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DAIRY, FOOD AND ENVIRONMENTAL

SANITATION

SEPTEMBER 1993

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Announcement
Developing Scientist Awards Competitions
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IAMFES is pleased to announce continued extension of its program to encourage and recognize the work of students in the field of food safety research. In addition to the Oral Developing Scientist Award Competition, IAMFES will again offer a Poster Presentation Award Competition.

Purpose

1. To encourage graduate and undergraduate students to present their original research at the IAMFES meeting.
2. To foster professionalism in students through contact with peers and professional members of IAMFES.
3. To encourage participation by students in IAMFES and its annual meeting.

Developing Scientist Oral Competition:

The Oral Competition is open to GRADUATE students enrolled in M.S. or Ph.D. programs at accredited universities or colleges whose research deals with problems related to environmental, food and/or dairy sanitation, protection and safety. Candidates cannot have graduated more than one (1) year prior to the deadline for submitting abstracts.

This year the Oral Competition will be limited to ten finalists and awards will be given to the top three presenters. The papers should be approximately fifteen (15) minutes, including a 2-4 minute discussion.

Awards: First Place: $500 and an Award Plaque; Second Place: $300 and a certificate of merit; Third Place: $100 and a certificate of merit. All of the winners will receive a one year membership including both *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection.*

Developing Scientist Poster Competition:

The Poster Competition is open to UNDERGRADUATE and GRADUATE students enrolled at accredited universities or colleges whose research deals with problems related to environmental, food and/or dairy sanitation, protection and safety. Candidates cannot have graduated more than one (1) year prior to the deadline for submitting abstracts.

Ten finalists will be selected for the Poster Competition. The presentation must be mounted on a 8' by 4' display board (provided at the meeting) for the entire duration of the Poster Session at the Annual Meeting. The presenter must be present at their poster for a specific time, approximately two hours during the session.

Award: First Place: $500 and an Award Plaque; Second Place: $300 and a certificate of merit; Third Place: $100 and a certificate of merit. All of the winners will receive a one year membership including both *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection.*

Instructions to Developing Scientist Awards Competitions Entrants (Oral and Poster):

*** Note: Both a short abstract and an extended abstract must be submitted to the IAMFES office no later than December 15, 1993. No forms will be sent to entrants. Enclose two self-addressed, stamped postcards with your submitted abstracts.**

1. An original short abstract of the paper must be submitted on the blue abstract form from the September issue of IAMFES' journals. Indicate on the short abstract form whether the presentation is submitted for the Oral or Poster Competition.
2. One original and four copies of an extended abstract MUST BE SUBMITTED with the short abstract. Instructions for preparing the extended abstract follow. Attach one copy of the short abstract to each copy of the extended abstract and submit together with the original short abstract.
3. The presentation and the student must be recommended and approved for the Competition by the Major Professor or Department Head, who must sign both the short and the extended abstracts.
4. The work must represent original research done by the student and must be presented by the student.
5. Each student may enter only one (1) paper in either the Oral or Poster Competition.
6. All students will receive confirmation of acceptance of their presentations along with guidelines for preparing their Oral or Poster Presentations.
7. **All students with accepted abstracts will receive a complimentary membership which includes their choice of *Dairy, Food, and Environmental Sanitation* or the *Journal of Food Protection.***
8. Winners are announced at the Annual Awards Banquet. The ten finalists for the Oral Competition and the Poster Competition will receive complimentary tickets and are expected to be present at the Banquet.

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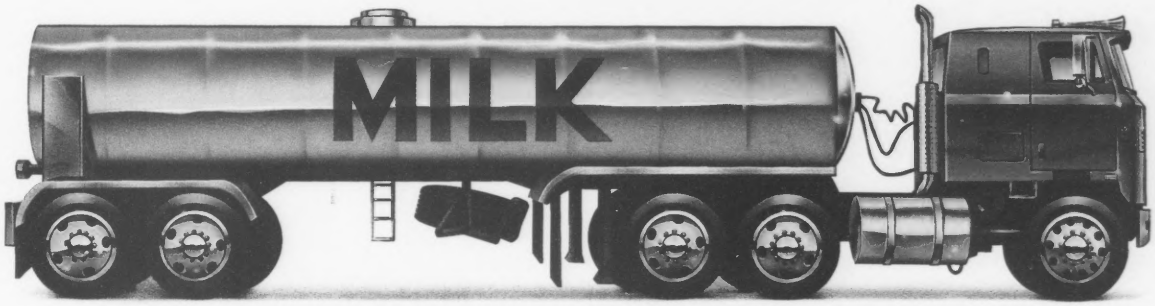

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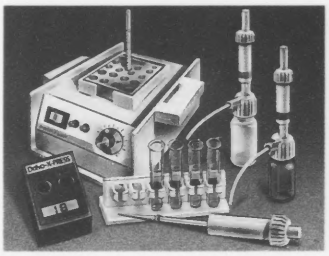

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Dairy, Food and Environmental Sanitation CONTENTS

Articles:

Association News:

ABOUT THE COVER . . . *Photo courtesy of Silliker Laboratories Group, Inc., Homewood, IL. Dr. Karl Eckner, research scientist, and Wendy Lepper, microbiologist, perform an inoculation study to determine if this product can support the growth of* B. cereus *and/or* Staphyloccocus aureus.

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Thoughts From the President . . .

By
Harold Bengsch
IAMFES President

And What a Meeting It Was!

To simply state that the 80th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians was a success would be an understatement of great magnitude.

With nearly 1,000 persons registered for this meeting, it ranks as one of our largest ever annual meetings.

The Georgia Association of Food and Environmental Sanitarians through the expert coordination of the local arrangements committee co-chairs, Joe Frank and Bob Brackett, did a superb job of facilitating an event with numerous activities both on and off site.

To the program advisory committee chaired by Ann Draughon, our hats are off to what is being described as the "mother of all programs." Undoubtedly, the quality involvement of the International Life Sciences Institute added greatly to this year's annual meeting. The international speakers involved, plus the pertinent international research information presented during the various ILSI Symposia made this year's meeting an unqualified international event.

Because of the success and enthusiastic response from attendees, it is not surprising that the executive board and the new program advisory committee along with ILSI officials are already looking at other possibilities of joint involvement.

Speaking of the new program advisory committee, this year's new chairman, Norm Stern, has already held two meetings in laying the groundwork for the 1994 annual meeting. Based upon what I have already observed, that program will in no way be taking a back seat to the excellent program we have just experienced.

What appears to have been a very well received program event this year was the Tuesday afternoon session "Communicating Food Safety in the News." This was a new venture for our association for having interactive participation between the media, food industry, and academia. This was a very interesting general session and based upon the comments from the crowd in attendance, one upon which we should expand.

Many other exciting announcements and activities took place at this year's annual meeting which shall be the subject of follow-up articles in the president's column. The announcement of the new "Black Pearl" award, Thursday's strategic planning meeting and the development of the readership survey instrument to name only a few.

Finally, I hope you will join me in saluting our immediate past president, Michael Doyle, on his excellent leadership these past 12 months. Mike, you have done a great job in guiding this association through an outstanding year and moving us well into the strategic planning phase which will prepare us for the challenges awaiting in the 21st Century.

To our executive manager, Steve Halstead and staff; meeting the challenges of an annual meeting under the best of circumstances is no small task. Meeting those challenges when complicated by: No air conditioning with air temperatures of 100° plus, no running water, no cold drinking water and no lavatory facilities along with the constant stress of a flooded city had to take its toll. But meet the challenge you did and you did it in a professional manner that belied the stresses you were under. TO YOU ALL, A GREAT BIG THANK YOU. Until next month ...

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On My Mind . . .

By
Steven K. Halstead, CAE
IAMFES
Executive Manager

is Floods-Part II....

You may recall that I ended my column last month saying "and rain is predicted for tomorrow. And the day after. And the day after." Those words became our worst nightmare come true.

Des Moines is located at the confluence of the Des Moines and the Raccoon rivers. On July 9, both river basins received rainfalls ranging from five to eight inches. On the 10th, we knew we were in trouble.

Saylorville Reservoir is located on the Des Moines River about 12 miles north of the city. Eight months of record rainfall had left it very close to its capacity even though it was releasing the maximum amount of water it could. The release, some 300,000 gallons per second, was enough to cause minor flooding downstream.

The Raccoon River has no flood control dams, so everything that was going into it was coming downstream, straight into Des Moines. When those waters hit the already full Des Moines River, we had a flood of historic proportions.

If you have ever flown into Des Moines, you have probably gone down Fleur Drive. I think that Fleur Drive is one of the prettiest airport to downtown routes in this country. It passes Grey's Lake and runs alongside the Raccoon River as it travels past Waterworks Park. At the peak of the flood, Fleur Drive was under some 14 feet of water. The traffic signals were barely out of water! Space does not allow me to share other, similar stories.

Our office is located on one of the highest points in the city, so at no time were we in any danger of flooding. In fact, no one on the staff suffered any direct losses from the flood.

For most of us, the flood was an inconvenience. We discovered on July 11 that the Des Moines Waterworks had been flooded and that flood water had entered the system before the pumps went out. Thus we were without water for what was to become something over three weeks.

That morning, I drove to the office to make sure that it was okay and then called the staff to tell them that we would be closed on Monday. Everybody showed up anyway saying that with the Annual Meeting coming up they couldn't stay away. We were soon to learn the price of that dedication.

The first thing people say is "No drinking water? What do you do when you get thirsty?" As we found out, people use lots of water everyday, but they drink very little of it. When you can't turn on the tap, you suddenly realize what no water means: No hand washing; no stool flushing; no showers; no fountain Cokes; no ice cube machines; no fire protection; and....no air conditioning.

Being a modern office building, we also had no windows to open. To beat the heat, we tried to come in early, but at 6:00 AM, the lowest the temperature was was 82° F -- the highest was 88° F. By wearing casual clothes, running fans and drinking plenty of fluids, we held on as long as we could each day. It was not pleasant, but we had no choice, the Annual Meeting would go on whether we were ready or not.

On July 20, the air conditioning was restored by bringing in tank trucks of water to run the evaporators. A week later, running water was restored and on July 31, the water was declared safe to drink. The crisis in Des Moines was over and all that remained was a massive clean up.

I'll tell you about that next month.

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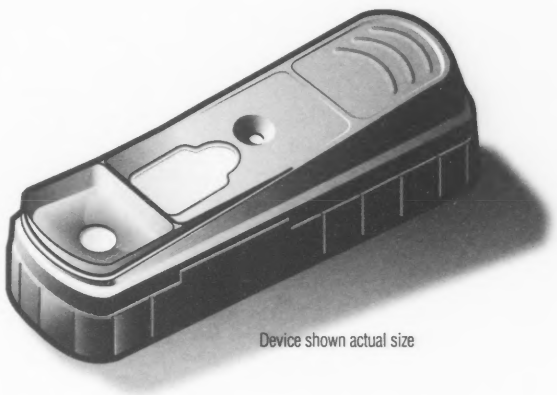

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Dairy, Food and Environmental Sanitation, Vol. 13, No. 9, Pages 510-515 (September 1993)

Evolving Methodologies for Microbiological Examination of Milk and Dairy Foods

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Introduction

Microbiological analysis is critical in assessing safety, quality, shelf-life and compliance with regulatory standards and specifications of milk and dairy foods. Notwithstanding the advanced technology and automation in the processing and component analysis of the dairy foods, the focus of dairy microbiology still remains on conventional plating methods and isolation and biochemical characterizations of the microorganisms of interest.

These obviously slow and retrospective methods are often not suitable for perishable, relatively short, shelf-life dairy foods. The dairy industry needs to use rapid methods for estimating microbial contamination in milk from production through processing, handling, storage and distribution. The term "rapid" generally refers to methods that give reliable results in a shorter time than when compared to conventional plating methods. Miniaturized, modified automated and instrumental methods have also been described as "rapid", since there may be savings in terms of sample preparation and labor and therefore an increase in the total number of samples analyzed per day, even though the results may not be obtained for 2-3 days.

New methods are also justified from the standpoint of reducing the level of expenditure incurred for undertaking routine microbiological testing, implementing management programs such as HACCP, and improving efficiency and reliability of recording, handling, interpreting, and retrieving microbiological data by computers.

While the need for new and rapid methods in dairy microbiology laboratories is well recognized, microbiological testing in the dairy industry has been largely based upon traditional plate count methods, most probable number (MPN) estimations, and empirical tests such as the resazurin and methylene blue reduction tests. During the past two decades several methods have been developed to meet the industry needs for rapid and reliable means for conducting microbiological analysis of milk and dairy products. The main objective of this paper is to discuss briefly some of the concepts and instrumental approaches to microbiological analyses and modifications of several conventional tests currently finding acceptance in dairy microbiology laboratories. The mention of various manufacturers and instruments is merely to illustrate the various techniques and approaches in the evolving methodologies in dairy microbiology.

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Rapid Methods and Automation in Microbiology

In the past twenty years, much interest has developed in evolving methodology for microbiological analysis in clinical as well as applied (food and pharmaceutical) microbiology. This is evidenced by the series of international symposia held on the subject (Stockholm, 1973; Cambridge, U.K. 1976; Washington, D.C., 1984; Berlin, 1984; Florence, Italy, 1987; Finland, 1990). The Seventh International Congress on Rapid Methods and Automation in Microbiology and Immunology will be held in London, England. Several symposia (e.g. Tilton, 1982; Habermehl, 1985) and reviews (Pierson and Stern, 1986; Fung et al, 1988, Fung, 1991, Vasavada, 1993) on the subject have been published. The thrust of early developments in rapid and automated microbiology in the clinical laboratory for rapid identification and characterization of pathogenic isolates to aid in early diagnosing of disease, to the extent, this thrust continues today. However, during the past decade many of the procedures and instruments developed for the clinical laboratory have been successfully applied to the dairy microbiology laboratory.

Also, several "hands-on" workshops and symposia concerning rapid and automated methods in microbiology have been developed over the last decade. Some of the workshops are comprehensive, 8-10 day programs involving hands-on experience with various tests and instruments. Others are limited in scope, involving demonstrations of various techniques and instrumentation available for food microbiology laboratory. Such workshops have been offered in U.S.A., Canada, Australia, Taiwan, Singapore, Malaysia, New Zealand, Mexico and India.

Adjuncts to Conventional Methods

There are several labor and material saving methods that essentially involve modification or mechanization of traditional methods, e.g. agar droplet technique (Sharpe and Kilsby, 1971), the plate loop count (Wright et al, 1970; Flemming and O'Connor, 1975), spiral plating (Gilchrist et

al, 1973; Jarvis et al., 1977) and the hydrophobic grid membrane filter (HGMF) technique (Entis, 1983; 1986). While facilitating handling of large numbers of samples and economizing time and material required for conducting the microbiological analyses, these methods are not truly rapid methods as they require the same incubation period as the conventional methods.

Noteworthy among the products on the market designed to facilitate conventional plate count methods are the Iso-Grid system, the Petrifilm plates and the Spiral system with CASBA (computer assisted spiral bio-assay) data processor. The Iso-Grid system is a filtration method which uses a HGMF consisting of 1600 growth cells. The diluted sample is first filtered through a pre-filter (5 micron) to remove large food particles and then through the HGMF. The HGMF is placed on a selective agar and incubated under specified conditions to allow the growth of microorganisms trapped on the filter. An optional Iso-Grid counter or manual counting procedure may be used to determine the number of microorganisms present in the food. The HGMF method is officially recognized by the AOAC and FDA and is used for detecting and enumerating *Salmonella* and coliforms, as well as for determining aerobic plate counts (Dziezak, 1987).

Petrifilm plates are dual-layer film systems coated with nutrients and a cold water soluble gelling agent. The diluted sample is inoculated on the Petrifilm surface, similar to the regular surface plating method, and the resulting petriplate is incubated under specified conditions to allow growth of the microorganisms. The standard plate count and coliform counts may be determined by the Petrifilm SM and Petrifilm VRB respectively. Petrifilm plates have been evaluated extensively through collaborative studies (Ginn et al, 1984, 1986) and are recognized as an official method for microbiological analysis of milk and dairy products (Dziezak, 1987).

The spiral system involves precise delivery of a continuously decreasing volume of a liquid sample onto the surface of an agar plate. Use of a hand or Laser counter and a CASBA data handling system can facilitate throughput. While greatly reducing media and diluent requirements (Gilchrist et al, 1973; Jarvis et al, 1977), the clogging of the dispensing tube by food particles (e.g. cottage cheese) may be prevented by using special stomacher bags containing a filter (Konuma and Kurata, 1982). The method is widely used for determination of aerobic plate counts of milk and dairy products (Richardson, 1985).

Among the methods developed in recent years, various pre-incubation procedures for estimating psychrotrophic bacteria in milk products have received much attention. The 21°C/25h incubation of milk followed by a conventional standard plate count procedure gives a good and reliable estimate of psychrotrophic bacteria. Since Gram-negative psychrotrophs are the primary cause of spoilage in milk and dairy products, the preliminary incubation procedures are widely used to assess the potential shelf-life of pasteurized milk and cream (Phillips et al, 1984). Pre-incubations with selective inhibitors such as: benzalkonium chloride; bile salts; crystal violet; penicillin; and nisin have also been used to determine spoilage potential and to predict shelf-life (Griffiths et al, 1984c; Bishop and White, 1985; Byrne et al 1989).

Instrumental Methods for Detection of Microbial Growth and Metabolism

Several of the new methods which have evolved in the past 20 years for rapid microbiological analysis, rely on the detection of unique and significant changes in the growth medium caused by microbial metabolism. These novel methods include the use of radiometry (Limpi et al, 1974; Rowley et al, 1979) microcalorimetry (Gram and Sogaard, 1986) and impedimetry (Gnan and Luedecke, 1982; Bossuyt and Waes, 1983; Phillips and Griffiths, 1985; Eden and Eden, 1985).

The impedimetric technique involves measurement of the changes in electrical impedance resulting from microbial metabolism and growth. The impedance detection time is indicative of the time required to reach populations of approximately $10^6 mL^{-1}$ and is inversely proportional to the initial levels of microbial contamination present in the sample being analyzed. Impedance changes are also influenced by the composition of growth medium, temperature of incubation and specific growth kinetics. This provides the basis for using the impedance method for other dairy microbiology applications such as detection of antibiotics and evaluating starter culture activity (Okigbo et al, 1985; Tsai and Luedecke, 1989) and determining levels of bacteriophage (Waes and Bossuyt, 1984; D'Ombrain et al, 1990).

Rapid Quick Screening Method

Traditional methods for evaluating milk quality or screening for quality parameters such as bacterial numbers, somatic cells, antibiotics, etc..., are often cumbersome and time consuming. Simple tests such as dye reduction tests, coliform mastitis test (CMT), direct microscopic count (DMC), and pH measurements, have been used for routine analysis of incoming milk. However, these tests suffer from lack of specificity, selectivity and sensitivity. Rapid screening tests which allow accept/reject decisions on milk tankers at the time of receival is desired by the industry. Newer methods applicable for the quick screening of milk quality include the direct epifluorescent test (DEFT), the Limulus test and ATP measurement.

The DEFT test involves filtering of a sample through a polycarbonate filter (0.6 micron pore size, 25 mm diameter) to concentrate bacteria, followed by staining the bacteria on the filter using acridine orange and examination with epifluorescent microscopy. Pettipher et al, (1980) studied this technique exclusively and developed a rapid test for determining the viable microbial cell count in milk (Pettipher and Rodrigues, 1980). Griffiths et al, (1984b) combined DEFT with a pre-incubation procedure to detect post processing contamination of pasteurized cream. The DEFT test is rapid (about 30 min) and much more sensitive than the dye reduction test. However, it requires trained technicians and is subject to poor reproducability and low specificity.

The ATP measurement tests are based on the principle that the ATP levels within any group of microorganisms

are directly proportional to the number of microorganisms present. ATP can be easily measured in terms of the bioluminescence resulting from the reaction between ATP and the luciferin/luciferase enzyme system obtained from fireflies. This test has been widely used in Europe (Bossuyt, 1981; Waes and Bossuyt, 1981; Griffiths et al, 1984a) for detecting post pasteurization contamination in milk and cream. Since somatic cells in milk constitute a non microbial source of ATP, separation of microorganisms or treatment of the sample to hydrolyse somatic cell ATP is necessary prior to determining ATP from bacterial cells. Despite the additional steps required and relatively low sensitivity and poor reproducability claimed by some (Jarvis, 1985), the ATP measurement has been used for a 5-minute platform test for judging raw milk quality (Bossuyt, 1982).

The Limulus Amoebocyte Lysate (LAL) method is a rapid (lh) test for determining the levels of Gram-negative psychrotrophic bacteria in milk and dairy products. The test is based on a reaction between endotoxin or lipopolysaccharide (LPS) levels of Gram-negative bacterial cell walls with a lysate of the amoebocytes of the horse-shoe crab *Limulus* (Hansen et al, 1982; Heeschen et al, 1985). The test involves serial dilutions of the sample to determine a threshold value of endotoxin/LPS, which is indicated by a firm gel (Heeschen et al, 1985). A microfiltration method for application of the limulus test to dairy bacteriology has been developed as a commercial test kit (Sudi et al, 1981). One of the unique features of the limulus test is its usefulness in determining the previous history of the milk in investigating the quality and shelf-life of heat treated products such as UHT milk and dry milk powders (Hansen, et al 1982; Mikolajczik and Brucker, 1983).

Rapid screening methods for use in dairy microbiology also include the catalasemeter. This instrument is based on the simple and rapid estimation of the catalase activity present in milk or culture filtrates. The principle is based on the flotation time of a paper filter disc containing catalase in a tube containing stabilised H_20_2. Upon reaction, the evolved gases cause the disc to float. The time required for the disc to float (Disc Flotation Time) is inversely proportional to the catalase activity. Since mastitic milk characteristically contains elevated levels of somatic cells and high catalase activity, the catalasemeter has been used for rapid screening of abnormal and poor quality milk (Fischer and Vasavada, 1987; Johnson and Vasavada, 1988; Vasavada et al, 1988) and for predicting milk quality and shelf-life (Byrne et al, 1989).

Rapid Detection, Characterization and Identification of Pathogens, Toxins and Residues

Much attention has been paid recently to the problem of pathogenic microorganisms in milk and dairy products. Contamination of milk with mycotoxins and antibiotic residues is also a matter of serious concern to the dairy industry.

Many diagnostic kits such as: API; Enterotube; Minitek; Spectrum 10; MicroID, all provide a convenient and often rapid system for the identification of bacterial isolates based on selected biochemical reactions. These kits were primarily developed for the clinical laboratory, though many of them have been found to be very useful in food and dairy microbiology laboratories (Fung and Cox, 1981; Cox et al, 1987; Cox et al, 1988). The miniaturized diagnostic kits are efficient, labor saving, economical and about 90-99% accurate (Fung et al, 1988).

Automated systems for rapid identification and characterization of microbial isolates include the Vitek System, the AMBIS system and the HP Microbial Identification System. The Vitek Automicrobial System and the Vitek Jr. are computer driven systems involving the use of specially designed test cards containing microwells lined with lyophilized media for specific biochemical tests. The test card is aseptically inoculated with a suspension of pure isolate, loaded into the incubator equipped with a photometric reader/detector to detect turbidity or color difference indicating a positive/negative test result. The biochemical reactions of the test microorganisms are compared with data for known standard microorganisms and an identification is made. The Vitek system can allow characterization and identification of as many as 120 different isolates.

The AMBIS microbiology system is based on a computerised comparison of peptide banding pattern or microbial "finger printing" of polypeptide patterns for known standard microorganisms. The pure colony is incubated in a medium containing L-[^{35}S] methionine, followed by SDS-PAGE electrophoresis of the cell free extract and automated comparison of the polypeptide banding patterns of the unknown against that of the known standard microorganism.

The HP microbial identification system is based on the determination of cellular fatty acid composition of unknown isolates by a computerized gas-chromatographic method. The HP microbial identification system is reportedly capable of differentiating between two otherwise indistinguishable pathovars of *Pseudomonas syringae* (Dziezak, 1987).

Evolving methodology for rapid detection and characterization of pathogenic microorganisms include DNA Probe (Gene-Trak) for detection of *Salmonella*, ELISA methods for detection of *Salmonella*, *Listeria*, and staphylococci, and Rapid Passive Agglutinations (RPLA) tests for detection of staphylococci, *Staph.* enterotoxin and *Campylobacter* (Dziezak, 1987). A new system called the One-Two Test has been detecting as few as 1-2 *Salmonella* cells per 25g sample in 24-30h. This test relies on immunological immobilization of motile *Salmonella*.

Monitoring milk supply for aflatoxin and animal drug residues such as beta-lactam antibiotics and sulfamethazine has been facilitated tremendously by rapid ELISA tests (Dilley and Dixon-Holland, 1990).

Predictive Microbiology

Another approach to monitoring product quality and shelf-life prediction is through the use of predictive mathematical models. In this procedure regression equations are generated to predict the growth or relative growth rate of spoilage microorganisms at various product storage temperatures. One such model is the Square Root Model of Ratkowsky et al (1982). This model has been used by Chandler and McMeekin (1985), who described a correla-

tion between storage temperature and the rate of deterioration of pasteurized, homogenized milk. At temperatures up to 13°C the major spoilage microorganisms were pseudomonads. They displayed the typical psychrotrophic response to temperature which was described by a relative rate function based on the Square Root Model.

Relative rate functions are at the core of this type of predictive microbiology. They are incorporated into electronic devices known as Time/Temperature Function Integrators (TTFI) which are capable of monitoring continually the temperature history of a product (Owen and Nesbitt, 1984). The circuitry of the TTFI converts impulses received from a sensor, sums the temperature history and displays the integrated information as an equivalent number of days at a specified reference temperature (4°C for dairy products).

Chandler and McMeekin (1989) extended their earlier studies to report the correlation between TTFI readings and the bacteriological and organoleptic quality of pasteurized, homogenized milk stored in the temperature ranges 5-6°C and 10-12°C. The observed linear relationship extended from microbial levels representing an initial contamination of $10mL^{-1}$, to those at which the product would be spoiled ($10^{7.5}mL^{-1}$). This indicated that the TTFI could be used to monitor continually, elapsed and remaining product shelf-life. This monitoring would require only the presence of the TTFI and the organoleptic assessment of product quality.

Griffiths and Phillips (1988) used the Square Root Model as a basis for developing equations for the prediction of the shelf-life of pasteurized milk. They related the parameter (T_o), unique to the Square Root Model, to a variety of selective plate counts. This in turn enabled them to predict product shelf-life at different storage temperatures even when the spoilage microflora was no longer solely Gram-negative psychrotrophs.

Summary

Microbiological testing of milk and dairy foods have traditionally involved conventional plating procedures with selective or non-selective media, dye reduction tests or occasionally most probable number or other tests. Over the years, these conventional methods have evolved, albeit slowly, into rapid methods to meet the changing needs of the dairy industry, with respect to raw material acquisition, process control and finished product evaluation.

According to Jarvis (1985) the methodological needs of the dairy industry can be divided into two groups: general and specific. The criteria for general and specific needs and some of the newer methods designed to meet those needs are given in Table 1.

The general needs of the dairy industry require the development of simple, reliable and rapid, feed back methods. These methods allow meaningful information regarding various monitoring activities to be obtained in a short enough time, so as to allow any appropriate action to be taken is warranted by a particular situation.

Screening methods that provide information regarding the quality of ingredients and raw materials and thereby enable the dairy industry worker to accept, reject or quarantine products until verification of hazard or non-compliance, are particularly in demand. Methods that allow computerized data recording, storage and retrieval can be very useful in meeting the delivery schedules of relatively short shelf-life products.

Table 1. Methodological Needs of the Dairy Industry Met by Evolving Techniques.

Need	Criteria	Methods
General		
	simple to operate	Spiral Plater; ATP; Petrifilm Iso-Grid; Redigel
	low running cost	Petrifilm; Iso-Grid; ATP Limulus
	minimal labour	Impedance; Spiral System CASBA ATP
	computer compatible predictive	Impedance
Specific		
	screening raw material	ATP; DEFT; MUG assay
	detecting pathogens	Salmonella 1-2; DNA probes ELISA methods
	detecting toxins	RPLA; ELISA
	characterizing pathogens	VITEK; AMBIS; HP; Biolog

While the initial cost of these methods may be relatively high, they can be economical in the long term. Specific needs of industry deals with rapid detection and characterization of various pathogens and toxins and for detecting adulteration of milk and dairy products with added water, animal drug residues, environmental residues and traces of elements thought to be harmful to human health.

Much progress has been made in methodologies for detecting pathogens such as: *Salmonella*, *Listeria monocytogenes*, and *Campylobacter jejuni*. RPLA tests for detecting staphylococcal enterotoxin and ELISA methods for detecting aflatoxins are now available.

Evolution of methodology for the dairy microbiology laboratory will continue. Recent advances in immunology, biotechnology and instrumentation will lead to methods capable of detecting very low levels of microorganisms, toxins or chemical contaminants with low false positive and false negative results.

The current slow, labor intensive and retrospective methods for microbiological analyses will be replaced by these newer methods. However, the extent to which industry adopts the newer methods will depend upon regulatory approval, proper education and training of employees, and reliable performance of the newer methods in actual field situations.

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Determining Differences in Microbial Growth Rates Using Linear Regression

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OBJECTIVES

Microbiologists must often make comparisons between growth rates to determine if growth is influenced by different conditions. This study presents a simple, statistically correct, method for comparing growth rates. The method was used to analyze two microbiological data sets. The first data set contains growth rate data from our laboratory for *Listeria innocua* PFEI and *Listeria monocytogenes* Scott A PFEI in media at a variety of temperatures (Duh and Schaffner, In press). The second data set contains growth rate data for *Listeria innocua* at 37°C when heat is provided by either conventional heating or specially designed microwave oven.

METHODS

Growth rates are based on the period in the growth curve where the population increase is logarithmic, so only those points which lay on the linear portion of the Log (CFU/ml) vs time plot were selected for analysis.

Three models were used to represent the data in three different ways. Three models were:

Model 1	$Y_1 = A_1 + B_1 X$	$Y_2 = A_2 + B_2 X$
Model 2	$Y_1 = A_1 + B X$	$Y_2 = A_2 + B X$
Model 3	$Y = A + B X$	

where A and B refer to the Y intercept and slope of the line respectively. Different parameter estimates have different subscripts (i.e., A_1 and A_2). Model one assume that the growth rates and initial counts are different. Model two also assumes different initial counts, but the same growth rate. Model three assumes that the initial counts and the growth rates are the same.

The different models were fit to the data using the least squares method. The models were compared two by two (i.e., 1 vs 2, 2 vs 3, 3 vs 1) using the F statistic as an indicator of goodness of fit. The residual sum of squares (ss) and degrees of freedom (df) were calculated for each model pair. The F value was determined using the following formula:

$$F_{(i,j)} = \frac{\left(\frac{ss_i - ss_j}{df_i - df_j}\right)}{\frac{ss_j}{df_j}}$$

where i and j refer to different models.

The data for growth rate comparison of *Listeria innocua* and *Listeria monocytogenes* were taken from Duh and Schaffner (in press). The cultures were maintained in Brain Heart Infusion broth (BHI), (Difco, Detroit, MI) and were incubated at one of 15 temperatures from 2°C to 45°C. Incubators were monitored to ensure that temperatures were controlled to within 0.5°C.

Stock and working cultures for microwave experiment were prepared as described by Duh and Schaffner (in press). The data were collected by maintaining *Listeria innocua* in Brain Heart Infusion broth in a standard incubator (Fisher Scientific, Model 146 A) or in microwave oven (Toshiba, Model ERS-6831B) at 37°C. The microwave oven used in this study was improvised by Welt, Tong and Rossen (in press). Plate counts were determined by standard methods.

RESULTS AND DISCUSSION

The first objective of this study was to utilize the statistical technique described above to determine if the growth rates of *Listeria innocua* and *Listeria monocytogenes* were statistically different at different temperatures. At most temperatures (2, 3, 5, 15, 20, 30, 35, 37 and 40°C) model one was selected. When model one is selected this means the two different growth curves have different slopes and different intercepts. Therefore in most cases the growth rates of these two organisms are significantly different at the same temperature. Model two was the most preferred model at temperatures of 8, 10, 25, 42 and 44°C. At these temperatures the slopes of the growth curves of *Listeria innocua* and *Listeria monocytogenes* are same. The reciprocal of the slope of the growth curve is the growth rate, therefore the growth rate of *Listeria innocua* and *Listeria monocytogenes* are not significantly different. Model two indicates that the Y intercepts (and hence the lag times) for the two organisms are significantly different. At one temperature (38°C) model three was selected. This means that the growth rates and lag times of *Listeria innocua* and *Listeria monocytogenes* on BHI at 38°C are not significantly different. These results indicate that it may be possible to design an experiment to be performed in environments where *Listeria monocytogenes* should not be used (i.e., the processing plant) which utilize *Listeria innocua* instead. At temperatures where growth rates are identical (i.e., model two or three is selected), *Listeria innocua* should be an acceptable substitute for pathogenic *Listeria monocytogenes*.

The second objective of the study was to utilize the statistical method described above to determine if microwave energy had an athermal effect on the growth rate of *Listeria innocua*. It was found that model two (same slope, different intercepts) best describes the relationship between the growth rates of *Listeria innocua* at 37°C in conventional and microwave heating. The growth rates of *Listeria innocua* were not significantly different under each heating condition. These results show that microwave heating does not impart a significant athermal effect on growth rate of *Listeria innocua* at 37°C. Coote, Holyoak and Cole (1991) reported that thermal inactivation by microwave heating was not comparable with conventional heating. They suggested this difference was due to the uneven heating produced by microwave energy. Uneven heating can be eliminated by using continuous agitation and computer aided temperature control (Welt, Tong and Rossen, in press). These same techniques were used in this study, and we have shown that when they are used no significant difference in growth rates between conventional and microwave heated samples are apparent.

SIGNIFICANT FINDINGS, CONCLUSIONS AND IMPLICATIONS

The statistical technique described above has been successfully employed in the analysis of two different types of experiments where microbial growth rates must be compared. We have demonstrated that the growth rate of *Listeria innocua* and *Listeria monocytogenes* are not significantly different at some temperatures. At these temperatures *Listeria innocua* may be a useful non pathogenic alternative to *Listeria monocytogenes*. We have also shown that there is no significant difference in the effect of microwave heating and conventional heating on *Listeria innocua* growth rates BHI broth at 37°C. This statistical technique can be used in the future to analyze the results of experiments where the effect of other factors like pH, preservative concentration or water activity on microbial growth rate or lag time are measured.

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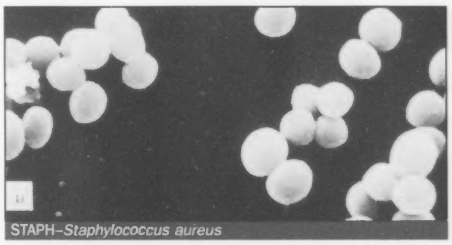
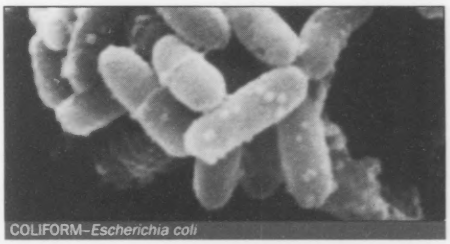
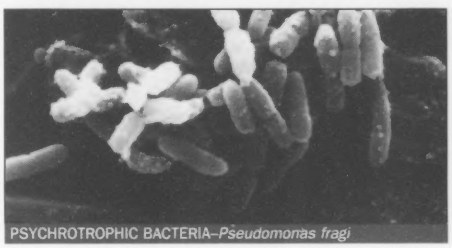


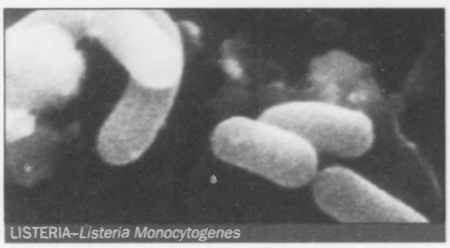
STAPH–*Staphylococcus aureus*



COLIFORM–*Escherichia coli*



PSYCHROTROPHIC BACTERIA–*Pseudomonas fragi*



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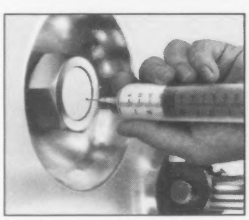

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Photographs of bacteria supplied by Dr. Edmund Zottola of the University of Minnesota, St. Paul, MN.

Dairy, Food and Environmental Sanitation, Vol. 13, No. 9, Pages 520-523 (September 1993)

Evaluation of Three Microorganism Recovery Procedures Used to Determine Handwash Efficacy

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BioScience Laboratories, Inc., 300 North Willson Avenue, Bozeman, MT 59715

INTRODUCTION

Accurate and reliable determinations of the microbial populations residing on the hands are critical in evaluating the effectiveness of both handwash products and methods (Block, 1991; Paulson, 1993). Only when one is sure of reliable hand sampling methods can one attempt to assess the benefits of the handwash procedure in terms of microbial reduction.

Microorganisms which reside on the hand surfaces are classified in two general categories. The first category consists of all contaminate microorganisms which are accidently "picked up" by food handlers and are transient in that they reside on the hands only temporarily. The second category consists of those microorganisms which permanently reside on the hand surfaces, that is, the normal skin flora.

In the food industry, both categories are important. Contaminant microorganisms are responsible for infectious disease outbreaks passed from food handlers to consumers via food. Perhaps the most common occurrence of this phenomenon is in situations where food handlers encounter enteric microorganisms from contact with their infected feces or the infected feces of others (usually via hand to hand transmission), and do not remove these microorganisms via an effective handwash. The contaminating microorganisms are then passed on to the food they are preparing, thus in turn they are passed on to the consumers through the food (Frazier & Westhoff, 1988; Paulson, 1988).

The microorganisms which normally reside on the hands usually do not pose any threat of infectious disease to consumers. These microorganisms are more important in contributing to food spoilage, particularly in partially prepared foods such as pre-cooked chicken and fish.

In trying to establish the efficacy of various handwash products and handwash methods, a number of food processing plants conduct experiments with their workers to evaluate antimicrobial efficacy. The two hand sampling methods most commonly used in these experiments in measuring the levels of microorganisms remaining on the hands are the "swab" and the "finger press" techniques.

In brief, the swab technique consists of swabbing the palmer surfaces of the hands as well as between the digits with a pre-moistened swab and culturing it on an agar plate. The finger press method is conducted by having test subjects press their palmer surface and/or finger pads lightly onto an agar plate.

There is also a third method which is not widely used in the food industry but is the standard hand sampling method for the evaluation of medical hand disinfection products. It is the "glove juice" method. This method consists of placing surgical gloves over the hands, instilling a surfactant to strip the hands of bacteria, and the plating of aliquots taken from the "glove juice" contained in the gloves (ASTM, 1987).

A study was designed in our laboratory to compare these three methods for their accuracy in estimating known microbial populations on the hands. Four different contamination levels were used to evaluate how the sampling methods responded in terms of accurate population estimates to varying population levels.

The focus of this study was with contaminating microorganisms, not with the normal microorganisms residing on the hands. We artificially seeded human volunteers' hands with known levels of the marker bacteria *Serratia marcescens*. The use of *Serratia marcescens* was valuable to this study in three ways. First, it is as resistant to mechanical removal from the hands as such pathogens as *E. coli*, *Salmonella sp.*, and *Shigella sp*. Second, it develops red bacterial colonies on tryptic soy agar which distinguishes it from any other microorganism residing on the hands. This prevents mistaking the artificially contaminated microorganisms with normal or other transient microorganisms, thereby preventing biasing the recovery estimate of the wash procedure. Third, since it is seeded onto the hands in known, equal population levels, the precision and accuracy of the three hand sampling procedures can be compared directly.

MATERIALS AND METHODS

Sixty human subjects over the age of 18 but under the age of 70 were recruited for this study. Subjects were of mixed sex and age; all were free of clinically evident dermatoses or injuries to the hands or forearms. No immune compromised subjects were admitted into the study. Subjects were randomly assigned to one of the three hand sampling

methods (Glove Juice, Swab, Finger Press) as well as one of four microbial contamination levels: $1x10^8$, $1x10^6$, $1x10^4$, $1x10^2$ colony forming units per hand. Five subjects per configuration were employed. This design allowed for the statistical comparison of the three hand sampling methods at four different contamination levels (see Table I).

TABLE I. Number of Subjects per Sampling Method and Contamination Level.

	Microorganism Contamination Level				
Sampling Method	10^8	10^6	10^4	10^2	Total
Swab	5 subjects	5 subjects	5 subjects	5 subjects	20 subjects
Finger Press	5 subjects	5 subjects	5 subjects	5 subjects	20 subjects
Glove Juice	5 subjects	5 subjects	5 subjects	5 subjects	20 subjects
Total	15 subjects	15 subjects	15 subjects	15 subjects	60 subjects

Contaminating Microorganism:

Serratia marcescens (ATCC #14756, red pigmented strain) microorganisms were used in this study to clearly identify the recovered microorganisms. Since *Serratia marcescens* colonies appear red on tryptic soy agar, they can easily be identified as the marker microorganism. Any non-red colonies appearing on the agar plates were not counted. The employment of *Serratia marcescens* prevented biasing the results by mixing up the normal and marker microorganisms.

Contamination Method:

Aliquots of *Serratia marcescens* were pipetted into each of the subject's cupped hands at the designated contamination level. The bacterial suspension was evenly applied over subjects' hands via the subjects massaging the suspension over the fronts and backs of the hands. Upon the completion, the hands were allowed to air dry for one minute.

Sampling Method:

Swab Procedure

A sterile, 0.8% saline moistened swab was directly swabbed over the palmar surfaces of both hands as well as at the base of the interdigital spaces. The swab was then placed in a 2 ml tube of sterile, physiological saline and vortexed for 5 seconds. One ml aliquots were plated in duplicate on tryptic soy agar. The plates were incubated at 25°C ± 2°C until the colonies had grown sufficiently (24-48 hours).

Finger Press Procedure

Subjects gently touched the surface of agar plate with the tips of their fingers. The agar plates were incubated at 25°C ± 2°C until the colonies had grown sufficiently (24-48 hours).

Glove Juice Procedure

Sterile, powder free, latex, surgical gloves were placed over the subject's hands and 75 ml of sterile phosphate buffered saline (pH 7.8) containing a surfactant (0.1% Triton X-100) were instilled into the glove.

The wrist was secured and the hand massaged through the glove for 60 seconds by a trained laboratory attendant. Aliquots of the "glove juice" were removed and plated on tryptic soy agar.

Duplicate spread agar plates were prepared from each dilution level and incubated at approximately 25°C ± 2°C until the colonies had grown sufficiently (24-48 hours).

CALCULATIONS

Swab and Fingertip

The number of viable microorganisms recovered from each hand was designated the "R" value. Each "R" value was determined using the following formula:

$$R = \log_{10} [(C_i)\ 10^{-D}]$$

where:

R = The adjusted average $\log_{10}$ colony count measurement for each subject at each sampling time. It represents the $\log_{10}$ number of microorganisms.

NOTE: The reason a $\log_{10}$ transformation was performed on these data was to make them linear scale. A linear scale, more appropriately a $\log_{10}$ linear scale, is a requirement of the statistical models used.

C_i = The arithmetic average colony count of the two duplicate plate counts for each subject at a particular dilution level.

D = The dilution factor.*

* Since there was no dilution factor for the finger press method, the dilution level is irrelevant. The formula becomes:

$$R = \log_{10} (C_i)$$

Glove Juice

A slight expansion of the formula was required with the glove juice procedure to account for the 75 mls of stripper solution instilled into the gloves.

$$R = \log_{10} [75\ (C_i)\ 10^{-D}]$$

where:

R = The adjusted average $\log_{10}$ colony count measurement for each subject.

75 = In order to determine the number of microorganisms residing on each subject's hands, we had to multiply by 75 which is the amount of stripping solution instilled into each glove.

C_i = The arithmetic average colony count of the two duplicate plate counts for each subject at a particular dilution level.

D = The dilution factor.

RESULTS

Figures 1 through 4 provide a graphical summary of the results.

Based upon these data, the glove juice sampling procedure was consistently within 1/2 a $\log_{10}$ of the seeded microbial populations ($p<0.001$). Both the swab and finger press methods consistently underestimated the bacterial counts by as much as 2 to 3 logs ($p<0.001$). The swab procedure was consistently more reliable than the finger press method, in both accuracy and precision, in estimating the microbial contamination levels.

Figure 1
10^8 (Log_{10} 8) Level Contamination

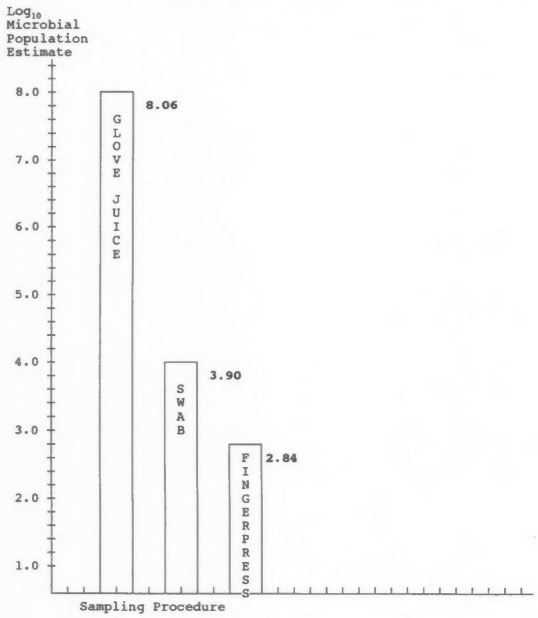


Figure 2
10^6 (Log_{10} 6) Level Contamination

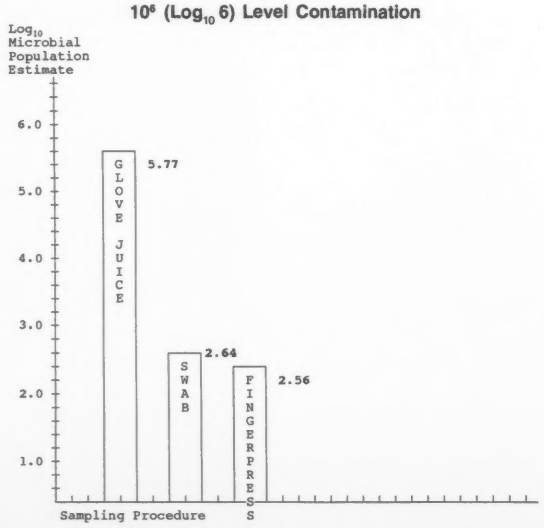


Figure 3
10^4 (Log_{10} 4) Level Contamination

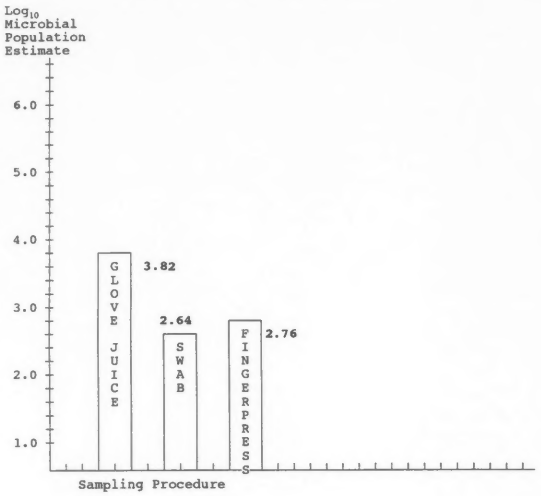
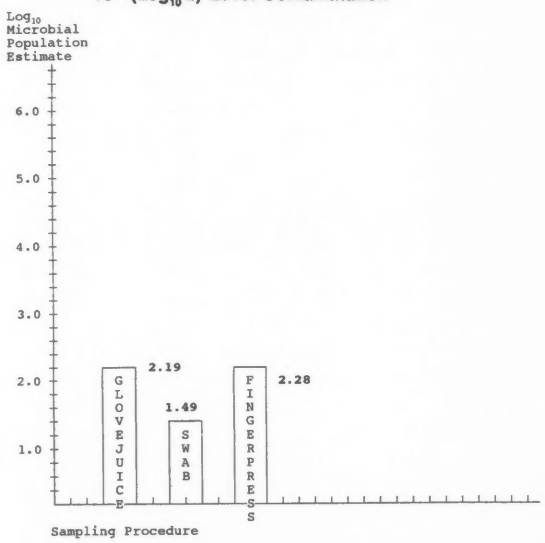


Figure 4
10^2 (Log_{10} 2) Level Contamination



DISCUSSION

An obvious problem in relying on the swab or finger press method to assess the efficacy of handwash products and procedures was that they consistently underestimated the contaminant microbial populations. Using these two methods may promote a false sense of security as to the efficacy of the handwash product or handwash procedure. That is, one may conclude erroneously that the hand wash product/procedure is doing a better job than it really is at estimating the number of microorganisms contaminating the hands.

It is our recommendation that the glove juice sampling method be used in determining the efficacy of handwash products and procedures. It repeatedly demonstrated the most accurate estimate of the number of microorganisms at the four contamination levels.

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IAMFES Secretary Nominations Due for 1994 Election

Nominations are now being taken for Secretary for IAMFES. This year an industry representative will be elected.

Once all nominations are received by the nominating committee, two persons will be chosen to run for the office. This is a five-year term, moving up yearly until he or she is President of IAMFES, then serving one year after as Past President. The term of office begins the last day of the 1994 Annual Meeting. All IAMFES Executive Board Members meet three times a year.

Two people selected are placed on the ballot. The winner is determined by majority vote of the membership through a mail vote, in the spring of 1994.

Please send a biographical sketch and photograph NO LATER THAN OCTOBER 15, 1993 to the Nominations Chairperson:

Lawrence Roth
Alberta Agriculture
6909 116th Street
Edmonton, Alberta
Canada T6H 4P2
(403)427-4054

Conference for Food Protection

The seventh Conference for Food Protection will be held March 12-17, 1994 at the Red Lion Inn, San Jose, California.

Registration information including Issue submission forms will be mailed around November 1st to all who attended the 1992 Conference, members, state food agencies and others on the CFP distribution list.

The objectives of the Conference are to promote food safety and consumer protection and provide a forum for:

- Identifying and addressing problems in the production, processing, packaging, distribution, sale and service of food.
- Focusing on the food protection programs governing food service, retail food stores and the vending segments of the food industry.
- Adopting sound, uniform procedures which will be accepted by food regulatory agencies and industry and promoting these procedures among states, territories and the District of Columbia.
- Establishing a working liaison among governmental agencies, industry, academic institutions, professional associations and consumer groups concerned with food safety.
- Coordinating with the USPHS/FDA and USDA to disseminate information regarding food safety issues that fall under their jurisdiction.

The new FDA Food Code which is nearing completion and will be published soon as an Availability Notice in the Federal Register. The 1994 Conference will be an excellent forum for Issues to be submitted dealing with comments on the Food Code.

Issues submitted to the Conference for deliberation should focus on retail food issues. These Issues are assigned to one of three Councils. Councils are composed of twenty-two (22) members balanced between government and industry interests.

Persons interested in promoting the objectives of the Conference are welcome and encouraged to request membership and/or attend the 1994 Conference. Membership dues are $50, which will entitle you to receive all CFP mailings, etc. Additionally, persons may request to be placed on the mailing list to receive 1994 Conference announcements.

For further information contact:
Leon Townsend, Executive Secretary,
Conference for Food Protection,
110 Tecumseh Trail,
Frankfort, Kentucky 40601
Telephone and/or FAX 502/695-0253.

Dairy Quality Assurance Program Reduces Residues

Records kept by Department of Agriculture officials in Minnesota show that voluntary participation in the Milk & Dairy Beef Quality Assurance Residue Prevention Protocol will reduce the risk of having a violative drug residue in milk by over 50 percent.

Bill Coleman, director of the department's dairy and livestock division, says that only seven of the violations were caused by the 1,000 producers who completed the Quality Assurance Program. This is in contrast to the 214 producers who had not participated in the program who had residue violations during the past year.

"Based on these results, the accidental shipment of milk containing illegal levels of drug residues would be half as likely to occur if a producer has completed the program," he says.

"Why not reduce your risk of an accident by following this very simple procedure," encourages Sandra Greufe of the Dairy Quality Center. First, obtain the Producer Manual from your milk handler or veterinarian. Next, review the ten Critical Control Points on your farm. Third, review your evaluation with your veterinarian and finally, report your activity via the card in the manual.

"Nothing as effective can be as simple or inexpensive," she adds, "as following the Ten Critical Control Points." They are:

1. Practice Healthy Herd Management
2. Establish A Valid Veterinarian/Client/Patient Relationship (VCPR)
3. Use Only FDA-Approved Over-The-Counter (OTC) Or Prescription (Rx) Drugs With Veterinarian's Guidance
4. Make Sure All Drugs You Use Have Labels That Comply With State And/Or Federal Labeling Requirements
5. Store All Drugs Correctly
6. Administer All Drugs Properly and Identify All Treated Animals
7. Maintain And Use Proper Treatment Records On All Treated Animals
8. Use Drug Residue Screening Tests
9. Implement Employee/Family Awareness Of Proper Drug Use To Avoid Marketing Adulterated Products
10. Complete The Milk and Dairy Beef Residue Prevention Protocol Annually

Naturally, progressive milk producers will find that they meet many or even most of the guidelines and suggestions found in the manual. The real reason the program works is because of the producer-veterinarian dialog about specific situations on your farm.

For more information, please write the Dairy Quality Assurance Center, 801 Shakespeare, P.O. Box 497, Stratford, IA 50249, or call (515)838-2793.

Short Course on Mechanization and Automation in Cheesemaking Coming in September

Process Control Automation and Mechanization in Cheesemaking, a short course introducing concepts related to control, automation and mechanization in cheesemaking operations, takes place Thursday and Friday, September 9-10, 9 a.m. - 5 p.m., at the University Club on the UC Davis campus. Designed for technical and managerial personnel in the California dairy industry, this course is sponsored in part by the California Cheese Research and Education Fund in cooperation with University Extension, UC Davis.

Topics include the basics of cheesemaking process control, programmable logic controllers, operator interfaces, impact of computerization on cheesemaking, impact of automation on cheese yield and quality, quantifying the risk and return of automation, and exposure to state-of-the-art proprietary systems. Program coordinator, Moshe Rosenberg, is a professor in UC Davis' Department of Food Science md Technology.

The $350 fee includes lunch each day, a barbecue dinner and all course materials. Enrollment is limited to 40 students. To request more information or to enroll, call toll free in California (800) 752-0881. From Davis, Dixon, Woodland or outside California, call (916) 757-8777.

The 1993 Food Industry Environmental Conference Advance Notice

The Seventh Food Industry Environmental Conference will be held in Atlanta, Georgia on November 15-16, 1993. The conference is designed to promote the understanding and development of new research on food processing waste treatment, regulatory issues affecting the industry, and process design and operating strategies. Included in the two-day conference are technical paper presentations and a products and services exhibition.

The conference will be held at the Omni Hotel at CNN Center. Registration fee is $275 per person, $295 on site, and includes admission to all the technical sessions, the exhibition, an exhibitors' reception, lunches, and refreshment breaks, and a copy of the proceedings. The exhibition fee is $695. For more details, contact Georgia Tech's Training Programs Office at 404-894-7430.

Pre-Show Workshop Offered on High Temperature Short Time (HTST) Pasteurization Techniques at Food and Dairy Expo '93

The Dairy & Foods Industries Supply Association (DFISA) has announced that a pre-EXPO HTST Workshop has been planned for Friday, October 15, 1993, at the Georgia World Congress Center. Al Votion, Rating Officer and Registered Sanitarian of the Texas Department of Health, will present a six hour course using the Texas Association of Milk, Food and Environmental Sanitation HTST pasteurizer demonstration unit.

Mr. Votion has trained more than 1500 people with his now-famous HTST demonstration unit. His six-hour course will consist of lectures, demonstrations and hands-on participation using the pasteurization equipment. By taking an active part in the process, attendees will gain a deeper understanding of the HTST process, its techniques and its advantages.

Participants will receive over 600 pages of permanent reference materials, including the Grade A Pasteurized Milk Ordinance, the State Training Branch Manual "Milk Pasteurization Controls and Tests" (the Cow Book), 3-A Accepted Practices for Sanitary Construction, Installation, Testing and Operation of High Temperature Short Time Pasteurizers and Higher Heat Short Time Systems, and Al's own "Helpful Hints on HTST Operation". The workshop will also include information on 1993 revisions to the PMO providing for a new certification program to qualify plant personnel to seal HTST controls.

Seating is limited and because of the course's popularity, initial registration will be limited to two persons per company with additional registrants from the same company confirmed on a space available basis. Registration fee is $50 per person and includes all reference materials.

(continued on page 531)

CALL FOR PAPERS

IAMFES 81th Annual Meeting

July 31 - August 3, 1994
San Antonio, Texas

Instructions to Prepare Abstracts

Procedure

☐ Use the printed Abstract form that appears on the other side of this page.

☐ Type in the title, Capitalize the first letter of the first word and proper nouns.

☐ List the names of authors and institution(s). Capitalize first letters and initials.

☐ Give the name, title, mailing address and the office telephone number of the author who will present the paper.

☐ If the paper is to be presented by a student entered in the Developing Scientist Awards Competitions, check the box to indicate this and have the form signed by your Major Professor or Department Head.

☐ Check the most appropriate box to indicate the general subject area of the paper. Indicate subject if checking other.

Type the abstract *double-spaced*, in the space provided on the abstract form.

Mail *two* copies of the abstract before December 15, 1993 to:

Steven K. Halstead, CAE
Executive Manager, IAMFES
200W Merle Hay Centre
6200 Aurora Avenue
Des Moines, IA 50322

Enclose *two* stamped, self-addressed post cards. Two cards must be included with *each* abstract that is submitted. One will be returned to acknowledge receipt of the abstract and the other to notify the presenter of the time the paper is to be presented.

Content of the Abstract

The abstract should describe briefly: *(a)* the problem studied, *(b)* methods applied, *(c)* essential results, and *(d)* conclusions.

Presentations Format:

Papers may be presented orally or by poster format at the discretion of the Program Committee. Oral presentations will be scheduled so a speaker has a maximum of 15 minutes, including a 2-4 minute discussion. Carousel projectors for 35 mm slides will be available. **Overhead projectors are not to be used and none will be available.**

Subject Matter for Papers

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

Developing Scientist Awards Competitions

The **Oral Competition** is open to GRADUATE students enrolled at accredited universities or colleges whose research deals with problems related to environmental, food and/or dairy sanitation, protection and safety. Candidates cannot have graduated more than one (1) year prior to the deadline for submitting abstracts.

This year the Oral Competition will be limited to ten finalists and awards will be given to the top three presenters. The papers should be approximately fifteen (15) minutes, including a 2-4 minute discussion.

The **Poster Competition** is open to UNDERGRADUATE and GRADUATE students enrolled at accredited universities or colleges whose research deals with problems related to environmental, food and/or dairy sanitation, protection and safety. Candidates cannot have graduated more than one (1) year prior to the deadline for submitting abstracts.

Ten finalists will be selected for the Poster Competition. The presentation must be mounted on a 8' by 4' display board (provided at the meeting) for the entire duration of the Poster Session at the Annual Meeting. The presenter must be present at their poster for a specific time, approximately two hours during the session. **(For more information on the Developing Scientist Awards Competitions, see page 501 of this issue of *Dairy, Food and Environmental Sanitation* and the following blue pages.)**

All winners are presented and honored at the annual Awards Banquet. The ten finalists will receive complimentary tickets and are expected to be present at the Banquet.

Additional Abstract Forms

Extra copies of the abstract forms may be obtained from Steven K. Halstead, Executive Manager, or you may photo copy this one.

Membership in IAMFES

Membership in IAMFES is NOT a requirement for presenting a paper at the IAMFES Annual Meeting

(OVER)

IAMFES Abstract Form
DEADLINE: DECEMBER 15, 1993

Title of Paper _____

_____

Authors _____

_____

Name and Title of Presenter _____

_____

Institution and Address of Presenter _____

_____

Office Phone Number (_____)_____-_____

General Subject Area

- ☐ Quality Assurance/Control
- ☐ Food Microbiology
- ☐ Dairy Microbiology
- ☐ Waste Management
- ☐ Lab Methods
- ☐ Foodborne Pathogens
- ☐ Chemical Residues
- ☐ Environmental Health
- ☐ Food Service
- ☐ Sanitation
- ☐ Food Safety
- ☐ Processing
- ☐ Epidemiology
- ☐ Other _____

Check the presentation format you prefer.

- ☐ Oral
- ☐ Poster
- ☐ Video Theater
- ☐ No Preference

Developing Scientist Awards Competition ☐ Yes ☐ Oral ☐ Poster

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

Please type abstract, double-spaced, in the space provided here.

Selected presentations, with permission, will be recorded (audio or video).

I authorize IAMFES to record my presentation.

Signature _____ Date: _____

I do not wish to be recorded.

Signature _____ Date: _____

Judging Criteria for Developing Scientist Awards Competitions

Judging

The abstracts and presentations will be evaluated by an independent panel of judges. Selection of ten finalists for both the Oral and Poster Competitions will be based on evaluations of the abstracts and the scientific quality of the work (see judging criteria). All entrants in the Developing Scientist Awards Competitions will be advised of the judges' decisions by March 31, 1994.

Only the ten finalists in each category will be judged upon their final presentations at the Annual Meeting and will be eligible for the final awards. All other entrants who submitted papers accepted by the IAMFES Program Committee will be expected to present their papers/posters as part of the regular Annual Meeting program.

Judging Criteria

ABSTRACTS

Short abstract: clarity, comprehensiveness, conciseness;
Extended abstract: technical merit, organization, completeness;

SCIENTIFIC QUALITY

Adequacy of experimental design;
Extent objectives were met;
Difficulty of research, depth;
Validity of conclusions based upon data;
Technical merit, contribution to science;

ORAL PRESENTATION or POSTER PRESENTATION

Organization: clarity of introduction, objectives, methods, results and conclusions;
Quality of visuals;
Quality and poise of presentation and in answering questions;

*** Note: Both a short abstract and an extended abstract must be submitted to the IAMFES office no later than December 15, 1993. No forms will be sent to entrants. Enclose two self-addressed, stamped postcards with your submitted abstracts.**

Instructions for Preparation of Extended Abstract:
Type your abstract, single-spaced, using elite (12 pitch) letter-quality type, on 8.5" x 11" pages. The margins should be as follows: Top: 1"; Bottom: 0.75"; Left: 1"; Right: 1". Do not exceed 3 pages, and DO NOT attach additional tables or graphs.

A. The first section should occupy the first fifth of the first page and read as follows:

First 3 lines or less, type:
TITLE: Capitalize only the first letter of the title and first letters of proper nouns.

Leave a blank line, then in the next 2 lines or less, type:
AUTHORS: Capitalize name of SPEAKER ONLY.

Leave a blank line then in the next 4 lines or less, type:
AFFILIATIONS: Name and complete mailing address of Affiliation.

Leave a blank line then on the next line, type:
Developing Scientist Awards Competition: Oral or Poster.

Leave a blank line then type:
Professor (or Department Head): Have your Professor or Department Head sign here.

B. Leave two blank lines then state briefly (8 lines or less):

"OBJECTIVES"
Indent the first line 5 spaces.

Leave a blank line, then describe:
"METHODS"
This should take up a maximum of three-quarters of a page; continue on page 2 if necessary. Include sufficient detail to indicate the adequacy of the experimental design and difficulty of research.

Leave a blank line then describe:
"RESULTS AND DISCUSSION"
This should take up a maximum length equivalent to 1 page; continue on page 3 if necessary. This section should indicate the extent to which objectives were met and validity of conclusions based upon data.

Leave a blank line then describe:
"SIGNIFICANT FINDINGS, CONCLUSIONS AND IMPLICATIONS"
This section should take up a maximum of 15 lines and should indicate the technical merit and contribution to science of the work.

Leave a blank line then list:
"REFERENCES":
List a maximum of four significant references. At the end of this section you will probably be close to the bottom of page 3.

Advance registration with payment must be received by DFISA, by September 10, 1993. Send registration payment to: DFISA Foundation, 6245 Executive Boulevard, Rockville, MD 20852-3938, (301)984-1444, FAX (301)881-7832.

DFISA is an international trade association of more than 800 equipment, supply, and ingredients companies serving the dairy, food, and beverage industries. The Association sponsors Food & Dairy EXPO which will be held this year at Atlanta's Georgia World Congress Center, October 16-19.

Silliker Laboratories Opens Madison, Wisconsin Laboratory

Silliker Laboratories, a leading network of independent food testing laboratories recently announced the opening of its newest laboratory, in Madison, WI. Silliker of Wisconsin, will provide new and existing clients with comprehensive microbiological testing, research, technical consulting, and educational services. The Madison facility is Silliker's thirteenth in the United States and Canada.

In announcing the opening of the new laboratory, Dr. Russell S. Flowers, president, Silliker Laboratories Group, Inc., said the facility will provide Wisconsin, the nation's largest dairy producing state, with Silliker's complete scope of services. Special emphasis will be placed on the unique needs of the meat, dairy, and confectionery industries. Jeffrey L. Kornacki, Ph.D., a Silliker veteran with extensive experience in the dairy sciences and over 8 years of solid food industry experience, was named Laboratory Director.

"Under the direction of Jeff Kornacki, Silliker's Madison lab will serve the region with the highest standards of accuracy, timeliness, and technical expertise. We are happy to now provide Wisconsin food processors with local service. This has been a hallmark of the Silliker organization for over 25 years." Dr. Flowers said.

Headquartered in Homewood, IL, Silliker Laboratories are located in Chicago Heights, IL; Columbus, OH; Garwood, NJ; Stone Mountain, GA; Sinking Spring, PA; Carson, CA; Hayward, CA; Fresno, CA; College Station, TX; Grand Prairie, TX; San Antonio, TX; Madison, WI; and Mississauga, Ontario, Canada.

For more information on Silliker of Wisconsin contact Jeffrey L. Kornacki, Ph.D., laboratory director at (608)249-9112/FAX (608)249-9886, or write: Silliker of Wisconsin, 3688 Kinsman Boulevard, Madison, WI, 53704.

Partners in Education, A Successful Association Program

The DFISA Foundation, which was established in 1983 to award scholarships, fund industry education activities and assist in the development of industry-wide research, has entered into the final stages of its latest segment of the Partners in Education Program.

In order to actively support research, student education and training programs the Foundation of the Dairy & Food Industries Supply Association has augmented the education or scholarship funds of several associations by $1,000.

Many associations were invited to offer allocation plans for the 1993 grant, some that have responded are: the Carolina/ Virginia Dairy Products Assoc. Inc. (CVDPA), the South Dakota State Dairy Assoc., the Institute of Food Technologists (IFT), Oregon State University's Department of Food Science and Technology in concert with the Oregon Dairy Industries (ODI) Assoc., SECO Dairies of Florida, Inc., the Southern Association of Dairy Food Manufacturers, Inc. (SADFM) and The International Association of Milk, Food and Environmental Sanitarians, Inc. (IAMFES).

The DFISA Foundation, since its inception, has given the industry more than one-half million dollars. For some associations this is not the first time receiving dollars from the Foundation, "The major portion of this grant will go to continue a program we started with an earlier Partners in Education grant," IAMFES. For others, it is the first time, "We are delighted to accept your offer," CVDPA, "We would gratefully accept a $1,000 donation," IFT, "We are most pleased to be invited to participate in the Partners in Education program of the Foundation," ODI.

The DFISA Foundation also sponsors Food MegaTrends '93, a free conference for processors at Food & Dairy EXPO '93. EXPO '93 will be held October 16-19, in Atlanta at the Georgia World Congress Center.

DFISA is an international trade association of more than 800 equipment, ingredient, service and supply companies serving the dairy, food, beverage and related processing industries.

AOAC International Names 1993 Harvey W. Wiley Award Winner and Fellows of AOAC International

Harvey W. Wiley Award Winner

AOAC INTERNATIONAL (formerly the Association of Official Analytical Chemists) has named Dr. James J. Pestka as the 1993 Harvey W. Wiley Award winner in recognition of his outstanding contribution to analytical science. Mr. Pestka will receive this most prestigious of AOAC awards at the opening session of the 107th AOAC INTERNATIONAL Annual Meeting in Washington, D.C. on July 26, 1993.

Dr. Pestka, a professor with the Michigan State University (MSU), was awarded this honor for his work in the development of immunoassays for mycotoxins - work which has had a significant impact on agricultural testing. His development of enzyme-based immunosorbent assays (ELISA) led to the production of

widely used test kits by industry for the rapid testing of mycotoxins in agricultural commodities such as corn, wheat, milk, peanuts, and cottonseed, and in food and feed products made from grains and oilseeds.

Dr. Pestka's current primary research interests are in the areas of immunological effects of dietary contaminants and constituents, metabolism and toxic effects of mycotoxins, and immunochemical analysis for food safety verification. Other research interests are the toxicity of mycotoxins and their metabolites and the immunological effects of dietary contaminants to animals.

As a dedicated educator and scientist, Dr. Pestka has received several awards including the 1992 Michigan State University Carl G. Smith Award for the outstanding faculty member in food agricultural sciences and the Institute of Food Technologists' 1988 Samuel Cate Prescott Award for outstanding researcher under the age of 36. He is the author of over 85 papers and reviews.

Dr. Pestka earned a B.A. at the State University of New York College of Buffalo, a Ph.D. from Cornell University and did postdoctoral work at the University of Wisconsin.

1993 Fellows of AOAC INTERNATIONAL

In recognition of ten or more years of meritorious service to the Association, nine AOAC members have been named 1993 Fellows of AOAC INTERNATIONAL. They are: Wallace H. Andrews, U.S. Food & Drug Administration, Washington, District of Columbia, U.S.A., for work in food microbiology methodology; Ellen J. de Vries, Solvay Duphar BV, Weesp, The Netherlands, for work on Vitamin D methodology and service on the AOAC Committee on the Constitution and as Secretary of the AOAC Europe Section; Robert M. Eppley, U.S. Food & Drug Administration, Washington, District of Columbia, U.S.A., for work in mycotoxin methodology; Russell S. Flowers, Silliker Laboratory Group, Homewood, Illinois, U.S.A., for work in microbiology methodology; Carolyn A. Geisler, U.S. Food & Drug Administration, Denver, Colorado, U.S.A., for work on methodology for food additives and residues, feeds, fertilizers, and related materials, and for serving on the Constitution and Long Range Planning Committees; Bernadette M. McMahon, U.S. Food & Drug Administration, Washington, District of Columbia, U.S.A., for work on pesticide methodology and service on the Publications Planning Committee; Arvid W. Munson, Phoenix Regulatory Association, Ltd., Sterling, Virginia, U.S.A., for service on the AOAC Board of Directors, Long Range Planning and Interlaboratory Committees; Harvey W. Newsome, Health & Welfare Canada, Ottawa, Ontario, Canada, for work in pesticide methodology and on AOAC's Test Kit Performance Testing Program; Eric Sheinin, North Potomac, Maryland, U.S.A., for work in drug methodology and service on the Official Methods Board.

AOAC INTERNATIONAL is a scientific organization whose primary objective is to promote methods validation and quality measurements in the analytical sciences.

Zeiss Microscopes Featured in Jurassic Park

The new popular movie Jurassic Park, directed by Steven Spielberg, is the story of the genetic engineering and cloning of live dinosaurs for a theme park built on an island off the coast of Costa Rica.

A variety of Zeiss microscopes were featured in the film's cloning laboratory, including a Zeiss stereomicroscope, Standard 25 upright microscope, inverted microscope and the LSM confocal laser scan microscope.

The producers and scientific advisors for the film specifically chose Zeiss microscopes because of their modern design and the Zeiss reputation for advanced technology.

For more information contact Irv Toplin at (914)681-7670.

30th Italian Cheese Seminar to Feature Renowned List of Speakers

Marschall Products will host the 30th anniversary Italian Cheese Seminar this fall at the John Q. Hammons Trade Center at the Holiday Inn- Madison West. This year's ICS, "A Festival of Flavors" will celebrate the innovations and discoveries of past years while presenting the newest findings affecting cheese makers and marketers in the nineties.

James Path of the University of Wisconsin's Center for Dairy Research will present "Specialty Cheese; A World of Opportunities and Potential." In his presentation he will define specialty cheeses and take a look at specialty cheeses from around the world. He will also outline the Specialty Cheese Program at the Center for Dairy Research.

Among other topics to be presented this year is "A Method for Manufacturing Reduced-Fat Mozzarella Cheese" by Dr. Donald J. McMahon of the Western Center for Dairy Protein Research and Technology, Logan, Utah. Also addressing Mozzarella cheese production will be Robert W. Hutkins of the University of Nebraska. He will present research concerning the function of lactic starter cultures in cheese making, specifically, how starter culture metabolism affects the functional properties of Mozzarella to achieve lower browning.

Three other presentations will center on the manufacture of Mozzarella cheese with J. J. Yun exploring the impact of whey pH, Paul Kinstedt looking at the impact of coagulant levels, and David Barbano outlining the contributions of coagulant, starter cultures and milk enzymes. Bill Knoespel of Marschall will focus on custom starter cultures.

Set for September 28 and 29, the 30th Italian Cheese Seminar will be attended by cheese makers from around the globe.

For more information, contact Jo Ann Sterenberg, ICS Coordinator, at (219)264-2557.

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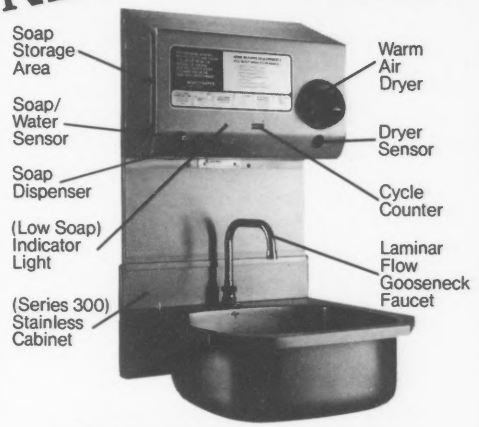

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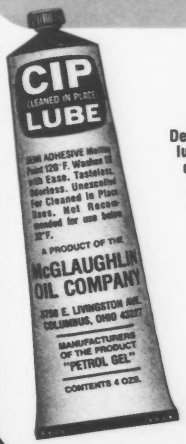

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Food and Environmental Hazards to Health

*The World Health Organization's Golden Rules for Safe Food Preparation**

The challenges of ensuring food safety and preventing foodborne diseases are important public health goals. Public health agencies, animal health agencies, commercial food producers and retailers must work together in order to provide the public with a safe food supply.

Unfortunately, most cases of foodborne diseases can be traced to improper food preparation errors in restaurants and homes. The World Health Organization's (WHO) Golden Rules for Safe Food Preparation address the most common kitchen errors responsible for foodborne disease:

1. **Choose foods processed for safety**: While many foods, such as fruits and vegetables, are best in their natural state, others simply are not safe unless they have been processed. For example, always buy pasteurized as opposed to raw milk and, if you have the choice, select fresh or frozen poultry treated with ionizing radiation. When shopping, keep in mind that food processing was invented to improve safety as well as to prolong shelf life. Certain foods eaten raw, such as lettuce, need thorough washing.
2. **Cook food thoroughly**: Many raw foods, most notably poultry, meats, and unpasteurized milk, are very often contaminated with disease-causing pathogens. Thorough cooking will kill the pathogens, but remember that the temperature of all parts of the food must reach at least 70°C (158°F). If cooked chicken is still raw near the bone, put it back in the oven until it is done—all the way through. Frozen meat, fish, and poultry must be thoroughly thawed before cooking.
3. **Eat cooked foods immediately**: When cooked foods cool to room temperature, microbes begin to proliferate. The longer the wait, the greater the risk. To be on the safe side, eat cooked foods just as soon as they come off the heat.
4. **Store cooked foods carefully**: If you must prepare foods in advance or want to keep leftovers, be sure to store them under either hot (near or above 60°C [140°]) or cool (near or below 10°C [40°F]) conditions. This rule is of vital importance if you plan to store foods for more than four or five hours. Foods for infants should preferably not be stored at all.

   A common error, responsible for countless cases of foodborne disease, is putting too large a quantity of warm food in the refrigerator. In an overburdened refrigerator, cooked foods cannot cool to the core as quickly as they must. When the center of food remains warm (above 10°C [40°F]) for too long, microbes thrive, quickly proliferating to disease-producing levels.
5. **Reheat cooked foods thoroughly**: This is your best protection against microbes that may have developed during storage (proper storage slows down microbial growth but does not kill the organisms).

   Once again, thorough reheating means that all parts of the food must reach at least 70°C (158°F).
6. **Avoid contact between raw foods and cooked foods**: Safely cooked foods can become contaminated through even the slightest contact with raw foods. This cross-contamination can be direct, as when raw poultry meat comes into contact with cooked foods. It can also be more subtle. For example, do not prepare a raw chicken and then use the same unwashed cutting board and knife to carve the cooked bird. Doing so can reintroduce all the potential risks for microbial growth and subsequent illness prior to cooking.
7. **Wash hands repeatedly**: Wash hands thoroughly before you start preparing foods and after every interruption—especially if you have to change the baby or have been to the toilet. After preparing raw foods such as fish, meat, or poultry, wash again before you start handling other foods. And if you have an infection on your hand, be sure to bandage or cover it before preparing food. Remember, also, that household pets—dogs, birds, and especially turtles—often harbor dangerous pathogens that can pass from your hands into food.
8. **Keep all kitchen surfaces meticulously clean**: Since foods are so easily contaminated, any surface used for food preparation must be kept absolutely clean. Think of every food scrap, crumb, or spot as a potential reservoir of germs. Cloths that come into contact with dishes and utensils should be changed every day.

   Separate cloths for cleaning the floors also require frequent washing.
9. **Protect foods from insects, rodents, and other animals**: Animals frequently carry pathogenic microorganisms which cause foodborne diseases. Storing foods in tightly sealed containers is your best protection.
10. **Use pure water**: Pure water is just as important for food preparation as for drinking. If you have any doubts about the water supply, boil the water before adding it to food or making ice for drinks. Be especially careful with any water used to prepare an infant's meal.

Editorial Comment: Copies of these rules provide a valuable teaching resource for food handler education. They can be displayed in health centers, hospitals, and in restaurant kitchens where the high turnover of personnel make such teaching aids valuable. The wall chart is available in English, French, Spanish, or German versions. To obtain a free copy (please specify which language), send a self-addressed label to Food Safety Unit, Division of Health Protection and Promotion, World Health Organization, 1211 Geneva 27, Switzerland.

For a free catalogue of WHO's publications on food safety (DSA.FOS.91.A), in English or French, write to Distribution and Sales, World Health Organization, 1211 Geneva 27, Switzerland.

**Adapted from World Health Forum 1991; 12:403-5; Food Safety Unit, World Health Organization, Geneva.*

FDA Establishes Seafood Hotline

A toll-free Seafood Hotline for consumers has been established by the Food and Drug Administration (FDA). The hotline answers questions on seafood buying, handling, and storage for home consumption, and also on seafood labeling. FDA seafood specialists answer questions directly between 10 a.m. and 2 p.m., Eastern Time, Monday through Friday. In addition, the hotline is available 24 hours a day through a computerized information retrieval system that permits callers using touchtone phones to request FDA seafood publications, listen to prerecorded seafood safety messages, and gain access to other information. The hotline number is 1-800-FDA-4010.

Vibrio vulnificus *Infections Associated with Raw Oyster Consumption — Florida, 1981-1992*

Vibrio vulnificus is a gram-negative bacterium that can cause serious illness and death in persons with preexisting liver disease or compromised immune systems. From 1981 through 1992, 125 persons with *V. vulnificus* infections, of whom 44 (35%) died, were reported to the Florida Department of Health and Rehabilitative Services (HRS). This report summarizes data on these cases and presents estimates of the at-risk population in Florida.

The infections generally occurred each year from March through December and peaked from May through October. Seventy-two persons (58%) had primary septicemia, 35 (28%) had wound infections, and 18 (14%) had gastroenteritis. In patients with primary septicemia, 58 infections (81%) occurred among persons with a history of raw oyster consumption during the week before onset of illness. The mean age of these persons was 60 years (range: 33-90 years; standard deviation: 12.9 years); 51 (88%) were male. Fourteen (78%) of the patients with gastroenteritis also had raw oyster-associated illness. Their mean age was 49 years (range: 19-89 years; standard deviation: 25.7 years); seven (50%) were male.

Of the 40 deaths caused by septicemia, 35 (88%) were associated with raw oyster consumption. Nine of these deaths occurred in 1992. The case-fatality rate from raw oyster-associated *V. vulnificus* septicemia among patients with pre-existing liver disease was 67% (30 of 445) compared with 38% (5 of 13) among those who were not known to have liver disease.

Results of the 1988 Florida Behavioral Risk Factor Survey (BRFS) were used to estimate the proportions of the Florida population who ate raw oysters, and the proportion of the population who ate raw oysters and who believed they had liver disease (e.g., cirrhosis). These estimates were used in conjunction with case reports and population data from the Florida Office of Vital Statistics to estimate the risk for illness and death associated with *V. vulnificus*.

BRFS and state population data indicate that approximately 3 million persons in Florida eat raw oysters; of these, 71,000 persons believe they have liver disease. Based on the number of cases reported to the Florida HRS during 1981-1992, the annual rate of illness from *V. vulnificus* infection for adults with liver disease who ate raw oysters was 72 per 1 million adults — 80 times the rate for adults without known liver disease who ate raw oysters (0.9 per 1 million). The annual rate of death from *V. vulnificus* for adults with liver disease who ate raw oysters was 45 per 1 million — more than 200 times greater than the rate for persons without known liver disease who ate raw oysters (0.2 per 1 million).

Editorial Note: *V. vulnificus* was first described as a cause of human illness in 1979. Although there is no national surveillance for infections caused by this pathogen, regional surveillance in four states along the Gulf Coast indicates an annual incidence for *V. vulnificus* infections of at least 0.6 per 1 million persons and a case-fatality rate of 22%.

V. vulnificus, a free-living bacterium, occurs naturally in the marine environment, rather than as a result of pollution by human or animal fecal waste. This organism is commonly found in estuarine waters of the Gulf of Mexico, where it may contaminate oysters and other shellfish. Legal harvesting of oysters is limited to areas free of fecal contamination; however, *V. vulnificus* is ubiquitous in warm ocean waters, and oysters harvested from approved sites may be contaminated. Therefore, regardless of the source of the oysters, the potential for infection exists whenever raw oysters are consumed.

Ingestion of raw or undercooked shellfish contaminated with *V. vulnificus* can lead to primary septicemia or gastroenteritis. In addition, *V. vulnificus* can cause infection by directly contaminating open wounds during swimming, shellfish cleaning, and other marine activities.

The findings in this report are consistent with other studies indicating that persons with liver disease are at increased risk for infection with *V. vulnificus* and death. Persons with compromised immune systems (e.g., chronic renal insufficiency, cancer, diabetes, steroid-dependent asthma, and chronic intestinal disease) or iron overload states (e.g., thalassemia and hemochromatosis) may also be at increased risk for infection with *V. vulnificus* and death. Whether persons with acquired immunodeficiency syndrome are at increased risk for *V. vulnificus* infections is unknown.

A previous study in north Florida indicated that less than 15% of high-risk patients were aware of the risks associated with raw oyster consumption. To increase awareness of risks for infection with this pathogen, the Florida HRS has issued press releases to inform the general public and has provided gastroenterologists in the state with clinical references and information for their patients with liver disease. California and Louisiana both require written consumer alerts regarding the risk of raw oyster consumption be visible where raw oysters are sold at retail food establishments. The Florida HRS also is working with other agencies in the state to establish labeling requirements for raw oysters that would inform consumers at all points of sale of the risk for serious illness for persons with liver disease or compromised immune systems who consume raw oysters. The wording of such labeling will be similar to the label already required by the Florida Department of Natural Resources for all wholesale shellstock and shucked products: "Consumer Information — There is a risk associated with consuming raw oysters or any raw animal protein. If you have chronic illness of the liver, stomach, or blood or have immune disorders, you are at a greater risk of serious illness from raw oysters and should eat oysters fully cooked. If unsure of your risk, consult a physician."

MMWR 6/4/93

Federal Register

Revisions to the Food Chemicals Codex Policy on Lead and Heavy Metals Specifications; Opportunity for Public Comment

Agency: Food and Drug Administration, HHS.

Action: Notice.

Summary: The Food and Drug Administration (FDA) is announcing an opportunity for public comment to support implementation of the revised Food Chemicals Codex policy on lead and heavy metals specifications that was approved by the National Academy of Sciences/Institute of Medicine (NAS/IOM) Committee on Food Chemicals Codex. This revised policy is intended to be published in the fourth edition of the Food Chemicals Codex. FDA is also giving notice that the Committee is soliciting suggestions for lower limits for lead and heavy metals in food ingredient monographs.

Dates: Comments and information by September 13, 1993. The NAS/IOM Committee on Food Chemicals Codex advises that comments and information not received by this date cannot be considered for the fourth edition but will be considered for a later edition or supplement.

Addresses: Submit written comments and information to the NAS/IOM Committee on Food Chemicals Codex, National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, DC 20418.

For Further Information Contact: Fatima N. Johnson, Committee on Food Chemicals Codex, Food and Nutrition Board, National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, DC 20418, 202-334-2580, or Paul M. Kuznesof, Center for Food Safety and Applied Nutrition (HFS-247), Food and Drug Administration, 200 C St., SW, Washington, DC 20204, 202-254-9537.

Supplementary Information: FDA provides research contracts to NAS/IOM to support the preparation of the Food Chemicals Codex, a compilation of specification monographs for substances used as food ingredients. In the Federal Register of November 22, 1991 (56 FR 58910), FDA announced that the NAS/IOM Committee on Food Chemicals Codex was considering new monographs and monograph revisions for inclusion in the fourth supplement to the Food Chemicals Codex, third edition that is scheduled to be published in late 1993. The public was invited to comment and make suggestions for consideration.

FDA now gives notice that the NAS/IOM Committee on Food Chemicals Codex is soliciting, from all interested parties, comments and data to support implementation of the following revised policy for establishing lower specifications for lead and heavy metals:

The Committee on Food Chemicals Codex (FCC) recognizes the desirability of lowering lead exposure, especially in the case of infants and children. Overall exposure to lead is a public health concern. Whereas diet is not the largest source of lead exposure, it is a significant one. While ingestion of FCC substances does not represent the major source of dietary lead, it is desirable to lower the lead limits for all FCC substances, particularly for those substances consumed in high amounts. Therefore, the Committee's policy is to reduce lead limits (as well as the heavy metals limit because of their interrelated nature) to the lowest extent feasible for FCC substances, especially given that more recent evidence shows deleterious neurobehavioral effects occurring in children exposed to lead at levels below those previously considered acceptable.

In setting heavy metals and lead limits, the Committee considers the amount of a food chemical consumed, the feasibility of manufacturing a product within these limits, and the availability of analytical methods to ensure compliance. The constraints of good manufacturing practice and the availability of reliable analytical methods are often limiting factors in setting lower lead and heavy metals limits.

The Committee regards as one of its goals the assurance of the safety of properly used food chemicals. This means that FCC specifications will respond to advances in knowledge about new manufacturing methods, analytical techniques, or toxicology and safety issues.

This revised policy will be published in the planned fourth edition of the Food Chemicals Codex that is scheduled for publication in early 1996.

In addition, FDA gives notice that the NAS/IOM Committee on Food Chemicals Codex is soliciting suggested lower limits for lead and heavy metals (this includes silver, arsenic, bismuth, cadmium, copper, mercury, lead, antimony, and tin) in food ingredient monographs. In responding, the Committee invites industry and other interested persons to provide: (1) Manufacturing and production data that can be used in setting lower lead and heavy metals limits, and (2) information on appropriate analytical methodologies for quantifying these trace element contaminants in specific food chemicals.

Information received in response to this notice will be used by the NAS/IOM Committee on Food Chemicals Codex when considering new specifications for lead and heavy metals and in reaching its conclusions regarding implementation of the revised policy. The public will be given ample opportunity to comment on any suggested changes in Food Chemicals Codex monographs.

FDA emphasizes that it will continue to publish any proposals to adopt new Food Chemicals Codex monographs or monograph revisions for currently regulated substances in the Federal Register. The public will be given ample opportunity to comment on any suggested changes in FDA specifications.

Two copies of written comments are to be submitted to NAS at the address listed above. Comments can be submitted electronically to the Food Chemicals Codex bulletin board, 202-334-1738, as well. Each submission should include the statement that it is in response to this Federal Register notice. NAS will forward a copy of each comment, submitted either electronically or in writing, to the Dockets Management Branch (HFA-305), Food and Drug Administration, rm. 1-23, 12420 Parklawn Drive, Rockville, MD 20857, to be placed under docket number 93N-0183 for public review.

Dated: July 8, 1993.

Michael R. Taylor,

Deputy Commissioner for Policy.

(FR Doc. 93-16698 Filed 7-14-93; 8:45 am)

Updates . . .

IAMFES Secretary Nominations Due for 1994 Election

Nominations are now being taken for Secretary for IAMFES. This year an industry representative will be elected.

Once all nominations are received by the nominating committee, two persons will be chosen to run for the office. This is a five-year term, moving up yearly until he or she is President of IAMFES, then serving one year after as Past President. The term of office begins the last day of the 1994 Annual Meeting. All IAMFES Executive Board Members meet three times a year.

Two people selected are placed on the ballot. The winner is determined by majority vote of the membership through a mail vote, in the spring of 1994.

Please send a biographical sketch and photograph NO LATER THAN OCTOBER 15, 1993 to the Nominations Chairperson:

Lawrence Roth
Alberta Agriculture
6909 116th Street
Edmonton, Alberta
Canada T6H 4P2
(403)427-4054

Call for Papers for the 81st IAMFES Annual Meeting

Hyatt Regency
San Antonio, Texas
July 31 - August 3, 1994

This is an invitation of all IAMFES members to submit a paper for presentation at the 81st IAMFES Annual Meeting, to be held at the Hyatt Regency, San Antonio, Texas, July 31-August 3, 1994. Abstract forms are published on pages 529-532 of this issue of *Dairy, Food and Environmental Sanitation*.

To receive more information on submitting a paper for presentation at the 81st IAMFES Annual Meeting, contact IAMFES at (800)369-6337 (US) or (800)284-6336 (Canada) or (515)276-3344, or write to IAMFES, 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, IA 50322.

Deadline for Submission of Abstracts:
DECEMBER 15, 1993

HAZCON-Based Total Quality Management

Establishing a Hazard Control-Based TQM and Program Assessment of an Operation (Part XVI)

O. Peter Snyder, Jr., Ph.D.,
Hospitality Institute of Technology and Management,
830 Transfer Road, Suite 35,
St. Paul, MN 55114

Management Philosophy, Attitude, and Organization

The goal of HAZCON is hazard control. There are two major steps to hazard control. First, **one must be able to identify the hazards**. This is purely a technical task. The second step, **control**, is much more difficult. There are two components to control: **correct specification of technical controls** with the least probability of failure, in keeping with economic capabilities, and then, **management training and guidance of personnel** to carry out technical controls and compensate for weaknesses in the technical controls.

There is also a desire that the government participate in this hazard control process. The problem with this is that the government is typically out-of-date in terms of correct technical information. Also, the purpose of government intervention is not control. It is enforcement of its out-of-date regulations. As a result, government audits are rarely helpful. **Self control is the way to achieve hazard control.**

Planning for Zero Process Errors

The control system components for zero errors includes the following:

1. Management: commitment; involvement; resources; correct policies, procedures, and standards to prevent safety and quality problems; enforcement; organization for problem prevention
2. Consumer: market-dominant products and services correctly used; no product abuse
3. Employee: selection; training; empowerment; coaching for continual development
4. Environment: air quality; temperature; area sanitation; waste and emission control; minimum impact on the environment
5. Facilities: insect and rodent proof; totally cleanable to less than 1 microorganism per cm^2; maintained
6. Equipment: fails safe; easily maintained; sanitized; consistent, reliable performance; capable of high productivity
7. Supplies and materials: requirement for all suppliers to have HAZCON-based TQM programs and provide just-in-time delivery
8. Products and services (methods): procedures and standards for the manufacturing and delivery ensures zero defects in safety and competitive customer satisfaction.

Fundamentals for Achieving Quality-Assured Performance

This outline lists the elements that are crucial to systems development, the fundamentals for achieving quality-assured performance. Remember, system safety is under the total control of the **owner/CEO** of the organization. The owner/CEO is also responsible for **quality improvement** (QI). Using feedback from the system, the CEO must look for ways to make processes simpler, improve equipment and facility, and improve training, etc. The **employee on the line** is the one responsible for **quality control** (QC). The **supervisor** is responsible for **quality assurance** (QA), that is, making it possible for the employee to perform with zero defects.

Note from the outline below that the first step to achieving quality-assured performance is to make sure that the organization's performance standards are defined so that employees can be trained accordingly before they are given tasks to perform.

Goals

1. You only get what you demand. You must inspect and test for what you expect.
2. People must know the performance standards.
   a. They must know what they are to accomplish.
   b. They must know how many mistakes they are allowed.
   c. They must know how they will be measured.
   d. They must be taught to meet performance standards. Standards must be realistic, understandable, measurable, behavioral, and capable of being accomplished.
3. You must establish measurement criteria for inspection.
4. You must enforce standards.
   a. You cannot tolerate a problem. You solve it or get rid of it.
   b. You must accept that the past cannot be changed, but that you can learn from it.
   c. Do not concentrate on mistakes. Rather, correct the problems that caused the mistakes. Causes can include:
      Poor training

Poor execution (i.e., poor task performance)
Poor choice of objectives
Poor leadership, coaching, and management system
Poor facilities, equipment, supplies.

d. Enforcement is typically reinforcement of standards via critiques, re-education, and clarification. Enforce with persistent inspection and training. Be tough but fair.

5. Be consistent, persistent, demanding, and fair.
6. Establish rules for achieving standards, but never let rules substitute for judgments of motives and circumstances.
7. Do not tolerate continuing violation of standards.

Planning Strategy

1. Establish objectives: What do I want to accomplish? How will I measure success?
2. What are my rewards? Why do I want to do it?
3. What are the risks? What can go wrong?
4. What are the alternative objectives? Why do I want to accomplish this one?

Plans

1. What is my timing? How long will it take?
2. What commitments will people make? Will management make?
3. Performance measurement: How will I know that we are on track?

Developing People

Developing people means:

1. Improving their skills
2. Teaching them new skills
3. Helping them eliminate weaknesses
4. Increasing responsibilities when they are capable
5. Moving them to new experiences to broaden their ability to judge
6. Allowing them to make mistakes, if they learn from the mistakes.

Current Licensing

Relating this to current licensing systems for retail and wholesale food establishments, one recognizes that the government provides essentially no correct guidance and demands no demonstration of control or control programs before employees are allowed to handle the highly contaminated food, or before individuals, who must be assumed to be contaminated upon entering the workplace, are employed to produce food products.

In most other industries, the government requires some form of licensing and education before people are allowed to work in a specific industry. Until the government requires the food industry to have mandatory hazard control programs before it is allowed to produce food, there will continue to be many illnesses and deaths each year due to the lack of correct information.

Inspection Is Not Prevention

It is critical to note that one cannot "inspect safety into a process". Management must **know** what the hazards are, **establish** effective controls, and **enforce** these controls in order to precontrol zero defects in products and services.

The Total Quality Management Cycle

Five Stages

There are five stages to building an effective organization. (See figure below). Stage 1 is **uncertainty** in operation. Management has no idea what will happen when the operation's doors are open every day. Following uncertainty, if the owner wishes, he or she can become **awakened, enlightened**, can achieve **wisdom**, and finally, will experience **certainty**. At this stage, even though there is not absolute control, the owner knows exactly the critical points that still need control, and can predict precisely what operations will be like on a daily basis.

Analysis and Planning

The first step in the effective Total Quality Management (TQM) cycle is **analysis and planning**. The owner defines the market specifications, makes a commitment to TQM; system performance standards and specifications for materials, supplies, equipment, facilities, environment, etc., are set. There is an Executive Quality Management team, which meets to examine the organization's strengths and weaknesses, its opportunities and threats, the cost of non-conformance; and to set goals and objectives for change. There are plans to capitalize on strengths, eliminate problems, and achieve opportunities. The existing policies, procedures, and standards are modified, in keeping with what was learned from feedback of the last TQM cycle. Management establishes an action calendar for change, allocates resources, and moves forward to Step 2.

Organization

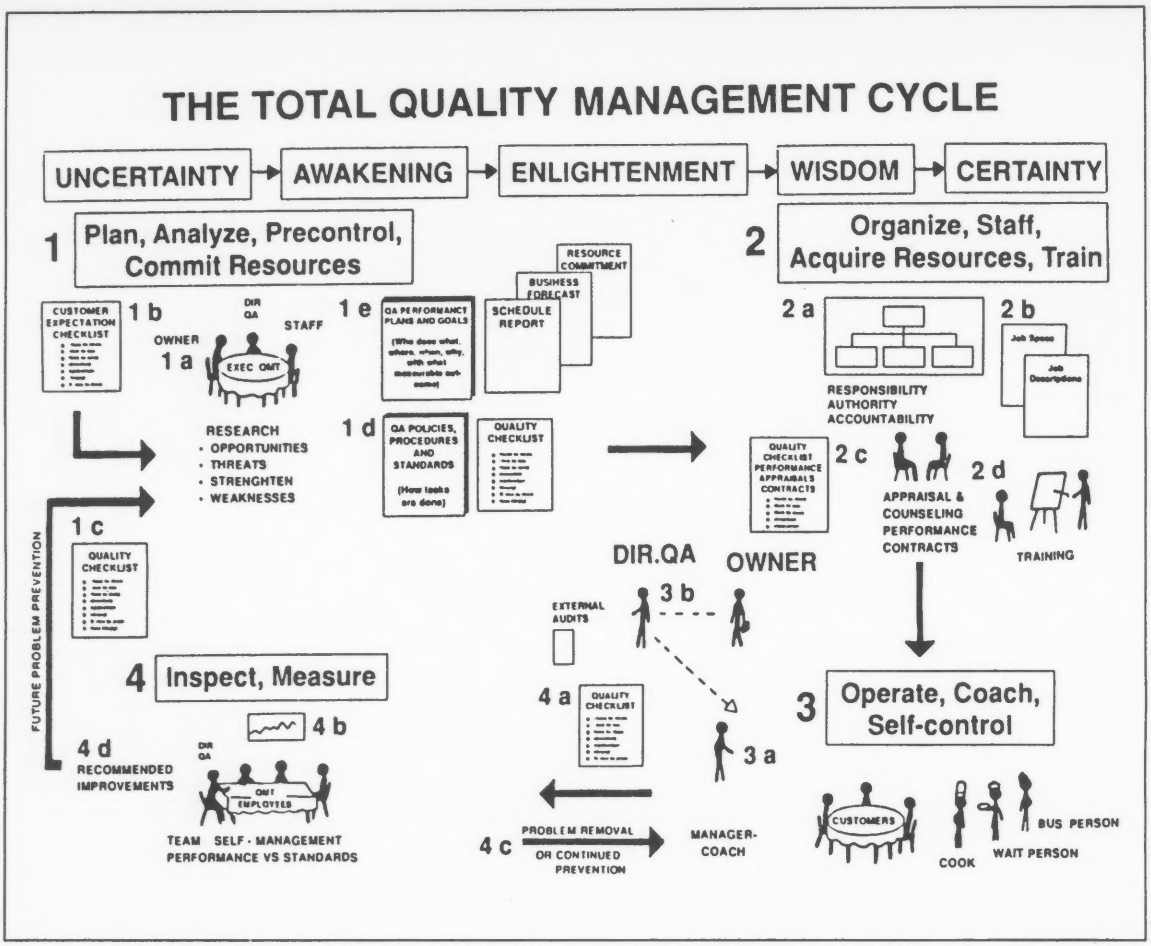
In Step 2, there is **organization staffing, material acquisition, training, and pre-operational readiness certification**. An action organization is established. Communications are clearly defined, with responsibility, accountability, and authority. Job specifications and descriptions in hiring procedures are prepared. Materials are acquired, people are counselled and trained, and there is pre-operational employee and system readiness certification.

Operation

In the third step, the **organization is in operation, supervisors lead and coach, reinforce, and control** employee performance. **Employees are self-managing**. There is production and selling of products. Management leads and motivates supervisors. There is delegation of responsibility for quality management to the lowest level of trained and certified personnel. On-the-spot coaching and corrections take place in order to make products and services conform. Every employee is a self-manager and self-controller, and team building takes place.

Measurement

In the final step, **the process is measured, Employee Quality Management teams** meet to discuss performance and to identify for management ways that processes can be

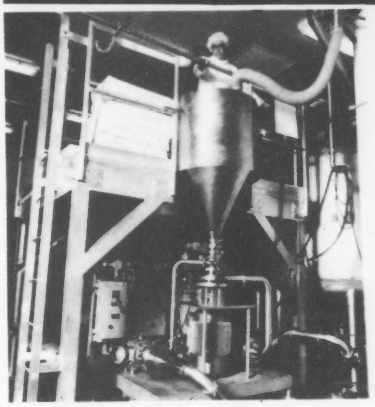


improved. External audits of statistical performance are made. Charting and recording of information is completed. All of this information is sent forward to the next cycle, Step 1, at which point management analyzes and plans for improved performance.

In an effective TQM program, the owner/CEO is the director of Total Quality Management. The Executive Quality Management team makes high-level decisions about new products, rewards, leadership, policies, etc. The Director of Quality Assurance does the "leg work" in terms of audits, maintaining performance data, training, maintaining manuals, etc. Each operational department, then, is responsible for using the quality assurance and quality improvement information to achieve zero defects in employee performance.

Part XVI will be continued in the October, 1993 issue of Dairy, Food and Environmental Sanitation.

Industry Products



Tri-Clover Blending System Line Expanded to Both Single- and Dual-Stage Models

An expanded line of blending systems to include both single-stage and dual-stage models will be featured by Tri-Clover Inc. at the Dairy & Food Expo '93 in Atlanta.

Designed to keep pace with other processing operations, the versatile Tri-Blender®-provides fast, uniform blending of dry ingredients. It affords customers the opportunities to boost production, reduce manpower, product loss and reprocessing time.

The Tri-Blender® efficiently integrates dry liquid ingredients without the introduction of air so that lumping, foaming and flooding, as well as pre- and post-blending, can be eliminated.

A new dual-stage Tri-Blender® system provides double blending, a particularly appealing feature for blending sugar products. The unit eliminates the need for additional strainers, pumps and other equipment, thereby creating the potential for reduced systems costs.

With the dual-stage system, as powder is added and percent solids increase, the vacuum remains constant, so the addition rate for powders does not decrease.

Operation of the basic Tri-Blender® begins with dry ingredients being fed into a hopper. A vacuum created by the blender draws the ingredients into the eye of the impeller. The diffuser keeps liquid and dry material separated until reaching the eye of the impeller. When the butterfly valve is actuated, it will seal the hopper intake as the last of the dry ingredients enters the blending chamber.

The liquid ingredient is simultaneously pumped into the outer diffuser. The liquid flows around the fuser tube and enters the blending chamber simultaneously with the dry ingredients. Blending then begins at the eye of the impeller within the casing. The system's screen enhances blending of highly hygroscopic powders. The end product is then either pumped directly to processing or recirculated through batch blending.

Tri-Clover, Inc. - Kenosha, WI

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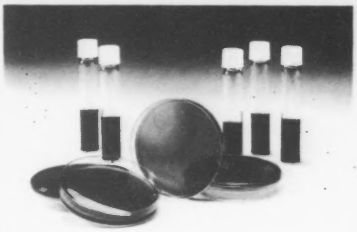

Salmonella *Enrichment Media from DIFCO Reduces Test Time, Increases Safety*

Difco Laboratories offers Rappaport-Vassiliadis *Salmonella* enrichment media, in broth or semisolid forms for the fast, safe and accurate detection of a wide range of serotypes.

The Association of Official Analytical Chemists recently granted first-action approval for Rappaport-Vassiliadis Medium Semisolid Modification (MSRV) as a standard method for testing both cocoa and chocolate. The AOAC acknowledgment offers the industry a new quality control benchmark for the testing of these foodstuffs.

Rappaport-Vassiliadis Rl0 Broth, also available from Difco, is less hazardous than selenite media, reducing the risk for users during preparation. In international collaborative studies, Rappaport-Vassiliadis Rl0 Broth gave a greater number of *Salmonella* isolates than tetrathionate broth, and detected a much wider range of *Salmonella* serotypes (data on file).

The semisolid form (MSRV) is a modification of the Rappaport-Vassiliadis Broth. MSRV detects motile *Salmonella* species as halos of growth around the original inoculum. This permits more rapid testing because users can perform seriological tests with migrated cultures isolated directly from the plate with no need for an additional purification step.

The confirmed test result is obtained 48 hours after the beginning of pre-enrichment.

Efficiency of *Salmonella* migration in the semisolid form is based on its high selectivity, which is the result of the presence of malachite green dye, novobiocin and high concentration of magnesium chloride.

Thorough testing assures high efficiency and selectivity, while Difco's 100 years of media engineering experience assures quality. Difco Rappaport-Vassiliadis R10 Broth and Difco Rappaport-Vassiliadis MSRV are available from a nationwide network of distributors who carry the full line of quality Difco products.

DIFCO Laboratories - Detroit, MI

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Precision Gas Mixer

To meet the calibration needs of scientific and industrial gas sensors, Columbus Instruments has developed a new precision gas mixer which has a remarkably wide mixing range that does not compromise a high accuracy reading of 1%! This rate of accuracy is achieved without the need to change components of the system, such as mass flow meters, as required in other gas mixers.

Columbus Instruments' PEGAS-3000 gas mixer allows the mixing of three (3) gases. While the primary application and calibration of the PEGAS-3000 is to mix air components (O_2, CO_2 and N_2), the principle of operation does not preclude mixing other gases. The C°2 mixing range is 0 to 10%, while O_2 and N_2 can be mixed in the range of 1% to 100% plus 0%. It takes approximately seven minutes to achieve a stable mixing condition and the 1% accuracy.

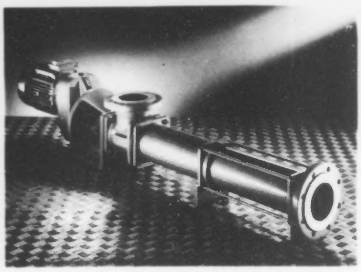
The available gas flow rate is 1.5 L/min., a sufficient rate for calibration purposes of most sensors. On request, models with higher flow rates for other applications are available. To obtain the required mixing percentages, the user enters the percent values for two gases, using the front panel buttons, and observes the numerical readings on the bright LED display. The third gas component, constituting a balance to 100%, is automatically computed by an internal microcontroller.

For mixing more than three gas components, two or more mixers can be connected in parallel with a common mixing chamber. After the new gas mix request, the microcontroller, which supervises system operation, waits and signals the time when the mixed gas achieves the specified accuracy.

The PEGAS-3000 mixer can be used instead of expensive, bottled, mixed gases. Its widely adjustable range allows the user to check the calibration and linearity of sensors and the measuring system in the entire measuring range, not only in a few selected points.

Columbus Instruments - Columbus, OH

Please circle No. 243
on your Reader Service Card



New Close-Coupled Monoflo® Progressing-Cavity Pumps Save Space and Provide Top Performance at Lowest Cost

Monoflo, a leading name in progressing-cavity pumps, now offers the B Range close-coupled pump.

These compact, high-performance pumps are designed for a variety of services including the handling of sludges, solids, and abrasive fluids in wastewater treatment; grouting mixes and drilling muds in the mining industry; polymer dosing in the chemical industry; coating mixes in the paper industry; a wide range of food products; and several oil-recovery applications.

B Range pumps, which offer exceptional value for the money, are available in cast iron and 316 Stainless with a variety of elastomers and rotating parts. Fifteen models cover capacities up to 440 USGPM and pressures to 175 PSI.

Other Monoflo progressing-cavity pumps are available, with either flange-free fit or molded-to-metal stators, for a wide range of general industrial applications and highly-viscous services.

Ingersoll-Dresser Pump Company - Chesapeake, VA

Please circle No. 244
on your Reader Service Card

Duct-Mounted Air Sterilizers for High Capacity Flows

Duct-mounted ultraviolet (UV) air disinfection systems with a microbial kill rate of over 99% have been developed by Aquionics Inc. for treating high volume air flows. For installation in food, dairy and beverage industry air handling systems, the UV-V units protect product handling and packaging areas by preventing the spread of spoilage organisms via heating, ventilation and air conditioning facilities. This improves product quality and extends shelf-life.

Containing a single, high intensity 1.2 or 2.5 kW arc-tube, each unit will treat air flows up to 2000 or 4000 cfm. The compact units are easily retrofitted into existing air ducts. Used down stream of air filtration, the low-maintenance UV units prevent contamination from microbial build-up on filter surfaces.

Aquionics, Inc. - Erlanger, KY

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VIDAS™

The VIDAS™ (Vitek ImmunoDiagnostic Assay System), a multiparametric immunoanalysis system from bioMérieux Vitek, Inc. is a major advancement in automated microbiology testing. VIDAS has been designed for direct antigen detection and serological testing of infectious disease agents. For the food industry, rapid pathogen screening of *Salmonella*, *Listeria*, and Staphylococcal enterotoxin can be easily accomplished.

The VIDAS utilizes a testing format known as ELFA (Enzyme-Linked Fluorescent Immunoassay), a version of the well-known ELISA technology. The end result of the testing protocol is a fluorescent product and the VIDAS reader utilizes a special optical scanner that measures the degree of fluorescence. The VIDAS uses bioMérieux Vitek's patented SPR (Solid Phase Receptacle), a pipette-like device coated with antibody, antigen, or other treatments on its interior surface allowing the capture of the target analyte. The VIDAS system also uses specially-designed VIDAS reagent strips which contain all pre-dispensed reagents required for on-line processing of an assay. From the moment the SPRs and the reagent strips are placed in the instrument, the VIDAS is fully automated.

The modular architecture of the VIDAS provides a random access testing capability for the laboratory. Different assays can be processed simultaneously or initiated at various times as designated by the operator. Virtually, any combination of assays can be processed in a single batch. The flexibility of the VIDAS allows each customer to "mix and match" quantities and types of assays as dictated by the laboratory workflow.

The VIDAS can be operated in combination with the VITEK® System or Bactometer® with the Vitek Nerve Center computer, or as a stand-alone system. Testing capacity is 30 tests with results automatically printed in as little as 45 minutes. Additional VIDAS readers may be added to expand the total VIDAS capacity to 120 tests.

For laboratories with smaller testing volumes, miniVIDAS™ has been designed as a totally integrated, automated, stand-alone system. One section of miniVIDAS functions as a compartment for the printer, computer, display screen, and keypad. Two other sections of miniVIDAS are used to process product samples and they can be run independently or together for a total of 12 tests at a time.

The miniVIDAS also contains optional ports with monodirectional interface to a laboratory information system and/or printer. Results are automatically printed in as little as 45 minutes. The miniVIDAS is capable of running all the same assays as VIDAS

The speed and accuracy of the VIDAS technology eliminates the need for costly sendouts or labor intensive procedures. The ease of use of the VIDAS or miniVIDAS coupled wit maximum throughput capabilities allows for an expanded test menu in a busy laboratory. Any laboratory, large or small, can no provide rapid and comprehensive pathogen screening results.

bioMérieux Vitek, Inc. - Hazelwood, MO

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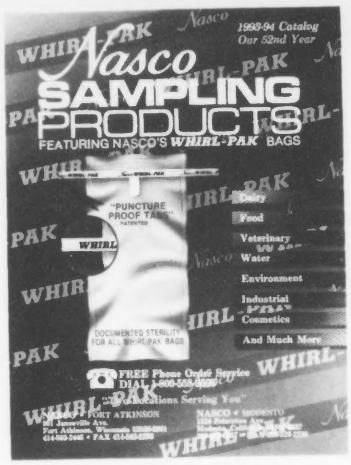
on your Reader Service Card



NASCO's 1993-94 Sampling Products Catalog

The 1993-94 Sampling Products Catalog is now available from NASCO in Fort Atkinson, Wisconsin, and Modesto, California. The catalog features a wide range of products used for sampling in the food, dairy, water, sewage, medical, veterinary, soil, forage, and industrial markets.

Included in the catalog are NASCO's Whirl-Pak® Sampling Bags with the patented "PUNCTURE PROOF TABS". Whirl-Pak® is the only sampling bag on the market with this unique feature which eliminates the sharp wire end on the tab, thus preventing bag puncture.

The 28-page catalog features three new Whirl-Pak® Bags. The first is the new Whirl-Pak® Pocket Bag, a 24 oz. sampling bag containing an outside pocket designed to hold the paperwork that accompanies the sample. This eliminates the need for a special label whenever sample information is needed. The 300 ml Thio-Bag® for water sampling is the second new bag that's introduced. This bag holds three times the amount of the standard 4 oz. Thio-Bag®, and contains sodium thiosulfate to neutralize chlorine in the water sample. This larger size Thio-Bag® allows for multiple tests to be done on a single sample of water. The third new bag is the NASCO Trans-Pak™ Biohazard Specimen Transport Bag for patient specimens. The Trans-Pak™ Bag, with the biohazard symbol required by OSHA, has a unique outside pouch that separates important patient paperwork from the inside of the bag and the specimen—eliminating misplaced documents.

Also featured in the catalog is the Whirl-Pak® "Speci-Sponge" Bag, designed for surface sampling to test for Listeria, Salmonella, etc. The "Speci-Sponge" is a sterile environmental sampling sponge that may be moistened with either a diluent or the new DE Neutralizing Broth, which will neutralize a wide variety of sanitizers.

Other new items include cutting trays for the display and evaluation of food products; polyethylene ladles and dippers; a portable microscope complete with carrying case for use in the field; and pre-cleaned vials, bottles, and jars for environmental sampling.

NASCO - Fort Atkinson, WI

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MTS Level Plus® Offers the Low Cost LT420 Level Transmitter for 100% Maintenance-Free Operation

MTS Systems, Sensors Division introduces the new Level Plus LT420, the First maintenance-free, loop powered 4-20 mA level transmitter for $1000. The LT420 offers excellent repeatability (to 0.01% of full scale), overall accuracy to 0.1% of full scale and has no internal moving parts for longevity and reliability. The LT420 transmitter was designed specifically for routine, general purpose level measurement.

The LT420 uses industry-standard 4-20 mA output for easy retrofitting into most existing process control systems. Installation is easy, and in most cases, the transmitter can be installed without taking the tank out of service. Because density, temperature and dielectric changes do not affect the transmitter's ability to repeatably measure tank contents, the LT420 needs no calibration or scheduled maintenance to stay within specification.

The LT420 is completely sealed and never has to be opened and exposed to the environment. The zero and scale adjustments are manipulated using a magnet to turn the two internal potentiometers.

The Level Plus LT420 level transmitter is based on magnetostriction, a simple, yet very reliable technology for measuring liquid levels. Magnetostrictive level transmitters monitor tank levels by measuring the intersection of two magnetic fields: one from the moving float, the other in the transmitter.

MTS Sensors Division - Research Triangle Park, NC

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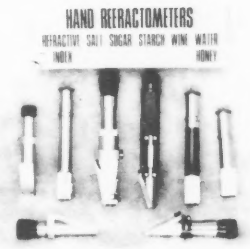

Hand Refractometers - Over 45 Models Available

Kernco Instruments Co., Inc. is pleased to announce its offering of the largest line of Hand Refractometers available from any one source.

Models are available to read directly in Brix (sugar), Salt, Honey, Alcohol in Wine, and in Starch. These refractometers can be used to measure the sugar content or soluable solids content in percentage of Brix or solids. Other models will measure in percentage of salt in food processes as well as being able to determine the percentage of honey and starch in other processes.

The ranges cover a low of 0-10% Brix (sugar) and up to a high of 0-90% Brix (sugar) and the capability of measuring salinity in 2 models with ranges covering 0-28.5 sodium chloride and the other model is a narrow range model covering a reading of 0-5% sodium chloride. Many models are temperature compensated.

All models are light in weight and are completely portable.

Kernco Instruments Co., Inc. - El Paso, TX

Please circle No. 251 on your Reader Service Card

New S.I.B. Smooth Inner-Bore Sanitary Tubing System Brochure Introduced

The Sani-Tech Group is proud to introduce our new State-Of-The Art S.I.B. (Smooth Inner-Bore) Tubing System and Fusion Equipment. The system virtually eliminates turbulinity of flow with no disruption to Laminar Flow. S.I.B. eliminates all mechanical connections and replaces them with a completely Smooth Inner-Bore fusion for bacteria-free piping systems. Available in 1/2" - 3" I.D. sizes in FDA and USDA sanctioned natural PP, PVDF and *Halar*. Applications include all High Purity System requirements.

Sani-Tech - Lafayette, NJ

Please circle No. 250 on your Reader Service Card

Crepaco Series "P" Sanitary Control Valves Promise Versatility

APV Crepaco now offers a full line of versatile sanitary air-operated valves which meet 3-A requirements. Suitable for flowrates to 900 USgpm and standard line pressures of 114 psig; a special air-loading device allows line pressures to 313 psig.

Features and options includes:

- Short stroke design, with long-stroke models for viscous liquids
- Position indicator stem as option, to visually show open/close position
- Tee, cross and divert valve bodies available
- Linear throttling valve with Moore positioner
- Encapsulated spring holder for safe assembly
- Air open/air close - Air open/spring close -spring open/air close
- Field reversibility for air open or air close operation
- Aseptic design optional
- Fractional valve sizes, 1/2" and 3/4"

Wide variety of sanitary connections and body configurations available. Special designs such as tank/kettle valve, tangential valve and sampling valves can be furnished .

APV Crepaco - Lake Mills, WI

Please circle No. 249 on your Reader Service Card

Pall KLEENPAK Disposable Filter Assemblies Provide Filtration Security And User Convenience Available From Pall Corporation

Pall KLEENPAK Filter Assemblies combine the widest available range of filter media and specially designed self-contained disposable assemblies to satisfy the highest standards of filtration security, reliability and user convenience. The unique self-contained design of each filter, complete with its KLEENPAK housing, minimizes operator exposure to finished products, solvents and chemicals. The integral design simplifies filter installation and change-outs. The integrally molded inlet and outlet connections provide maximum convenience and security in both sanitary and hosebarb designs.

The KLEENPAK Filter Assemblies' high strength design allows multiple autoclave cycles for extended use and maximum filter economy. The internal filter hold-up volume and dead space is minimized for maximum product recovery. All materials of construction pass USP Class VI Biological Tests for plastics at 121°C and are FDA listed.

KLEENPAK Filter Assemblies use Pall Ultipor® N_{66}®, Emflon® II and HDC® II filter media which are manufactured to Pall's high standard of quality assurance and cleanliness.

Pall Ultrafine Filtration Company - East Hills, NY

Please circle No. 252 on your Reader Service Card

New Rapid Hygiene Analyzer

Foss Food Technology announces the introduction of the Biotrace® Multi-lite luminometer for rapid extension of the hygienic condition of plant equipment, process lines, etc. The Multi-Lite offers significantly increased sensitivity and brings a new dimension to ATP-based analysis.

Hygiene swabs can be analyzed in minutes as can CIP rinse water, etc. "Real time" HACCP control is now possible with this compact, fully-portable unit.

Foss Food Technology - Eden Prairie, MN

Please circle No. 253 on your Reader Service Card

Affiliate News

Mr. Steve Halstead, Executive Manager of IAMFES, discusses "Texas Talk" with Ms. Janie Park, Secretary of TAMFES.

TAMFES Holds 11th Annual Meeting

The Texas Association of Milk, Food and Environmental Sanitarians held their 11th annual meeting at the Wyndham Hotel in Austin, Texas on June 8th and 9th, 1993.

325 people registered for the event.

Special guests were Dr. David R. Smith, Commissioner of Health for Texas and Mr. Steven K. Halstead representing IAMFES.

On Monday June 7th, a golf tournament was held with 93 participants.

Tuesday morning a laboratory session was held, chaired by Mr. Joseph Bare. Dr. Smith gave the opening remarks to start the annual conference. Speakers for the conference were: Mr. Paul Neill, Schepps Dairy; Mr. John Adams, Director of Milk Safety, National Milk Producers Federation; Dr. Ron Lacewell, Texas A&M University; Dr. Bruce Cords, Director of Research, Economics Laboratory; Mr. Art Bank, Director of Retail Food Protection, FDA; Mr. Dick Crone, Division Manager, Dean Foods; and Dr. Russ Flowers, President Silliker Laboratories.

A business meeting was held following the conference. Mr. Steven Halstead briefed the TAMFES, Board of Directors, on the status of the 1994 IAMFES meeting to be held in San Antonio, Texas.

The TAMFES organization would like to extend an early invitation to come to Texas for the International meeting in 1994. TAMFES plans to make this an outstanding meeting.

Mr. Joseph Bare was recognized with a plaque for outstanding services to the Texas Affiliate. We would also like to publicly thank Mr. Bare for the years he has spent organizing and chairing the laboratory session. Each year, since its inception, it has been to standing room only participants.

TAMFES would also like to thank Ms. Linda Ybarra, outgoing president and long time Board member, for her years of devotion to TAMFES. On Tuesday night, a fish fry/bar-b-cue and country western dance was held for the members entertainment.

Kent Roach was elected as the 1993-94 TAMFES president with Don Ritch as vice-president.

TAMFES OFFICERS

President	Kent Roach, San Antonio
President-Elect	Don Ritch, Dallas
Secretary	Janie Park, Austin
Treasurer	Ron Richter, College Station
Delegate	Kirmon Smith, Austin
Historian	Joe Goddard, Lubbock

Mail all correspondence to:

TAMFES
Ms. Janie Park
P. O. Box 2363
Cedar Park, TX 78613-2363
(512)458-7281

Upcoming IAMFES Affiliate Meetings

OCTOBER

•**6-8, Kansas Association of Sanitarians 64th Annual Educational Conference** will be held at the Doubletree Hotel, Overland Park, KS. For more information contact Galen Hulsing at (913)233-8961.

•**7-8, Fourteenth Annual Joint Educational Conference** sponsored by the Wisconsin Association of Milk and Food Sanitarians, Wisconsin Environmental Health Association and Wisconsin Dairy Plant Fieldmen's Association, will be held at the Chula Vista Resort, Wisconsin Dells, WI. For further information contact, Neil Vassau, Publicity Chairperson, P.O. Box 7883, Madison, WI 53707, (608)267-3504.

•**13-14, Iowa Association of Milk, Food and Environmental Sanitarians, Inc. Annual Meeting** will be held at the Ramada Inn, Waterloo, IA. For more information, please contact Dale Cooper at (319)927-3212.

•**21-22, Michigan Food Protection Seminar** to be held at the Bill Oliver Caberfae Motor Inn, Cadillac, MI. For more information call Bob Taylor, IAMFES Delegate and Meeting Liaison, at (517)335-4297.

•**26, Associated Illinois, Milk Food and Environmental Sanitarians Annual Meeting** will be held at the Carlisle in Lombard, IL. For more information call Bob Crombie at (815)726-1683.

•**26-28, Basic Pasteurization Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)458-7281.

NOVEMBER

•**2-3, North Dakota Environmental Health Association's Annual Meeting** to be held at the Doublewood in Bismarck, ND. For more information, contact Garry Hoffman, ND Departmentof Agriculture at (701)224-4763.

•**10-11, Alabama Association of Milk, Food and Environmental Sanitarians** will hold their Annual Meeting at the Howard Johnsons, Montgomery. For more information contact Dr. Tom McCaskey at (205)844-1518.

•**15-17, Pennsylvania Association of Dairy Sanitarians and Dairy Laboratory Analysts Fall Meeting** will be held at Penn State University, University Park, PA. For more information, contact Mike John at (717)762-7789.

Wisconsin Joint Conference 1993

A Dairy, Food and Environmental Health Symposium

The Wisconsin Association of Milk and Food Sanitarians (WAMFS), Wisconsin Environmental Health Association (WEHA), Wisconsin Association of Dairy Plant Field Representatives (WADPFR), joint conference is set for Thursday, October 7 and Friday, October 8, 1993 at the Chula Vista Resort in Wisconsin Dells.

Each group is planning separate programs at the conference that would be of interest to all groups. Some highlights include: an address by Secretary of the Department of Agriculture Alan Tracy on Dairy 2020. Other presentations planned are on Recycling, Lead, Bats, Wood Cutting Boards, Underground Storage Tanks, Radon, Ground Beef and *Escherichia coli*, Superior's Benzene Spill, Hazard Analysis & Critical Control Points Symposium, Cryptosporidium, Antibiotic Symposium, Interstate Shippers Report, 50th Anniversary celebration of WAMFS and many exhibitors.

Chula Vista Resort and the Wisconsin Dells area offers golf, tennis, swimming pools of all types, and many sites to see. For those who desire an extended weekend vacation, the resort has extended the price breaks for the weekend.

So come to the conference to educate yourself into the future, and mix a little fun in too.

For more information please contact Neil Vassau Department of Agriculture, Trade, & Consumer Protection, Bureau of Laboratory Services, P.O. Box 7883, Madison, WI 53707, 608-267-3504.

New IAMFES Members

Alabama

Rhonda L. Ezell
American Maize
Decatur

Karen Hensen
US Army
Anniston

David Kamau
Tuskegee University
Tuskegee University

Lynn McDonald
American Maize
Decatur

Robert Ralyea
US Army
Anniston

California

Debra Clark
University of California - Irvine
Irvine

Lisa Nesbett
National Food Processors Association
Dublin

Robin K. Oshiro
University of California - Irvine
Irvine

Mark Rodriguez
Chicago Brothers
San Diego

Chris Terry
Jimmie's Food, Inc.
Santa Rosa

George Tharrington
Hunt Wesson Foods
Fullerton

Nancy Watanabe
DNA Plant Technology
Oakland

Colorado

Indriati Ekasari
Imperial Holly
Colorado Springs

Edith Wilkin
Leprino Foods
Denver

Delaware

Fred Hartman
Dupont
Wilmington

Florida

Paul Bina
Toxin Technology
Sarasota

Georgia

Paul Bobyak
Rich-Seapak
Brunswick

Robert W. Brooks
Woodson-Tenent Laboratories
Gainesville

Cindy Leonard
CYNQUEST, Inc.
Marietta

Arnold G. Whittaker
Whittaker and Associates
Atlanta

Illinois

Stephanie Bell
Kraft General Foods
Glenview

J. Roy Escoubas
Viskase Corporation
Chicago

John A. Marcello
Educational Foundation of the
National Restaurant Association
Chicago

Larry J. Maturin
Food and Drug Administration
Summit-Argo

Linda Panek
The Hidden Valley Ranch Co.
Wheeling

Indiana

Rick Lopez
Marsh Supermarkets
Indianapolis

Iowa

Beth Lautner
National Pork Producers Council
Des Moines

Kentucky

Alvis Leslie, Jr.
Southern Belle Dairy
Bronston

Meredith Scales
Southern Belle Dairy
Somerset

Maryland

David Wagner
Food and Drug Administration
Beltsville

Michigan

C. C. Sheree Lin
S & J Laboratories, Inc.
Kalamazoo

Julie A. Seiter
Analytic & Biological Laboratories
Livonia

Kathline Rossmoore
The Stroh Brewing Co.
Detroit

Missouri

Jean Berney
Pet Inc.
St. Louis

Erin Geringer
Pet Inc.
St. Louis

Minnesota

Diane Parker
3M Microbiology
St. Paul

Crispin Philpott
3M Microbiology
St. Paul

Paul Suszko
3M Microbiology
St. Paul

New Jersey

Jamas Buckalew
Rutgers University
Piscataway

New York

Jim Fitts
NYS Department of Agriculture
and Markets
Homer

Ohio

Cadwell McKay
Columbus Health Department
Columbus

Tennessee

Mark Carter
McKee Foods Corporation
Collegedale

Melaine D. Jackson
Knoxville

Utah

Mark Lamb
US Airforce
Hill AFB

Washington

Ellen M. Kittson
State Health Laboratory Service
Ballajvra

West Virginia

Warren Charminski
West Virginia Dept. of Agriculture
Charleston

Wisconsin

Judith Aulik
University of Wisconsin-Madison
Madison

Austria

Regina Sommer
University of Vienna
Vienna

Brazil

Anita Tibana
Universidade Federal do Rio de Janeiro
Rio de Janeiro

Canada

Cynthia Grdic
University of Guelph
Toronto, Ontario

D. Ram Jee
Lockwood Pulmonary Functions Clinic
Toronto, Ontario

Debbie Labelle
J. M. Schneider, Inc.
Kitchener, Ontario

Ivan Linjachi
University of Guelph
Guelph, Ontario

Munira Peermohamed
Calgary Health Services
Calgary, Alberta

Amelia Trinidad
Columbia Centre for Disease Control
Vancouver, British Columbia

John Wendell
J. M. Schneider, Inc.
Kitchener, Ontario

News Release from the

3-A Sanitary Standards Committees

The 3-A Sanitary Standards Committees Meetings, May 17-21, 1993 in Milwaukee, Wisconsin, resulted in a number of actions. The following tentative standards received approval and will be effective six months after final approval, with the exception of Number 20-18, which becomes effective four months after final approval.

T-08-17N. Tentative 3-A Sanitary Standards for Pressure Reducing and Back Pressure Regulators Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Parts I & II, Draft Proposal, October 1989, Third Revision, May 1992.

T-08-19D. Tentative Revisions to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Automatic Positive Displacement Samplers), Number 08-17D, Second Revision, May 1992.

T-08-22P. Tentative Revisions to Parts I & II of 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Fittings & Plug-Type Valves), Number 08-17, as amended, First Revision, May 1992.

T-09-00A. Tentative Amendments to Parts I & II of 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products (Fittings & Plug-Type Valves), Number 08-17, as amended. First Revision, May 1992.

T-11-04. Tentative Amendments to 3-A Sanitary Standards for Plate Type Heat Exchangers for Milk and Milk Products, Number 11-03, First Revision, May 1992.

T-13-09. Tentative Revisions to 3-A Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13-08, Sixth Revision, May 1992.

T-23-02. Tentative Revisions to 3-A Sanitary Standards for Equipment for Packaging Frozen Desserts, Cottage Cheese and Similar Milk Products, Number 23-01, Fourth Revision, May 1992.

T-44-01. Tentative Amendments to 3-A Sanitary Standards for Air Driven Diaphragm Pumps, Number 44-00, First Revision, May 1992.

T-20-18. Tentative Amendments to 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-17, Proposal, January 1993.

T-08-Title/Serial Number Amendment. These are eight proposals to amend most of the valves and fittings standards so they have unique titles and serial numbers.

The following are title and serial number changes to the 08 series:

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-17 as Amended (Fittings and Plug-Type Valves).

To: 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-00
And: 3-A Sanitary Standards for Plug-Type Valves for Milk and Milk Products, Number 51-00

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-20A, Compression-Type Valves

To: 3-A Sanitary Standards for Compression-Type Valves for Milk and Milk Products, Number 53-00

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-17C, Boot-seal Type Valves

To: 3-A Sanitary Standards for Boot-Seal Type Valves for Milk and Milk Products, Number 55-00

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number T-08-17E Rev., Inlet and Outlet Leak-Protector Plug-Type Valves

To: 3-A Sanitary Standards for Inlet and Outlet Leak-Protector Plug-Type Valves for Milk and Milk products, Number 56-00

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-17F Rev., Tank Outlet Valves

To: 3-A Sanitary Standards for Tank Outlet Valves for Milk and Milk products, Number 57-00

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-17M, Vacuum Breakers and Check Valves

To: 3-A Sanitary Standards for Vacuum Breakers and Check Valves for Milk and Milk Products, Number 58-00

To receive information on membership with IAMFES Circle 360 on this card

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International Association of Milk, Food and Environmental Sanitarians Inc

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Reader requests for information are sent to the appropriate company. Follow-up on reader requests are the responsibility of the company advertising.

The Advertisements included herein are not necessarily endorsed by the International Association of Milk, Food and Environmental Sanitarians, Inc.

Name _____ Title _____

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Please send information on items circled below: Deadline 60 days from issue date

101	114	127	140	153	166	179	192	205	218	231	244	257	270	283	296	309	322	335	348
102	115	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323	336	349
103	116	129	142	155	168	181	194	207	220	233	246	259	272	285	298	311	324	337	350
104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
106	119	132	145	158	171	184	197	210	223	236	249	262	275	288	301	314	327	340	353
107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
113	126	139	152	165	178	191	204	217	230	243	256	269	282	295	308	321	334	347	360

This second Reader Service Card is provided to allow co-workers to also respond to companies of interest.

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102	115	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323	336	349
103	116	129	142	155	168	181	194	207	220	233	246	259	272	285	298	311	324	337	350
104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
106	119	132	145	158	171	184	197	210	223	236	249	262	275	288	301	314	327	340	353
107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
113	126	139	152	165	178	191	204	217	230	243	256	269	282	295	308	321	334	347	360

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From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number 08-17D Rev., Automatic Positive Displacement Samplers

To: 3-A Sanitary Standards for Automatic Positive Displacement Samplers for Fluid Milk and Fluid Milk Products, Number 59-00

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Number T-08-17G Rev., Rupture Discs

To: 3-A Sanitary Standards for Rupture Discs for Milk and Milk Products, Number 60-00

From: Tentative Amendments to 3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Parts I and II, Number T-08-17N

To: 3-A Sanitary Standards for Pressure Reducing and Back Pressure Regulating Valves for Milk and Milk Products, Number 64-00

These new and amended 3-A Sanitary Standards will be published in upcoming issues of *Dairy, Food and Environmental Sanitation* as they become available. For further information on the 3-A Sanitary Standards program, contact Dr. Tom Gilmore, Technical Director, 3-A Sanitary Standards Committees, 6245 Executive Blvd., Rockville, MD 20852, Phone: (301)984-1444.

Reprinted from
Dairy, Food and Environmental Sanitation, Vol. 13, No. 9, Page 549 (September 1993)

3-A Sanitary Standards For Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-18

Formulated by
International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee

It is the purpose of the IAMFES, USPHS and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Multiple-use plastic materials used as product contact surfaces for dairy equipment heretofore or after developed which so differ in specifications or otherwise as not to conform with the following standards, but which, in fabricator's opinion are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS and DIC at any time.

The "3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-17," are hereby further amended as indicated in the following:

Section H. Standards for Acceptability, sub-paragraph H.2: Add the following materials to the list of Generic Classes of Plastics:

Table 1

Generic Classes of Plastics	Maximum Percent Weight Gain: Cleanability Response (Section E Regimen)	Product Treatment (Section F Regimen) Solution I	Solution J
POLYARYLSULFONE RESIN	0.40	0.80	1.50

These amended standards shall become effective September 20, 1993.

Business Exchange "Classifieds"

Services / Products

Food Testing & Analysis

Northeast Labs is a USDA-recognized Listeria Salmonella Lab, and also follows FDA protocols. Call us for · **Shelf Life Studies:** accelerated and real time · **Spoilage and Complaint Diagnosis:** microbial enumeration and identification of specific spoilage types—chemical breakdown—food-borne illness—chemical contaminants—foreign matter · **Specific Pathogen Exam:** listeria—salmonella—staph enterotoxins · **Fat Level Disputes on Meats:** sampling by MICA—USDA Certified Lab #2376 · **Nutritional Analysis**

NEL NEL NEL

NORTHEAST LABORATORY SERVICES
P.O. Box 788, Waterville, Maine 04903 1-800-244-8378

CIRCLE READER SERVICE NO. 322

CIRCLE READER SERVICE NO. 318

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ENVIRONMENTAL SYSTEMS SERVICE, LTD.

- **Testing for Listeria and other Pathogens**
- **Drug Residue Analysis by H.P.L.C. and GC/MS**
- **Dairy, Poultry and Food Product Testing**
- **Water and Wastewater Analysis**
- **Vitamin Analysis of Dairy Products and Concentrates.**

218 N. Main Street **Culpeper, VA 22701**
703-825-6660 **800-541-2116**

CIRCLE READER SERVICE NO. 349

Michelson Laboratories, Inc.

6280 Chalet Drive, Los Angeles, CA 90040
Telephone: (310) 928-0553 / (714) 971-0673 / FAX (310) 927-6625

COMPLETE DAIRY ANALYSIS SPECIALIZING IN:
- Chemical
- Microbiological
- Sugar Profile
- Fatty Acid Profile
- Vitamin A & D
- Quality Assurance
- Consulting
- IMS-USPHS-FDA Approved 06143

TECHNIQUES AVAILABLE:
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- Mass Spectrometry
- Gas Chromatography
- Atomic Absorption
- Spectrophotometry
- Spectrofluorometry
- Spiral Plater
- Laser Counter
- Microscopy
- Vitek & Bactometer
- Inductively Coupled Plasma

****

Also Offering: Milk Calibration Samples for Infra-red Milk Analyzer and Electronic Somatic Cell Counter

CIRCLE READER SERVICE NO. 340

COMPLETE LABORATORY SERVICES

Ingman Labs, Inc.
2945-34th Avenue South
Minneapolis, MN 55406
612-724-0121

CIRCLE READER SERVICE NO. 315

Advertising Opportunities in the Business Exchange

The Business Exchange "Classifieds" are a simple and economic way to promote your products, equipment and services to IAMFES members and other industry personnel. For as little as $52, you can bring your company's name and products to the attention of Dairy, Food and Environmental Sanitation readers. The Business Exchange section offers Economic Rates for Effective Advertising:

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Nine Time Rate:	$27 per column inch
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For more information on classified advertising in the Business Exchange, contact:

Randall Bosley
Advertising Representative

Lysa Fisk
Advertising Representative

Pam Wanninger
Advertising Representative

Scott Wells
Advertising Manager

at the
International Association of Milk, Food and Environmental Sanitarians
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322
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Add a Little Color to Your Classified Advertising

For a Very Low Cost!

To Highlight your Business Exchange Advertisement, and Make It Stand Out, IAMFES Announces the Availability of Spot Color.

For the low cost of $50 per placement, IAMFES will border your ad with bright red (PMS color #032). Selected text may also be highlighted in red.

IAMFES will set up your ad to include red at no additional charge.

Contact any of the IAMFES advertising staff listed at left for further information.

Coming Events

1993

October

•**2, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Orlando, FL. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**2-7, 36th Annual National Conference and Exposition of the Environmental Management Association** will be held at the Holiday Inn Surfside, Clearwater Beach, FL. For further information on EMA and its national conference, please contact EMA, 4350 DiPaolo Center, Suite C, Dearlove Road, Glenview, IL 60025-5212, (708)699-6362 or (708)699-6EMA, FAX: (708)699-1703.

•**3-8, 1993 National Safety Council Congress and Exposition "World Class Solutions"** will be held at the McCormick Place, Chicago, IL. For more information, please contact Robin L. Ungerleider at (708)775-2303.

•**6, HACCP Training and Certification Workshop for the Seafood Industry**, to be held at the Holiday Inn on the Bay at Embarcadero, San Diego, CA. Co-sponsored by the University of California Sea Grant Extension Program, the National Fisheries Institute, and the California Fisheries and Seafood Institute. Registration fee: $100. For more information contact Robert Price (916/752-2194) or Pamela Tom (916/752-3837), Food Science and Technology Department, University of California, Davis, CA 95616 (FAX: 926/752-4759).

•**6-8, Kansas Association of Sanitarians 64th Annual Educational Conference** will be held at the Doubletree Hotel, Overland Park, KS. For more information contact Galen Hulsing at (913)233-8961.

•**6-9, 1993 Dairy Foods Industry Convention**, sponsored by the Milk Industry Foundation, National Cheese Institute, International Ice Cream Association and American Butter Institute, along with their suppliers, will be held at the Palmer House Hilton, Chicago, IL. For more information, please contact Mary Vanderbeck at the International Dairy Foods Association, (202)296-4250.

•**7-8, Fourteenth Annual Joint Educational Conference** sponsored by the Wisconsin Association of Milk and Food Sanitarians, Wisconsin Environmental Health Association and Wisconsin Dairy Plant Fieldmen's Association, will be held at the Chula Vista Resort, Wisconsin Dells, WI. For further information contact, Neil Vassau, Publicity Chairperson, P.O. Box 7883, Madison, WI 53707, (608)267-3504.

•**8, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Atlanta, GA (downtown). This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**9, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Atlanta, GA (suburbs). This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**9, Symposium on Protein Definition**, sponsored by the International Dairy Federation, will be held in Minneapolis, MN. For more information contact the IDF General Secretariat, 41 Square Vergote, 1040 Brussels, Belgium, Tel: +32 2 733 98 88; FAX: +32 2 733 04 13.

•**12-15, DNA Fingerprinting**, sponsored by the American Type Culture Collection's Laboratory Workshops Department, will be held in Rockville, MD. For more information, please contact ATCC Workshops Manager, 12301 Parklawn Drive, Rockville, MD 20852, (301)231-5566, FAX (301)770-1805.

•**13-14, Annual Conference of the North Central Cheese Industries Association** to be held at the Sheraton Inn Airport Hotel, Minneapolis, MN. For further information contact E.A. Zottola, Executive Secretary, NCCIA, PO Box 8113, St. Paul, MN 55108.

•**13-14, Iowa Association of Milk, Food and Environmental Sanitarians, Inc. Annual Meeting** will be held at the Ramada Inn, Waterloo, IA. For more information, please contact Dale Cooper at (319)927-3212.

•**16, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Denver, CO. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**19-21, Food Preservation 2000 - Integrating Processing, Packaging, and Consumer Research** is sponsored by and held at U. S. Army Natick Research, Development and Engineering Center, Natick, MA, USA. For additional information, please contact Lisa McCormick or Sonya Herrin, Science and Technology Corporation, (804)865-7604.

•**21-22, Michigan Food Protection Seminar** to be held at the Bill Oliver Caberfae Motor Inn, Cadillac, MI. For more information call Bob Taylor, IAMFES Delegate and Meeting Liaison, at (517)335-4297.

•**26, Associated Illinois, Milk Food and Environmental Sanitarians Annual Meeting** will be held at the Carlisle in Lombard, IL. For more information call Bob Crombie at (815)726-1683.

•**26-28, Basic Pasteurization Course**, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians, will be held at the Le Baron Hotel, 1055 Regal Row, Dallas, TX. For more information, please contact Ms. Janie F. Park, TAMFES, P. O. Box 2363, Cedar Park, TX 78613-2363, (512)4458-7281.

•**28-29, Workshop on Practical Applications of HACCP Principles,** sponsored by the International Dairy Federation, will be held in Kiel, Germany. For more information contact Mr. Th. Kutzemeier, Verband der Deutschen Milchwirtschaft e.V., Deutsches Naitonal Komitee im Internationalen Milchwirtschaftsverband (I.M.V.), 137 Meckenheimer Allee, 5300 Bonn 1, Germany, Tel: +49 228 69 61 80, FAX: +49 228 63 84 25.

November

•**2-3, North Dakota Environmental Health Association's Annual Meeting** to be held at the Doublewood in Bismarck, ND. For more information, contact Garry Hoffman, ND Department of Agriculture at (701)224-4763.

•**3, HACCP Training and Certification Workshop for the Seafood Industry**, to be held at the Southern California Gas Company, Downey, CA. Co-sponsored by the University of California Sea Grant Extension Program, the National Fisheries Institute, and the California Fisheries and Seafood Institute. Registration fee: $100. For more information contact Robert Price (916/752-2194) or Pamela Tom (916/752-3837), Food Science and Technology Department, University of California, Davis, CA 95616 (FAX: 926/752-4759).

•**5, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Dallas, TX (downtown). This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**6, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Dallas, TX (suburbs). This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**10-11, Alabama Association of Milk, Food and Environmental Sanitarians** will hold their Annual Meeting at the Howard Johnsons, Montgomery. For more information contact Dr. Tom McCaskey at (205)844-1518.

•**12, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in New York, NY. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**13, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Northern New Jersey. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**14-16, The Food Industry Environmental Conference and Exhibition,** presented by the Environmental Science and Technology Laboratory and Georgia Tech Research Institute, will be held at the Omni Hotel at CNN Center, Atlanta, GA. For more information contact Edd Valentine or Charles Ross at (404)894-3806.

•**15-17, Pennsylvania Association of Dairy Sanitarians and Dairy Laboratory Analysts Fall Meeting** will be held at Penn State University, University Park, PA. For more information, contact Mike John at (717)762-7789.

•**18, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Washington, DC. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**19, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Philadelphia, PA. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

December

•**3, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Kansas City, MO. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**4, Food Labels: Learning the New Language**, A Workshop on the New FDA and USDA Food Labeling Requirements, will be held in Cleveland, OH. This workshop is co-sponsored by The American Dietetic Association Foundation and The Food Processors Institute and developed with a grant from Campbell Soup Company. For more information contact The Food Processors Institute (DLC), 1401 New York Avenue, NW, Suite 400, Washington, DC 20005, (202)393-0890.

•**8-10, Symposium on Antibiotics and Sulfonamides in**

Milk: Significance, Detection and Development of an Integrated Detection System, sponsored by the International Dairy Federation with AOAC International, to be held at the Conference Centre Kolle Kolle, Copenhagen, Denmark. For more information contact Prof. Dr. W. Heeschen, Bundesanstalt fur Milchforschung, Hermann Weigmann-Str.1, 2300 Kiel 1, Germany, Tel. +49 431 609 392, FAX: +49 431 609 222.

1994

May

•**7-12, Food Structure Annual Meeting** will be held at the Holiday Inn Downtown City Hall, Toronto, Ontario, Canada. For more information, please contact Dr. Om Johari, SMI, Chicago (AMF O'Hare), IL 60666-0507, USA (or call 708-529-6677, FAX: 708-980-6698).

To insure that your meeting time is published, send announcements at least 90 days in advance to: IAMFES, 200W Merle Hay Centre, 6200 Aurora Avenue, Des Moines, IA 50322.

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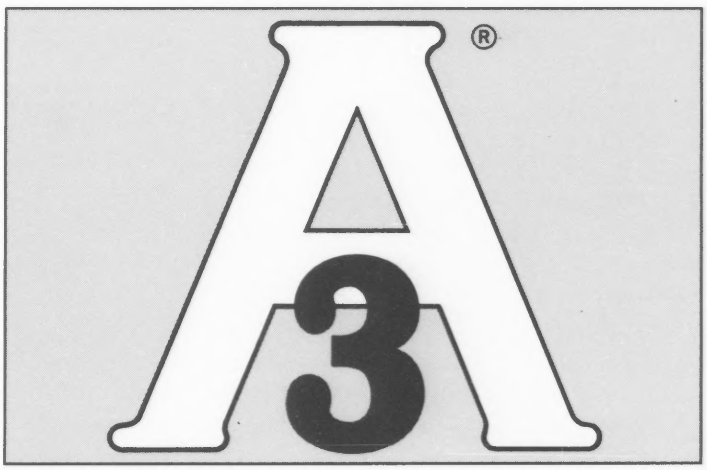

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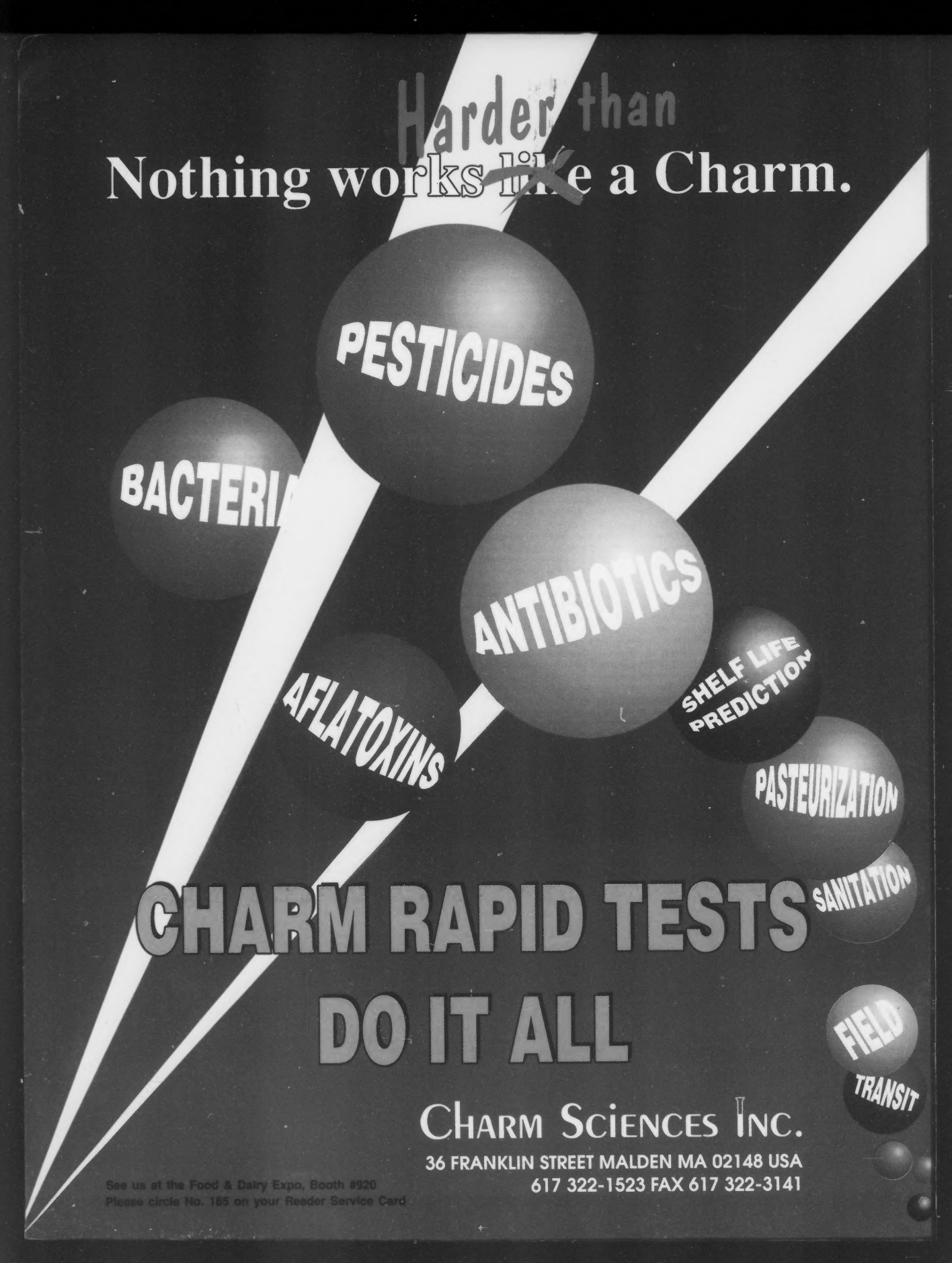
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