoring of Lactic Fermentations Using Impedance Microbiology–**J. COOMBS**, A. Marshall, A. Pridmore, and P. Silley, Bioscience International Inc., Rockville, MD
- The Efficacy of Washing and Sanitizing Animal Hauling Trucks–**K. RAJKOWSKI**, USDA, ARS, ERRC, Philadelphia, PA
- Enhanced Detection of Pathogens in Meat Products Using Automated Malthus Conductance Assays–**D. GIBSON**, BIODON, Aberdeen, United Kingdom
- Genetic Characterization and Identification of Lactic Acid Bacteria Important to the Food Industry Using Automated Ribotyping–**A. MCCARDELL**, J. Bruce, E. Cole, and M. Corby, DuPont Experimental Station, Wilmington, DE
- Biopreservation of Vacuum Packaged Coarse Ground Beef by *Leuconostoc gelidum* UAL 187–**R. WOROBO**, G. Greer, M. Stiles, and L. McMullen, University of Alberta, Edmonton, Alberta, Canada
- Oregon Consumers' Use of U.S.D.A. Safe Handling Instructions Label on Meats and Poultry and Their Knowledge of Foodborne Illness Risks–**M. WOODBURN** and C. Raab, Oregon State University, Corvallis, OR
- An Evaluation of the Efficacy of Two Beef Carcass Decontamination Methods–**S. KOCHEVAR**, J. Sofos, and G. Smith, Colorado State University, Fort Collins, CO
- Isolation of *Hafnia alvei* from Commercially-Prepared, Chub-Packed Ground Beef, and Its Importance in Meat Spoilage–**S. GAMAGE**, S. Ingham, and J. Luchansky, Food Research Institute, Madison, WI
- Microbiology of Aquacultured Striped Bass Grown in Earthen Ponds, Flow-Through Tanks, and Recirculating Tanks–**P. NEDOLUHA** and D. Westhoff, University of Maryland, College Park, MD
- Growth of Psychrotrophic Pathogens on Refrigerated Aquacultured Rainbow Trout and Channel Catfish Filets–**C. FERNANDES**, T. Thomas, and G. Flick, Virginia Polytechnic Institute and State University, Blacksburg, VA
- Effect of Organic Acids on the Microflora of Channel Catfish (*Ictalurus punctatus*)–**C. FERNANDES**, J. Cohen, T. Thomas, and G. Flick, Virginia Polytechnic Institute and State University, Blacksburg, VA
- Comparison of Quality in Aquacultured Fresh Catfish Filets II: Pathogens *Escherichia coli* O157:H7, *Campylobacter*, *Vibrio*, *Plesiomonas* and *Klebsiella*–**C. FERNANDES**, G. Flick, J. Silva, and T. McCaskey, Virginia Polytechnic Institute and State University, Blacksburg, VA
- Microbial Evaluation of Salmon Roe Processed in Alaska–**B. HIMELBLOOM** and C. Crapo, University of Alaska, Kodiak, AK
- Biogenic Amines in Fish Sauces–**Y. HUANG**, M. Zheng, H. Amos, K. Gates, and M. Froetschel, University of Georgia, Athens, GA
- Quality of Surimi Made from Tilapia and Carp–**Y. HUANG**, H. Abdel-Aal, and A. Awad, University of Georgia, Athens, GA

Tuesday Morning—July 2, 1996

Use of Indicator Microorganisms in Food Safety

8:30 Microbial Indicators: Purposes and Uses –**L. JAYKUS**, North Carolina State University, Raleigh, NC

8:55 The Use of Indicator Organisms in HACCP Plans–**A. McNAMARA**, USDA, FSIS, Washington, DC

9:20 Use of Microbial Indicators-Industry Perspective–**D. ZINK**, Nestle USA, Inc., Glendale, CA

9:45 Value of Microbial Indicators in Environmental Monitoring–**J. FRANK**, University of Georgia, Athens, GA

10:10 Break

10:30 Microbial Indicators and Foodborne Pathogens-*Salmonella*–**S. BAILEY**, USDA-ARS-RRC, Athens, GA

10:55 Microbial Indicators and Foodborne Pathogens-*Escherichia coli* O157:H7 –**R. NICKELSON**, National Cattleman's Beef Association, Chicago, IL

11:20 Bacteriophage Indicators of Enteric Pathogens in Food–**M. SOBSEY**, University of North Carolina at Chapel Hill, Chapel Hill, NC

Technical Session—*Escherichia coli/Listeria*

8:30 Acid and Heat Tolerance of Acid Habituated *Escherichia coli* O157:H7–**H. THIPPAREDDI**, D. Retzlaff, R. Phebus, and D. Fung, Kansas State University, Manhattan, KS

8:45 Changes in Heat-Resistance of *Escherichia coli* O157:H7 Following Heat Shock and Acid-Shock–**N. WILLIAMS** and S. Ingham, University of Wisconsin-Madison, Madison, WI

9:00 Influence of a_w and Temperature on Viability of Unheated and Heat-Stressed *Escherichia coli* O157:H7 in Salami–**R. CLAVERO** and L. Beuchat, University of Georgia, Griffin, GA

9:15 Isolation and Characterization of Substances Inhibitory to *Escherichia coli* O157:H7 and *Listeria monocytogenes*–**T. BRIDGEMAN** and E. Zottola, University of Minnesota, St. Paul, MN

9:30 Outer Membrane Proteins and Adherence of Iron-Stressed Enterohemorrhagic *Escherichia coli* to HEp-2 Cells–**T. SCHWACH** and E. Zottola, University of Minnesota, St. Paul, MN

9:45 Survival of *Escherichia coli* O157:H7 during Fermentation of Apple Cider–**J. SEMANCHEK** and D. Golden, University of Tennessee, Knoxville, TN

10:00 Break

10:20 Application of a Fluorogenic 5' Nuclease PCR Assay for Detection of *Listeria monocytogenes* in Raw Milk–**C. BATT**, D. Norton, B. Miller, R. Behari, S. Flood, V. Lunge, and P. Witham, Cornell University, Ithaca, NY

10:35 Development of a Bacteriophage-Mediated ATP Bioluminescent Detection System for *Listeria monocytogenes*–**L. MCINTYRE**, S. Jassim, and M. Griffiths, University of Guelph, Guelph, Ontario, Canada

10:50 Use of Nisin to Control *Listeria monocytogenes* in Queso Fresco Cheese–**A. DEGNAN**, N. Farkye, M. Johnson, and J. Luchansky, Food Research Institute, Madison, WI

11:05 Response of *Escherichia coli* O157:H7 in the Presence of Sodium Lactate during Refrigerated Storage with and without Temperature Abuse–**D. CONNER** and O. Oyarzabal, Auburn University, Auburn, AL

Increasing Dairy Product Shelf Life

8:30 Computerization in Pastuerization Controls–**R. COFFMAN**, Masterleo and Associates, Worthington, OH

9:00 Round Table Discussion on Increasing Shelf-Life from 16 to 21 Days–**J. DELANEY**, Prairie Farms Dairy Inc., Carlinville, IL; **R. FUQUA**, Quality Chekd Dairy Products Association, Naperville, IL; **T. BOUFFORD**, Ecolab Research Center, St. Paul, MN; **V. MILLS**, Evergreen Packaging, Cedar Rapids, IA

9:55 Break

10:15 Plant Design and Equipment for Aseptic and Near Aseptic Processing of Milk–**D. HENYON**, Elopak Inc., New Hudson, MI; **C. REINHART**, Waukesha Cherry Burrell, Louisville, KY; **R. SIMPSON**, APV Crepaco, Rosemont, IL

11:15 Regulatory Concerns of Aseptic Processing–**S. SIMS**, Food and Drug Administration, Washington, D.C.

11:45 Prevalence of *Listeria monocytogenes* in Dairy Products, **R. BYRNE**, International Dairy Foods Association, Washington, D.C.

Tempest in a Teapot

8:30 Fecal Coliforms in Tea: What's the Problem?–**M. DOYLE**, University of Georgia, Griffin, GA

9:00 TBA–**M. CIRIGLIANO**, T. J. Lipton, Englewood Cliffs, NJ

9:30 TBA–**T. SCHWARZ**, FDA, Washington, DC

10:00 Break

10:20 TBA–**R. HOWARD**, CDC, Atlanta, GA

10:50 TBA–**J. ARONOW**, Aronow & Pollock Communications, Inc., New York, NY

11:20 The Iced Tea Scare: How the Media Failed and Why–**H. KOME**, Harold Journal, Spartanburg, SC

Emerging Issues in Communicating Food Safety Risks

8:30 Consumer Perceptions of Food Safety Issues: What do We Know and How are We Using That Information in Developing Risk Communication Strategies?–**R. GRAVANI**, Cornell University, Ithaca, NY

9:00 Changing Newspaper Coverage of Microbial Food Safety Risks in North America and Implications for Risk Communication–**D. POWELL**, University of Guelph, Guelph, Ontario, Canada

9:30 Effect of Professional and Media Warnings about the Hazards of *Escherichia coli* O157:H7 Prior to and After the 1993 Jack-in-the-Box Outbreak–**L. HARRIS**, University of California-Davis, Davis, CA

10:00 Break

10:20 Communicating to the Public About New Technologies–**C. BRUHN**, University of California-Davis, Davis, CA

10:50 Overview of Existing Food Safety Communication and Education Programs–**C. ROBERTS**, U.S. Department of Agriculture/Food & Drug Administration, Beltsville, MD

11:20 Designing Food Safety and Nutrition Information, Educational Materials and Campaigns: A Comparative Review of Four Campaigns–**C. SCHIFFMAN**, Food and Drug Administration, Washington, D.C.

Posters–General Food Microbiology

- A Definitive and Rapid Method for Identifying Atypical *Salmonella* from Selective Agar Plates–**E. COLE**, S. Tseng, M. Barbour, D. Macool, L. Ecret, C. McDowell, H. White, and B. Kriegar, DuPont Experimental Station, Wilmington, DE
- Control of Enteric Pathogenic Bacteria on Fresh Produce–**D. PETERS**, S. Sumner, J. Albrecht, and L. Bullerman, University of Nebraska, Lincoln, NE
- Evaluation of the Salmonella BAX™ System. A Rapid PCR Based Method for the Analysis of Foods for Foodborne *Salmonella*–**C. SOBITIES**, A. Bennett, D. Greenwood, R. Betts, and J. Banks, DuPont Experimental Station, Wilmington, DE
- Establishing Baseline Risk for *Salmonella enteritidis* in Shell Eggs–**R. MORALES**, L. Jaykus, and P. Cowen, North Carolina State University, Raleigh, NC
- Elimination of *Salmonella* and *Staphylococcus aureus* from Bison, Ostrich, Alligator, and Caiman Meat by Gamma Irradiation–**D. THAYER** and G. Boyd, USDA, ARS, ERRC, Philadelphia, PA
- Detection of *Salmonella* in Food Using a Novel PCR-Based Fluorogenic 5' Nuclease Assay–**C. YAMASHIRO**, R. Behari, S. Flood, C. Thio, P. Witham, D. Norton, S. Kawasaki, B. Kimura, T. Fujii, and C. Paszko-Kolva, Perkin-Elmer, Foster City, CA
- Rapid Molecular Method for the Detection of Human Enteric Viruses in Clams–**A. DIX** and L. Jaykus, North Carolina State University, Raleigh, NC
- The Effects of Some Extrusion and Canning Processes on Deoxynivalenol–**C. WOLF-HALL**, L. Bullerman, and M. Hanna, University of Nebraska, Lincoln, NE
- Electron Microscopy of Fungal Spores Produced under Reduced Water Activity–**M. BLASZYK** and G. Blank, University of Manitoba, Winnipeg, Manitoba, Canada
- Stability of Fumonisin B_1 (FB_1) during Extrusion Cooking–**S. KATTA**, M. Castelo, S. Sumner, M. Hanna, and L. Bullerman, University of Nebraska, Lincoln, NE
- Inhibition of Growth and Mycotoxin Production of Penicillium by Lactobacillus Species–**H. GOURAMA**, Penn State, Reading, PA
- An Easy Screening Test for Detecting Yeast Contamination in Rinse Water Samples–**C. CHEN**, K. Doherty, and A. Naqui, IDEXX Laboratories, Inc., Westbrook, ME
- Fumonisin Concentrations in Commercial Corn-Based Food Products–**M. CASTELO**, S. Sumner, and L. Bullerman, University of Nebraska, Lincoln, NE
- Retention of Acid Tolerance and Acid Shock Responses in *Escherichia coli* O157:H7–**D. GARREN**, M. Harrison, and S. Russell, University of Georgia, Athens, GA
- A Model for the Interactions of Temperature pH, Lactate, Salt and Nitrite on the Survival of *Escherichia coli* O157:H7–**R. WHITING** and M. Golden, USDA, ARS, ERRC, Philadelphia, PA
- Effectiveness of Sanitizers vs. *Escherichia coli* O157:H7–**Z. WANG** and M. Banner, Diversey Corporation, Plymouth, MI
- Heat Shock Response Protects *Escherichia coli* O157:H7 Against Lethal Acidity–**G. WANG** and M. Doyle, University of Georgia, Griffin, GA
- Survival of *Escherichia coli* O157:H7 in Drinking and Recreational Water–**G. WANG** and M. Doyle, University of Georgia, Griffin, GA
- Heat Inactivation and Injury of *Escherichia coli* O157:H7 Cultured at 10 and 37°C–**J. SEMANCHEK** and D. Golden, University of Tennessee, Knoxville, TN
- Studies on the Survival of *Escherichia coli* O157:H7 in Fermented Meat Products–**D. RIORDAN**, G. Duffy, J. Sheridan, R. Whiting, B. Eblen, D. McDowell, and I. Blair, The National Food Centre Dunsinea, Castleknock, Ireland
- Evaluation of an ELISA System for Detecting Verotoxin Produced by Enterohemorrhagic *Escherichia coli* (EHEC)–**W. TSAI**, C. Miller, and E. Richter, Silliker Laboratories of Ohio, Inc., Columbus, OH
- A Multiplex PCR Assay for Detecting Verotoxin-Producing *Escherichia coli* O157:H7–**J. MENG**, S. Zhao, and M. Doyle, University of Georgia, Griffin, GA
- The Behavior of *Escherichia coli* O157:H7 in Fermentation Systems with Thermophilic and Mesophilic Dairy Starter Cultures–**J. SOUDAH**, and K. Boor, Cornell University, Ithaca, NY

- Thermal Inactivation of *Escherichia coli* O157:H7 in Meat–**O. SNYDER, JR.**, V. Juneja, and B. Marmer, Hospitality Institute of Technology & Management, St. Paul, MN
- Validation of Pepperoni Processes for Control of *Escherichia coli* O157:H7–**N. FAITH**, J. Hinkens, T. Lorang, P. Bailey, D. Buege, J. Luchansky, and C. Kaspar, University of Wisconsin, Madison, WI
- Survival of *Escherichia coli* O157:H7, *Listeria monocytogenes*, and *Salmonella typhimurium* in Ground Beef Jerky–**J. HARRISON** and M. Harrison, University of Georgia, Athens, GA
- Acid Stress and Death in Pathogenic *Escherichia coli*–**A. CASTILLO**, E. Cabrera-Diaz, and M. Rodriguez-Garcia, Texas A & M University, College Station, TX
- Effect of *Escherichia coli* O157:H7 Growth in the Presence or Absence of Glucose on Its Acid Tolerance–**R. BUCHANAN** and S. Edelson, USDA, ARS, ERRC, Philadelphia, PA
- Prevalence of *Escherichia coli* O157:H7 in Lebanon–**W. BIRBARI**, M. Jurdi, G. Araj, and M. Mikati, American University of Beirut, Beirut, Lebanon
- A PCR-Based Method for the Detection of *Escherichia coli* O157:H7 from Ground Beef–**W. BARBOUR**, L. Ecret, C. Sobities, S. Fritschel, DuPont Experimental Station, Wilmington, DE

Tuesday Afternoon–July 2, 1996

General Session–Ensuring a Safe Global Food Supply (Sponsored by ILSI)

1:30 A Global Perspective of Foodborne Disease–**S. NOTERMANS**, National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands

2:00 Microbial Food Safety Issues and Concerns in International Trade: Harmonization and Standards–**M. VAN SCHOTHORST**, NESTEC Ltd., Vevey, Switzerland

2:30 Microbial Hazards and Emerging Issues Associated with Produce–**K. WACHSMUTH**, U.S. Food and Drug Administration, Washington, D.C.

3:00 Microbial Hazards and Emerging Issues Associated with Seafood–**E. GARRETT**, National Marine Fishery Service, Pascagoula, MS

3:30 Break

3:50 IAMFES Annual Business Meeting

Wednesday Morning–July 3, 1996

Microbiological Issues in Seafood

8:30 Parasites in Seafoods–**A. ADAMS**, U.S. Food and Drug Administration, Bothell, WA

9:00 Marine Toxins–**R. MANGER**, U.S. Food and Drug Administration, Bothell, WA

9:30 Control of Bacterial Pathogens in Seafood –**M. EKLUND**, NMFS, Seattle, WA

10:00 Break

10:20 Risk Assessment of Seafood in Canada-Initial Stages–**E. TODD**, Health Canada, Ottawa, Ontario, Canada

10:50 Epidemiology and Detection of Human Enteric Viruses in Seafood–**L. JAYKUS**, North Carolina State University, Raleigh, NC

11:20 Aquaculture–**M. WEKELL**, U.S. Food and Drug Administration, Bothell, WA

Microbiology of Wine

8:30 Quality Control Aspects in Winemaking–**A. KARUMANCHIRI**, Liquor Control Board of Ontario, Toronto, Ontario, Canada

9:00 Influence of Yeast Strains on Wine Quality–**G. CONE**, American Yeast Co., Union City, CA

9:30 Yeast Enumeration and Identification–**L. BEUCHAT**, University of Georgia, Griffin, GA

10:00 Break

10:20 Interaction Between Yeasts and Malo-lactic Bacteria–**C. EDWARDS**, Washington State University, Pullman, WA

10:50 Physiology of the Malo-lactic Bacteria–**E. OLSEN**, Chateau Ste Michelle, Woodinville, WA

11:20 Wine Spoilage Microorganisms and Their Control–**D. SPLITTSTOESSER**, Cornell University, Geneva, NY

Dairy Foods Safety and Quality–Dairy Foods Research Centers

8:30 The Development and Use of Bacteriocin-Containing Dairy Ingredients to Control Unwanted Microorganisms in Formulated Foods–**E. ZOTTOLA**, University of Minnesota, St. Paul, MN

9:00 Survival of *Escherichia coli* O157:H7 in Fermented Dairy Foods–**K. BOOR**, Cornell University, Ithaca, NY

9:30 Mastitis Pathogens that Cause Public Health Concerns–**J. CULLOR**, Dairy Food Safety Laboratory, Tulare, CA

10:00 Break

10:20 Microbiological Safety and Quality of Reduced-Fat Cheddar Cheese–**E. JOHNSON**, University of Wisconsin, Madison, WI

10:50 HACCP Model Programs for the Dairy Industry–**R. BISHOP**, University of Wisconsin, Madison, WI

Framework for Assessing the Risk of Microbial Contamination (Sponsored by ILSI)

8:30 The Role of Risk Assessment in Microbial Food/Water Safety Regulatory Issues–**D. VOSE**, DVRAS, Wincanton, United Kingdom

9:00 Risk Assessment Principles Document of the U.S. National Advisory Committee on Microbial Criteria for Foods–**R. BUCHANAN**, U.S. Department of Agriculture, Philadelphia, PA

9:30 Overview of Microbial Risk Assessment in the Agri-Food Industry: Approaches to Identifying Intervention Strategies for Risk Reduction–**A. LAMMERDING**, Agriculture and Agri-Food Canada, Guelph, Ontario, Canada

10:00 Break

10:20 Conceptual Framework for Microbial Water Safety Risk Assessment: Report of the ILSI Risk Science Institute Working Group on Microbial Risk Assessment–**J. SEED**, ILSI Risk Science Institute, Washington, D.C.

10:50 Development of Risk Assessment Guidelines for Foods of Animal Origin in International Trade–**S. HATHAWAY**, Ministry of Agriculture and Fisheries Regulatory Authority, Gisborne, New Zealand

11:20 Practical Approaches to Risk Assessment–**M. VAN SCHOTHORST**, NESTEC, Ltd., Vevey, Switzerland

Wednesday Afternoon–July 3, 1996

Surveillance of Foodborne and Waterborne Disease

1:30 *Salmonella enteritidis* Surveillance in New York State–**J. GUZEWICH**, New York Department of Health, Albany, NY

2:00 *Escherichia coli* O157:H7 Outbreaks in the Northeast United States–**B. BARTLESON**, Washington State Department of Health, Olympia, WA

2:30 Foodborne Disease Surveillance–A National Perspective–**E. TODD**, Health Canada, Ottawa, Ontario, Canada

3:00 Break

3:20 Foodborne Disease Surveillance in Latin America and the Caribbean–An International Perspective–**P. ARAMBULO**, Pan American Health Organization, Washington, D.C.

3:50 On Sites Investigation of Waterborne Disease–**K. FOX**, Environmental Protection Agency, Cincinnati, OH

4:20 Procedures to Investigate Waterborne Illness–**F. BRYAN**, Food Safety Consultant, Lithonia, GA

Current Methods and Future Prospects for the Control of Foodborne Pathogen Colonization in the Gastrointestinal Tract

1:30 Strategies for Controlling *Salmonella enteritidis* in Egg-Laying Chickens–**R. GAST**, USDA-ARS, Athens, GA

2:00 Ecological Concepts for Developing Continuous-Flow Competitive Exclusion Cultures for Food Animals–**D. NISBET**, USDA-ARS, College Station, TX

2:30 Virulence Mechanisms of Bacterial Pathogens and the Effect of Human Biota Interactions in the Gut–**K. WILSON**, Duke University Medical Center, Durham, NC

3:00 Break

3:20 Research Strategies for Understanding Foodborne Pathogen Competiveness under Strict Anaerobic and Gastrointestinal Conditions–**S. RICKE**, Texas A & M University, College Station, TX

3:50 Immuno-Based Methodology for Detection of Competitive Exclusion Cultures–**L. STANKER**, USDA-ARS, College Station, TX

4:20 The Utility of Molecular Assays for Understanding Microbial Gene Expression in Gastrointestinal Tracts–**S. PILLAI**, Texas A & M University, El Paso, TX

Emerging Issues in Food Mycology

1:30 Occurrence, Toxicity and Fate of Fumonisins and Deoxynivalenol in Processed Foods–**L. BULLERMAN**, University of Nebraska, Lincoln, NE

2:00 Alternative Methods for Isolation, Culture and Identification of Fungi in Foods–**L. BEUCHAT**, University of Georgia, Griffin, GA

2:30 Immunological and Genetic Methods to Rapidly Detect Fungi in Foods–**M. COUSIN**, Purdue University, West Lafayette, IN

3:00 Break

3:20 Biocontrol of Mold Growth and Mycotoxin Production–**H. GOURAMA**, Penn State University, Reading, PA

3:50 Heat Resistant Molds and Preservative Resistant Yeasts–**A. KING**, USDA, Albany, CA

Intervention Strategies for Safe Meats: Production to Consumers

1:30 Probiotics–**N. COX**, USDA-ARS, Athens, GA

1:55 Slaughter–**J. REIMANN**, Excel Corporation, Wichita, KS

2:20 Chemical Treatments/Bacteriocins–**B. SHELDON**, North Carolina State University, Raleigh, NC

2:45 Irradiation–**J. DICKSON**, Iowa State University, Ames, IA

3:10 Break

3:30 Restaurants–**D. THENO**, Foodmaker Inc., San Diego, CA

3:55 Retail–**G. PRINCE**, The Kroger Company, Cincinnati, OH

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IAMFES

83rd Annual Meeting
June 30 – July 3, 1996
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Seattle, WA

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❑ 2 Double Beds

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After May 29, 1996 reservations will be accepted on a space and rate available basis. Reservations will be held until 6:00 p.m. on the date of arrival, unless guaranteed by a one night advance deposit, payable by certified check or a major credit card.

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83rd IAMFES Annual Meeting

Special Events

Opening Session

Ivan Parkin Lectureship
Sunday, June 30, 1996 — 7:00 p.m.

Lecture: Sense, Nonsense, and Science presented by: Joseph A. Schwarcz, Ph.D., Professor of Chemistry, Vanier College; Senior Adjunct Professor of McGill University; Science Editor of CJAD Radio; TV Columnist on The Discovery Channel.

Cheese and Wine Reception Held in the Exhibit Hall

Sunday, June 30, 1996 — 8:00 p.m. — 10:00 p.m.

The traditional opening of the Educational Exhibits and an opportunity to learn about the latest industry advancements as well as greet old friends and make new friends.

Exhibit Schedule

Monday, July 1, 1996

9:30 a.m. - 4:00 p.m. Exhibits Open
Complimentary Coffee and Donuts in Exhibit Hall (9:30 a.m. – 11:00 a.m.)

Tuesday, July 2, 1996

9:30 a.m. - 4:00 p.m. Exhibits Open
Complimentary Lunch in Exhibit Hall (12:00 p.m. – 1:30 p.m.)

Monday Night Gala
Evening at the Museum of Flight

Monday, July 1, 1996 — 6:00 p.m. — 9:00 p.m.
Registration: $45 (Late $50)

Enjoy dinner at Seattle's most spectacular attraction: Boeing Museum of Flight. In the steel and glass Great Gallery, the history of aviation soars past, with more than 20 full-sized aircraft flying in formation six stories above. Dinner will be in the Museum's Side Gallery overlooking the colorful displays.

After dinner feel free to tour the facility. Visit the "Red Barn", the birthplace of Boeing. See the world's only remaining M/D-21 Blackbird, a rare World War II FG-1D Corsair fighter, the sole remaining 1929 Boeing 80A Trimotor, and dozens of other vintage aircraft and spacecrafts.

Seattle Mariners vs. Oakland Athletics Baseball Game

Tuesday, July 2, 1996—6:00 p.m.—10:00 p.m.
Registration: $17 (must pre-register)

Plan to attend an evening at the Seattle Kingdome with family and friends while watching the 1995 American League West Champion Seattle Mariners play the Oakland Athletics in a game of baseball. Ticket price includes round trip transportation to the Kingdome and one admission to the game.

IAMFES Annual Awards Banquet and Reception

Wednesday, July 3, 1996
Reception: 6:00 p.m. — Banquet: 7:00 p.m.
Registration: $35 ($40 Late)

Included in Full Registration

IAMFES Kids' Pizza Banquet

Wednesday, July 3, 1996 — 6:30 p.m. — 9:30 p.m.
Registration: $15 ($20 Late)

Adult supervised for children ages 4 and up. Pizza, pop, and activities provided.

IAMFES Kids' Room

Monday — Wednesday, July 1, 1996 — July 3, 1996
9 a.m. — 12 noon and 1:30 p.m. — 4:30 p.m.
No registration required, please check in.

Adult supervised child care for children ages 4 and up.

Spouse/Companion Tours

Sample Seattle — A Deluxe City Tour

Sunday, June 30, 1996 — 10:00 a.m. — 3:00 p.m.
Registration: $30 (Late $35) Lunch on your own

Come sample Seattle – This tour provides an overview of the many attractions Seattle offers its visitors. You'll enjoy a drive along the waterfront with its import shops and fresh seafood restaurants. Then you'll drive into Pioneer Square, the city's oldest area rich with early 1900's architecture, much of which has been renovated into art galleries and specialty shops. Next is the International District in which evidence of the Pacific Rim cultural influences abound. The tour continues along Lake Washington into the Arboretum and on to the University of Washington campus. The Hiram Chittenden Locks and salmon ladders will be the first stop. The locks connect the Puget Sound with freshwater Lake Union and the salmon ladders feature seasonal migration of salmon returning to parent streams to spawn. Next you will travel to Magnolia Bluff for a breathtaking view of the Sound. Then back to the city and the world famous Pike Place Market for shopping. The day will be capped off with a visit to the Space Needle observation deck.

The Museum of Doll Art, Bellevue Art Museum and Shopping at Bellevue Square

Monday, July 1, 1996 — 9:00 a.m. — 3:00 p.m.
Registration: $30 (Late $35), Lunch on your own

You will visit an extraordinary museum dedicated to the preservation and exhibition of dolls as an art form. The nostalgia of Rosalie Whyel's Museum of Doll Art will fill you with memories of days gone by. Here you will witness one of the world's fine collections of dolls, teddy bears, toys and miniatures. Over 700 dolls ranging from rare porcelain pieces from the 18th century to Barbie and GI Joe are on display. After you experience the charm of the museum and its eloquent Victorian Gardens you will depart for Bellevue Square with over 200 shops and restaurants. Time will be provided for shopping. If shopping is not your forte, visit the Bellevue Art Museum on the third floor where contemporary Northwest art is on display. Then relax while sipping a cappuccino at Seattle's Best Coffee, or savor a warm cinnamon roll at Cinnabon.

Country Sampler

Tuesday, July 2, 1996 — 9:00 a.m. — 3:30 p.m.
Registration: $30 (Late $35), Lunch on your own

This favorite outing begins with a scenic ride through the foothills of the Cascade Mountains to breathtaking Snoqualmie Falls. Once worshipped by Native American Indians as a place for the gods, these falls are actually 97 feet higher than Niagara! Next you're off to Gilman Village in Issaquah. The homes are historic and provide a unique setting for shops which include hand-crafted jewelry, clothing, home accessories and freshly baked goods. You will have time to explore. The last stop will be Chateau Ste. Michelle, Washington's premier winery. Nestled on 87 acres of rolling grounds, the original manor house was built in 1912 and is surrounded by formal gardens, a trout pond, and hundreds of lush shrubs and flowers. During your private guided tour, you will witness the marvel of wine-making and learn the "sniff, swirl, and slurp" method of wine tasting as you sample world famous wines.

Historic Seattle

Wednesday, July 3, 1996 — 9:00 a.m. — 3:30 p.m.
Registration: $30 (Late $35), Lunch on your own

Discover the intrigue of Seattle's history and its fascinating architecture on this informative tour. You will break into smaller groups and begin your tour with a short walk to the Fifth Avenue Theater, a national historical landmark, where you will hear about the theater's latest production and enjoy the dramatic interior. Next is a short walk to Seattle's most recent architectural feat, the Underground Metro Bus Tunnel. You'll experience an incredibly clean, beautiful marbled tunnel on your trip down to Pioneer Square. The history of Seattle will unfold before you and come to life as you are guided through the streets on a walking tour of the district. During your tour you will visit the Klondike Museum and Seattle's Underground where you will see "old Seattle." During the afternoon you will have time to enjoy the area. The tour ends with a bus trip back to your hotel.

83rd IAMFES Annual Meeting Registration Form

Sheraton Seattle Hotel & Towers — Seattle, WA — June 30 - July 3, 1996
(Use photocopies for extra registrations)

FOR OFFICE USE
Date Rec'd. _____ First initial _____ Last name
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First Name (will appear on badge) (please print) Last Name

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Telephone # Fax #

Please check where applicable:

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___ Non-Member
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***REGISTER BY MAY 31, 1996 TO AVOID LATE REGISTRATION FEES**

REGISTRATION:	MEMBERS	NON-MEMBERS	AMOUNT
Registration (Banquet included)	$195 ($240 late)*	$275 ($320 late)*	
Student Member	$ 25 ($ 35 late)*	Not Available	
One Day Registration (Circle: Mon/Tues/Wed)	$100 ($120 late)*	$130 ($150 late)*	
Spouse/Companion (Name): _____	$ 25 ($ 25 late)*	$ 25 ($ 25 late)*	
Children (14 & Under), Names: _____	FREE	FREE	

NEW MEMBERSHIP FEES:		
Membership with *Dairy, Food & Environmental Sanitation*	$ 70	
Membership with *Dairy, Food & Env. Sanitation & Journal of Food Protection*	$110	
Student Membership ❒ *Dairy, Food & Env. San.* **or ❒ *Journal of Food Protection*	$ 35	
**Student Membership with *Dairy, Food & Env. San. & Journal of Food Protection*	$ 55	
***Full-time student verification required.*		
SHIPPING CHARGES: OUTSIDE THE U.S. - SURFACE RATE	$ 22.50 per journal	
AIRMAIL	$ 95.00 per journal	

OTHER FEES:	PER PERSON	# OF TICKETS	
Cheese and Wine Reception (Sun., 6/30)	FREE		
An Evening at the Museum of Flight (Mon., 7/1)	$ 45 ($ 50 late)*		
Seattle Mariners vs. Oakland Athletics Baseball Game (Tues., 7/2)	$ 17 (N/A late)*		
IAMFES Awards Banquet (Wed., 7/3)	$ 35 ($ 40 late)*		
Kids' Banquet (Wed., 7/3)	$ 15 ($ 20 late)*		

SPOUSE/COMPANION EVENTS:	PER PERSON		
Sample Seattle – A Deluxe City Tour (Sun., 6/30)	$ 30 ($ 35 late)*		
The Museum of Doll Art, Bellevue Art Museum and Bellevue Square (Mon., 7/1)	$ 30 ($ 35 late)*		
Country Sampler (Tues., 7/2)	$ 30 ($ 35 late)*		
Historic Seattle (Wed., 7/3)	$ 30 ($ 35 late)*		

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Send payment with registration to IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322–2863. Make checks payable to IAMFES. Registration must be post-marked by May 31, 1996. Registration post-marked after May 31, 1996 will be charged the late registration fee. For additional information contact Julie Cattanach at 1-800-369-6337.

Refund/Cancellation Policy

The IAMFES policy on refunds and/or cancellations is as follows: Registration fees, minus a $50 processing fee, will be refunded for written cancellations post-marked by June 14, 1996. No refunds will be made for cancellations post-marked after June 14, 1996, however, the registration may be transferred to a colleague with written notification to IAMFES.

Budget Rental Car Information

For information on special rental car rates from Budget call 1-800-866-6137. Please mention Rate Code: V9Y and BCD #: U009666.

The Workshops

Workshop 1—New Methods to Study Old and New Pathogens

Workshop Agenda

Saturday, June 29, 1996
8:00 a.m. - 5:00 p.m.

Fees:
Member: $220; After May 31, 1996: $270
Non-Member: $295; After May 31, 1996: $345

Workshop Instructor:
Charles Kaspar

The detection and typing of foodborne pathogens is a continually evolving aspect of food safety and an area where training must be constantly updated. This workshop is designed to fill this training need.

Participants will receive the latest information on the characteristics, ecology, and epidemiology of familiar foodborne pathogens. Another area to be presented will involve video demonstrations and literature on commercially available detection/typing systems including immunological and nucleic acid detection. Workshop facilitators are experts in each of these areas.

About the Instructors:

Clostridium botulinum
Dr. Eric Johnson
Associate Professor
Food Research Institute
University of Wisconsin
Madison, WI

Seafood safety-vibrios and toxins
Dr. Mark Tamplin
Associate Professor
Institute of Food and Agricultural Sciences
University of Florida
Gainesville, FL

Molecular subtyping and tracking
Dr. Charles Kaspar
Assistant Professor
Food Research Institute
University of Wisconsin
Madison, WI

Immunological detection methods
Dr. Tim Frier
Senior Scientist, Microbiology
Cargill Analytical Services
Cedar Rapids, IA

The use of gene probes and PCR for the detection of foodborne pathogens
Dr. Walter Hill
Research Geneticist
Food and Drug Administration
Bothell, WA

Workshop 2—Eat, Drink, and be Wary: Risk Communication

Workshop Agenda

Saturday, June 29, 1996
8:00 a.m. - 5:00 p.m.

Fees:
Member: $225; After May 31, 1996: $275
Non-Member: $300; After May 31, 1996: $350

Workshop Instructor:
Douglas Powell

While there has been strong focus on risk assessment, little attention has been paid to risk communication and microbial food safety. Yet food scientists and managers are increasingly called upon by clients, regulators, and the public to enter into value-laden conflicts involving technological risk, such as lethal bacteria in ground meat. But the mysterious language of probabilities and technology proficiency lends itself poorly to the general public; facts alone are never enough. Established risk communication theory offers a framework to study the most effective way for food professionals to communicate about specific risk.

This workshop will introduce the basic concepts of risk communication and use applied research, case studies, and role playing to substantiate the crucial role of risk communication as a bridge between food science and the consuming public. The following topics will be covered in this day-long workshop:

- Communication basics
- Public perceptions of microbial food safety
- Outrage factor
- Media coverage and consumer effect
- Techniques for gathering information
- Using electronic information to support risk communication activities
- Preparing for interviews/public meetings/consultations
- How to answer tough questions
- Good and bad examples of risk communication
- Communicating with different audiences
- Building trust and alliances
- Is it possible to separate risk assessment from risk management and communication?
- Integrating public and scientific judgements to manage food-related risks

About the Instructor:

Douglas Powell at the University of Guelph, Department of Food Science applies risk communication theory to issues of food safety and food biotechnology. Specifically, working with studying public perceptions of agricultural biotechnology and microbial aspects of food safety in North America; and the broader public discussions involving technology and society, which shape public attitudes and policy decisions. He completed a BS (honors) in molecular biology and genetics at the University of Guelph in 1985. After two years of work he entered journalism through the student press. He has been the editor of several community newspapers, has written for a diverse range of magazines, and managed communications at a university-based computer research center. He also is a freelance journalist, reporting on Canadian news for the Washington based journal, *Science*, and contributes regularly to the *Toronto Globe and Mail*.

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· WORKSHOPS ·

❑ **WORKSHOP 1: New Methods to Study Old and New Pathogens**
Sheraton Seattle Hotel & Towers, Seattle, WA — Saturday, June 29, 1996

	Before 5/31/96	After 5/31/96
IAMFES Member	**$220**	**$270**
Non-Member	**$295**	**$345**

❑ **WORKSHOP 2: Eat, Drink, and be Wary: Risk Communication**
Sheraton Seattle Hotel & Towers, Seattle, WA — Saturday, June 29, 1996

	Before 5/31/96	After 5/31/96
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The IAMFES policy on refunds and/or cancellations is as follows: Registration fees, minus a $50 processing fee, will be refunded for written cancellations postmarked by May 31, 1996. **No refunds will be made for cancellations post-marked after June 14, 1996,** 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 **May 31, 1996.**

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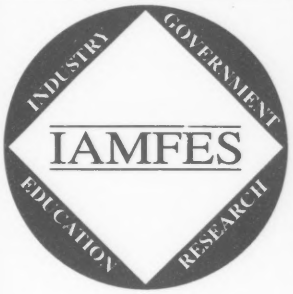

This is Your Personal Invitation to Join

The International Association of Milk, Food and Environmental Sanitarians, founded in 1911, is a non-profit educational association of food protection professionals. The IAMFES is dedicated to the education and service of its members, specifically, as well as industry personnel in general. Through membership in the Association, IAMFES members are able to keep informed of the latest scientific, technical and practical developments in food protection. IAMFES provides its members with an information network and forum for professional improvement through its two scientific journals, educational annual meeting and interaction with other food safety professionals.

Who are IAMFES Members?

The Association is comprised of a diverse membership of over 3,200 from 75 nations. IAMFES members belong to all facets of the food protection arena. The main groups of Association members fall into three categories: Industry Personnel, Government Officials and Academia.

Why are They IAMFES Members?

The diversity of its membership indicates that IAMFES has something to offer everyone involved in food protection and public health.

Your Benefits as an IAMFES Member

Dairy, Food and Environmental Sanitation — Published monthly, this is the official journal of IAMFES. Its purpose is the disseminating of current information of interest to the general IAMFES membership. Each issue contains three to five informational applied research or general interest articles, industry news and events, association news, columns on food safety and environmental hazards to health, a food and dairy industry related products section, and a calendar of upcoming meetings, seminars and workshops. All regular IAMFES members receive this publication as part of their membership.

Journal of Food Protection — A refereed monthly publication of scientific research and authoritative review articles. Each issue contains 15 to 20 technical research manuscripts and one to five articles reporting a wide variety of microbiological research pertaining to food safety and quality. The *Journal of Food Protection* is internationally recognized as the leading publication in the food and dairy microbiology field. This journal is available to all individuals who request it with their membership.

The IAMFES Annual Meeting — Held in a different city each year, the IAMFES Annual Meeting is a unique educational event. Three days of technical sessions, scientific symposia and commercial exhibits provide members and other industry personnel with over 200 presentations on the most current topics in food protection. It offers the opportunity to discuss new technologies and innovations with leading authorities in various fields concerned with food safety. IAMFES members receive a substantially reduced registration fee.

To Find Out More...

To learn more about IAMFES and the**many** other benefits and opportunities available to you as a member, please call (515) 276-3344 or (800) 369-6337; fax (515) 276-8655.

"The mission of IAMFES is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply"

International Association of Milk, Food and Environmental Sanitarians

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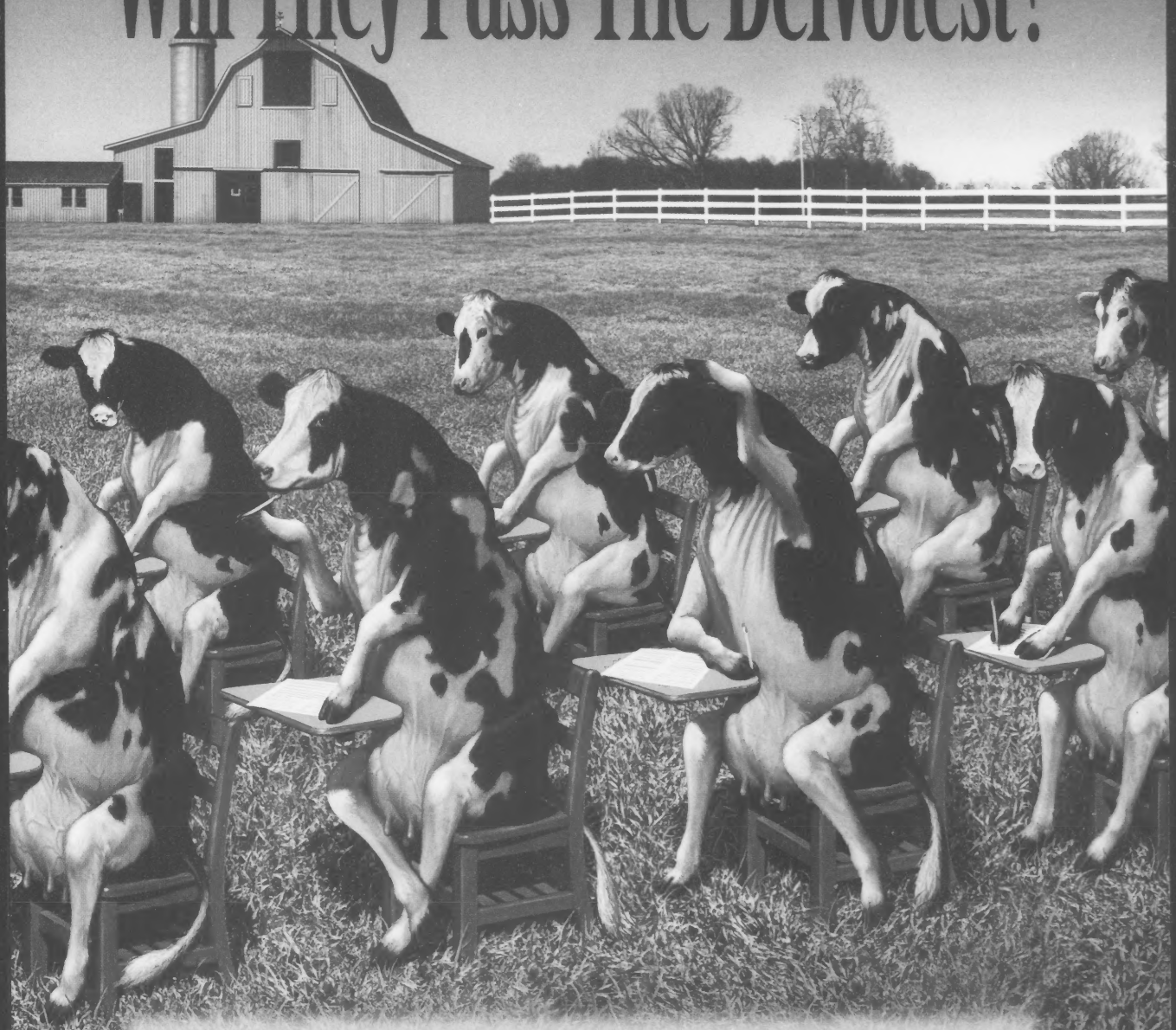

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