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# Dairy and Food Sanitation®



A Publication of the International Association of Milk, Food and Environmental Sanitarians, Inc.

A Suspected  
Waterborne  
Illness Outbreak

Spice Quality in  
Clear Plastic  
Packaging

Food Irradiation  
Course at UC  
Davis, March 13-15

Continuous Culture  
Fermenters Used in  
Study of Ruminant Nutrition


Adults Need  
Calcium Too

ACDPI Student Essay  
Deadline is January 15



National Mastitis Council Meeting, February 15-17, 1985

Call for Research Papers for the 1985 Annual  
Meeting. See the October Issue.

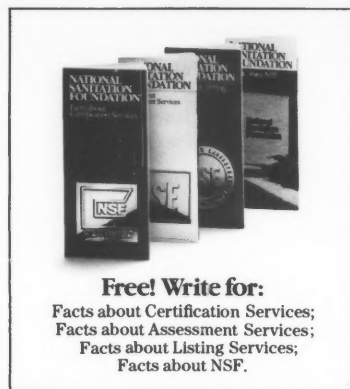
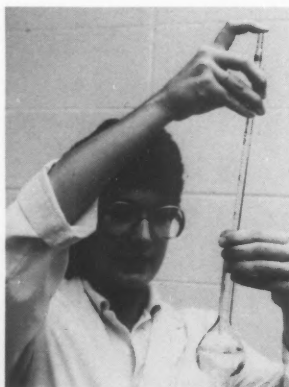


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## PROTECTION OF SPICE QUALITY USING CLEAR PLASTIC PACKAGING

RICARDO J. ALVAREZ, PH.D.  
and J. MORRIS BINDER

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Presented at the 71st Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, August, 1984, Edmonton, Alberta, Canada.

*Clear plastic is rapidly replacing metal cans as the standard of package identity for foodservice spices. This study was undertaken to compare the protective properties of Kodar® PET-G co-polyester bottles and metal cans in their ability to maintain the quality of selected spices. Paprika, parsley, garlic powder, pepper, nutmeg, cinnamon and cayenne pepper were stored at 100°F and 90% relative humidity for 30 days in both containers. Controls were maintained at 40°F for the same period. Flavor loss, moisture uptake, color change, oils and volatiles losses and lumping were less in the co-polyester container. Overall, the quality of the spices in the PET-G container was equal to or, in most cases, better than those stored in a metal can. In addition, the unique shape and clarity of the PET-G plastic container offers convenience, visual spice quality evaluation and a more manageable packaging system.*

Spices, simple and ancient products that fit right into the newest trends and discoveries. Today, the United States consumers are using more spices than ever. The United

States spice consumption is over 500 million pounds per year. Americans are adding new and/or different spices to their foods, making them more flavorful and adding value to their recipes and products.

Quality and safety are much sought after realities with consumers today. Consumers expect high quality in their spices. They expect consistent flavor. High quality spices can provide flavor and flavorful components to foods.

However, because spices are natural and are harvested in many areas of the world, they are liable and susceptible to normal variations in flavor, quality and strength. Several factors can affect the quality and value of spices. One of these factors is the packaging.

Food packaging has become an innovative area both in marketing and technology to many food companies. Packaging is one of the, or the first, product attributes that the consumer perceives. Plastic packaging is becoming popular in the food industry. However, the package must be both functional and aesthetically pleasing.

Spices and spice products are hygroscopic in nature, and, being highly sensitive to moisture, their absorption of moisture may result in caking, discoloration, hydrolytic rancidity, mold growth, and insect attack. Furthermore, since spices contain volatile aromatic components, the loss of these components and the absorption of foreign odors as a result of inefficient packaging may pose serious problems, especially in ground spices. In addition, heat and light ac-

celerate deterioration, especially with oxygen - sensitive products. Consequently, packaging is very important for the maintenance of high quality spices and spice products.

An innovative spice company decided to change the traditional package for its spices and spice products. PET-G co-polyester (Kodar®, Eastman Chemical Products, New York, NY) was chosen because it offers a variety of advantages, including excellent toughness, clarity, excellent barrier properties, good chemical resistance and melt strength. Therefore, this study was conducted to evaluate the protective properties of the metal can (traditional spice package) and the clear plastic PET-G jars (innovative new spice package) in their ability to protect spices.

Paprika, parsley, garlic powder, pepper, nutmeg, cinnamon and cayenne pepper were stored at 100°F and 90% relative humidity for 30 days in both containers. These were then compared with similar samples stored at 40°F for the same period. Selected treated and control spices listed previously were then evaluated for moisture uptake (ASTA, 1968), color (using a Macbeth Spectrophotometer system), volatile oils (ASTA, 1968), and organoleptically, using consumer panels. Flavor, appearance, and aroma were evaluated by the panelists. Difference and preference panels using 20 untrained panelists (consumers) were conducted. Some of the data were analyzed by two-way analyses of variance calculations. All analyses were done in duplicate.

Table 1 shows the color changes versus the standard when parsley flakes, cayenne pepper, and spanish paprika were stored at 100°F, 90% relative humidity. The parsley flakes and cayenne pepper stored in the plastic package changed color slightly less than the product in the metal can. However, the differences were not significant ( $\alpha=0.05$  level). Spanish paprika stored in the can changed less than the product in the plastic. Again, the results were not statistically significant ( $\alpha=0.05$  level). Color is very important in the PET-G container because of the immediate product quality association by the consumer. The clarity of the container clearly shows product quality, while the metal can hides the quality attributes of the product.

Table 2 shows the moisture absorption of six spices packaged in plastic PET-G containers and metal cans. Black pepper gained the same amount of moisture in both packages. The change in cayenne pepper and nutmeg was very similar in both containers. However, the cinnamon and spanish paprika stored in the metal can gained more moisture than the spice in the plastic container. The parsley flakes stored in the plastic container gained more moisture than the spice in the can, but this parsley retained more of the green color of the natural spice. Garlic powder packaged in the plastic container gained more moisture than that stored in the metal can, but the product started to cake in both containers. Addition of calcium stearate or silicone dioxide will prevent the caking in garlic powder in any container.

Table 3 shows the loss of volatile oils from spices packaged in both containers. In spices, flavor is commonly equated by the amount of volatile oil and non-volatile components, since these are the prime source of flavor and are clearly measurable using American Spice Trade Association (ASTA) standard test methods. All spices tested lost more volatiles (i.e. flavor) when packaged in the metal can: black pepper -0.09% vs. -0.28%, nutmeg -0.44% vs. -3.18%, cinnamon -0.20% vs. -0.33%, and

spanish paprika -0.09% vs. -0.28% in the plastic and metal can package, respectively. For oil and volatiles retention, the PET-G plastic package was superior to the metal can.

Consumer panels could not detect any difference in the flavor, aroma, and appearance of black pepper, paprika, parsley flakes, and cayenne pepper packaged and stored in plastic PET-G or in the metal can containers. However, nutmeg, cinnamon and garlic powder stored in the PET-G plastic were judged as "better" by the consumer panel. Nutmeg and cinnamon were shown to retain more volatile oils (aromatics, i.e. flavor) when packaged in the plastic container. The flavor of the garlic powder packaged in PET-G containers was noted as "stronger" than the spice in the metal can.

PET-G plastic spice jars are replacing metal cans as the standard for package identity in food service spices. The data shown in this paper shows why the above statement might be true.

Overall, the quality of the spices packaged in the PET-G container was equal to or, in most cases, better than those stored in a metal can. Flavor and volatile oil loss, moisture uptake and color change were usually less in the PET-G container. In addition, the unique shape and clarity of the PET-G plastic containers offer the user convenience, visual spice quality evaluation, and a more manageable spice packaging system.

#### REFERENCES

- 1) American Spice Trade Association (ASTA), 1968. Official analytical methods of the American Spice Trade Association 2nd Edition. Englewood Cliffs, NJ.

TABLE 1. Color change versus standard at 100°F, 90% relative humidity.

	% change	
	Plastic	Metal
Parsley flakes	+ 12.60	+ 14.79
Cayenne pepper	+ 14.99	+ 15.45
Spanish paprika	+ 14.81	+ 14.00

TABLE 2. Moisture gained versus standard at 100°F, 90% relative humidity.

	% change	
	Plastic	Metal
Black pepper	+ 0.24	+ 0.24
Cayenne pepper	+ 0.79	+ 0.73
Nutmeg	+ 0.69	+ 0.66
Spanish paprika	+ 0.79	+ 1.03
Cinnamon	+ 0.59	+ 0.72
Parsley flakes	+ 4.22	+ 3.08
Garlic powder	+ 1.09	+ 0.93

TABLE 3. Oils and volatiles lost versus standard at 100°F, 90% relative humidity.

	% change	
	Plastic	Metal
Black pepper	-0.09	-0.28
Nutmeg	-0.44	-3.18
Cinnamon	-0.20	-0.33
Spanish paprika	-0.09	-0.28

# An Outbreak of Suspected Waterborne Illness on a Small Military Installation

Cpt. Douglas A. Pelton, Environmental  
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UNITED STATES ARMY PACIFIC  
ENVIRONMENTAL HEALTH ENGINEERING  
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*An investigation into an occurrence of a suspected waterborne disease outbreak was conducted on a small military installation in Korea. The investigation revealed the potable water system was contaminated with the organisms Enterobacter cloacae and Acinetobacter calcovariosanitratu. However, these organisms were not specifically recovered from stool specimens of individuals who became ill. Direct and indirect cross-connections between potable and nonpotable water provided numerous potentials for contaminating the drinking water. Causation of the disease outbreak was not proven conclusively, but there was strong circumstantial evidence that contamination was entering the water system through the cross-connections. Corrective measures were implemented following the investigation and no further cases of disease have been reported from the installation.*

*"The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government."*

## BACKGROUND

An occurrence of a lower, gastrointestinal illness was identified on a small military installation in Korea in early December 1982. The illness was identified when an above-average number of personnel from the installation sought medical attention at one time. The installation had a population of approximately two-hundred personnel, 90% of which were students. The student population completely changed once each month near the first of the month. The installation staff remained fairly constant throughout the year. Investigation of the initial occurrence of disease, accomplished by the local health authorities, was non-conclusive although the illness was suspected to be of a waterborne origin. Evaluation of water quality, other than tests for bacteria of the coliform group and free available chlorine residuals, was not performed during the initial investigation. Numerous stool specimens were collected during the initial investigation, but no specific pathogenic organisms were isolated from those specimens. Symptoms of the illness consisted primarily of nausea, stomach cramps, and diarrhea. The number of cases that occurred, except during the initial outbreak when 60 students and staff became ill, is not known. However, the number of cases of staff illness did appear to be minimal.

Assistance of the United States Army Pacific Environmental Health

Engineering Agency (USAPACE-HEA) was requested to investigate the cause of the illnesses in May 1983, after reports of illness continued during February, March, and April 1983.

## THE INVESTIGATION

The investigation was conducted by a team consisting of a sanitarian, a sanitary engineer, and a microbiologist, in early June 1983. The investigation focused on a review of those environmental health aspects that could cause a lower, gastrointestinal illness (1,2). There was evidence that diarrheal illness was occurring within the installation population during the time the study was conducted, but no cases were being reported.

The installation provided all essential living services for both students and staff. There was little opportunity for outside environmental influences on the students, since they were almost always restricted to the installation due to the intensiveness of the course of study.

A foodservice facility that served three meals each day and a separate club with a bar and limited foodservice menu were provided for students and staff. A survey of the foodservice and bar facilities revealed that although some facilities and practices within the foodservice facility were deficient and club facilities were in-



adequate, food did not appear to be the probable cause of these illnesses (3,4). This exclusion was primarily because of the symptoms and continued occurrence of disease and a lack of staff illness.

All wastewater was disposed of on the installation through septic tanks discharging into leaching wells. As-built blueprints available on the wastewater systems were not precise or up-to-date as to the location of the septic tanks and leaching wells in relation to the potable water mains. However, contamination of the potable water system by effluents from the leaching wells or sewage lines did not appear to be occurring, since bottoms of the sewage collection lines and treatment facilities were further underground than the water lines, and the geology of the area would allow little lateral movement of sewage effluent.

The raw water source for the installation's potable water was an infiltration gallery located in a stream bed. The quality of the raw, surface water was poor, but water treatment equipment and processes, although not without deficiencies, produced a finished water of acceptable quality (5). This water system also served several other military installations, however this installation was at the far end of the distribution main. Personnel on other installations were not reporting any occurrences of illness. The potable water distribution main broke frequently between the water treatment plant and the installation where the illnesses occurred and resulted in complete water outages on that installation. Water mains were not disinfected or flushed after water outages which is a required practice. Free available chlorine residuals of 1.0 mg/l or less were usually maintained within the water system.

The investigation identified twenty direct and indirect cross-connections on the installation (6,7). These cross-connections provided potentials for contaminated water to be siphoned into the water system during periods of no or fluctuating water pressure. Direct cross-connections existed on tank-type toilets that had submerged ballcocks or did not have anti-siphon

ballcocks. These toilets could still be flushed after a loss of water pressure using the water remaining inside the tank. However, under negative pressure conditions, a small quantity of water could immediately be siphoned into the potable water system when the handle was tripped. This water would not necessarily be heavily contaminated, but by definition is not considered potable. Many of the porcelain tops were missing from toilet tanks, increasing the possibility of this water being contaminated. Indirect cross-connections also provided potentials for contamination of the water system during periods of no or fluctuating water pressure when hoses were in use or when faucets were leaking, as some were. Figure 1 summarizes the most common types of cross-connections existing on the installation. Other cross-connections were created when personnel slipped hoses over the ends of unthreaded faucets and used them to flush floor drains and to fill mop pails.

A 385 gallon water sample was collected from the installation water system during thirteen hours of sample collection using a hydrosol, a vacuum pump, and filters with a pore size of 0.45 microns. The water sample was collected from a bathroom used almost exclusively by the students. Each bathroom was equipped with a water fountain, and these fountains were located a short distance upstream from the direct cross-connections. The sample was analyzed for intestinal parasites and bacteria (2,8). No evidence of intestinal parasites was noted; however, the organisms *Enterobacter cloacae* and *Acinetobacter calcovariousanitratu*s were isolated during bacteriological examination of the water. The media used for bacterial analyses were Bacto-EMB Agar (a differential medium for the detection and isolation of Gram-negative intestinal pathogenic bacteria), Bacto-Brilliant Green Agar (a highly selective medium for isolation of Salmonella), Mannitol Salt Agar (a selective medium for isolation of pathogenic staphylococci), Blood Agar (for isolation of many fastidious pathogenic

microorganisms), MacConkey Agar (a differential medium for use in the detection and isolation of all types of dysentery, typhoid and paratyphoid bacteria), and XLD (a selective medium for the isolation of Shigella and Salmonella). The samples were incubated for 48 hours at 35 degrees Centigrade under both aerobic and anaerobic conditions. Biochemical analysis and gram-stains were used to confirm the tests. The level of bacterial contamination present in the water was between 68 and 136 colony forming units (CFU) in each milliliter of water. This would result in a dosage of between 16,000 and 32,000 CFU in each 8 ounce glass of water consumed.

#### CORRECTIVE ACTION

The following corrective actions were implemented as a result of our findings. All water lines throughout the installation were disinfected with a chlorine solution as specified in the American Water Works Association Standard for Disinfecting Water Mains (9). The chlorine solution was injected into the water main where the main entered the installation, and each faucet on the installation was then opened and the water allowed to run until a strong chlorine odor was apparent, at which time the faucet was shut off. The chlorine solution was allowed to remain in the system for 24 hours before each faucet was again opened and the water allowed to run until the odor of chlorine had disappeared. This procedure was conducted during the one-week break between classes of students. Work was also initiated to eliminate all direct and potential cross-connections to the potable water system.

#### DISCUSSION

It is estimated that only one-half of the disease outbreaks from community water systems in the United States are reported (10). Although the percentage of outbreaks reported from United States military installations overseas may be somewhat higher, all outbreaks are most likely not being reported.

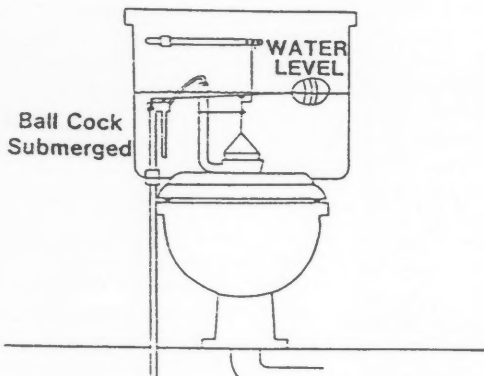
Reporting of the cases of this waterborne disease outbreak may be lower than would normally be expected, and this may be partially attributed to the generally mild effects of the illness. Underreporting may have been compounded by the stu-

dents' perception that if they missed any classes by going for medical attention, they would have to make up the missed training at a later time or even be expelled from the school.

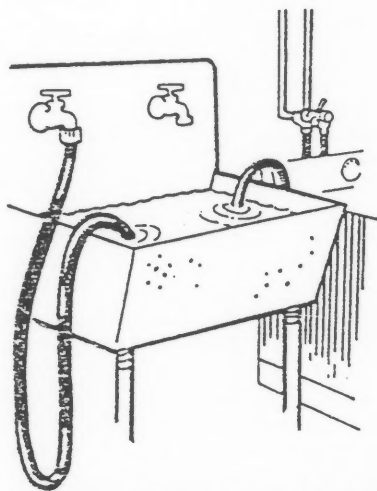
A lack of reported staff illness may be partially explained by their

infrequent use of the drinking fountains located in the bathhouses where the direct cross-connections could have caused localized contamination. Since the staff was a more stabilized population, many of them may already have been colonized with these

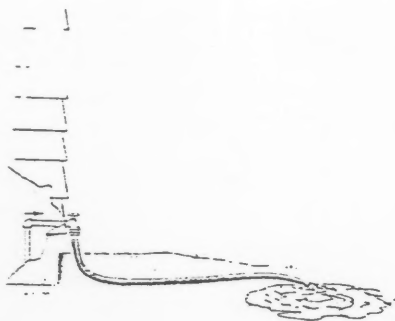
Figure 1



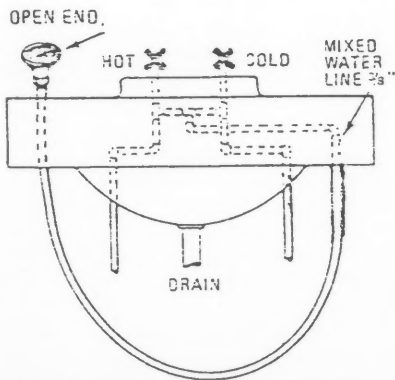
Seven toilets on the installation did not have anti-siphon ball cocks installed and two others that had anti-siphon ball cocks were submerged which eliminated the effectiveness of the anti-siphon ball cocks.



Five operational threaded faucets inside of buildings were not provided with hose connection vacuum breakers.



Four operational threaded faucets located outside of buildings were not provided with hose connection vacuum breakers.



Two shampoo sinks in the barber shop were not provided with in-line vacuum breakers on the water line to the shampoo hose.

bacteria, although one recently arrived staff member interviewed during our study did say he was experiencing diarrhea.

A large volume of water was filtered because *Giardia lamblia* was one of the suspected causes of this disease outbreak. Serial dilutions of that sample were made to determine the level of bacterial contamination in the water. Several media were used when analyzing the water samples, since water samples that had been routinely collected and analyzed on a weekly basis had been negative for coliform organisms and there was no evidence of the presence of other specific microorganisms within the water system. There is concern that the coliform group of organisms may not be the best organisms to indicate contamination within potable water systems, and our findings support that hypothesis (11, 12).

The results of examination of stool specimens from the first reported cases of disease may have been inconclusive if laboratory personnel were examining them specifically for known pathogenic organisms and were not looking for organisms that could be normal intestinal flora. The number of *Enterobacter cloacae* and *Acinetobacter calcovariousanitratu*s recovered from stool specimens may have been fewer than the number normally expected to cause disease, but yet may have caused disease in non-colonized individuals. The cause of this outbreak has not been proven, although strong circumstantial evidence points toward these two bacteria. The causative agent was also

not conclusively identified in 52% of the outbreaks occurring in the United States between 1946 and 1980 (10). Although these two bacteria may be normal intestinal flora, their presence within a potable water system has to be considered as contamination of that system.

There have been no additional reports of similar disease since the system was decontaminated and a program was initiated to eliminate cross-connections on the installation. Replacement of the entire deteriorated distribution main has been completed and should help reduce the number of water outages and fluctuating pressure problems. Fire hydrants have also been installed so the system can be periodically flushed.

Testing for the presence of bacteria of the coliform group and free available chlorine residuals cannot be relied upon as the only tools by which to prevent waterborne disease outbreaks. Emphasis is also required to ensure that construction of potable water systems and any alterations to those systems are in accordance with existing standards; that routine flushing and other routine maintenance is performed on water distribution systems; and that replacement of distribution systems is programmed and accomplished prior to the onset of major maintenance problems with the systems.

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### **No Elections To Be Held For IAMFES Secretary**

Due to the Constitutional Structure Change of the number of board members from five to seven members, the position of Secretary will be filled by Robert Gravani again this year. Elections will be held as normal, next year.

### **Manuscripts Invited For ACDPI Student Essay Contest**

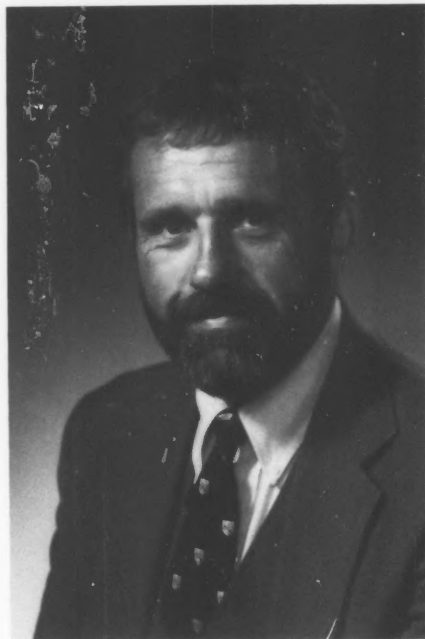
The winner of the 1985 American Cultured Dairy Products Student Essay Contest will be recognized at the Institute's Annual Meeting in Nashville, Tennessee on March 17-20, according to Board Chairman Jeff Edwards, The Kroger Co., Cincinnati, Ohio.

Guidelines for the contest - established in recognition of ACDPI's recent 25th Anniversary - are as follows:

1. The contest will be limited to college/university undergraduate students. (Graduate students are not eligible.)
2. The essay should cover one of two topics related to cultured dairy products:
  - a) Research needed to solve a current or anticipated problem. This may relate to any phase of cultured dairy products research such as product formulation, nutritional considerations, processing technologies, etc.
  - b) Sales/marketing ideas for current or proposed cultured dairy foods. These could include suggestions for innovative promotion programs to increase product consumption or means of enhancing the image of the dairy industry and/or its cultured products.
3. Length of the manuscript should be approximately ten double-spaced typewritten pages.

The winner will receive an all expenses paid trip to the Institute's '85 conclave, be given the opportunity to present his/her paper at a delegate general session on March 19, and be provided with a \$250 cash award. Additionally, the winning essay will be published in the *Cultured Dairy Products Journal*.

Deadline for submitting papers for the 1984-85 school year is January 15. Essays should be sent directly to Dr. Charles White, Dairy Science Department, Louisiana State University, Baton Rouge, LA 70803-4404.



*Francis F. Busta*

### **Busta Named Chairman Of Food Science and Human Nutrition Department**

Francis F. Busta has been named Chairman of the Food Science and Human Nutrition Department, Institute of Food and Agricultural Sciences (IFAS), at the University of Florida in Gainesville. The 33,000 student campus is located in north central Florida.

Dr. Busta was formerly a Professor in the Department of Food Science and Nutrition and the Department of Microbiology at the University of Minnesota, St. Paul. He received his B.A. degree in Bacteriology and his M.S. degree in Dairy Industries from the University of Minnesota. After receiving his Ph.D. in Food Science from the University of Illinois, Urbana in 1963, he joined the faculty at North Carolina State University, Raleigh. In 1967, he transferred to the University of Minnesota, St. Paul, where in 1971 he became Professor of Food Microbiology in the Department of Food Science and Nutrition. In 1984, he assumed the position of Professor and Chairman in the Food Science and Human Nutrition Department at the University of Florida.

Dr. Busta was a visiting scientist at Division of Food Research, CSIRO in Australia during 1974-75

and has traveled extensively on international research and teaching assignments. A sabbatical leave in 1981-82 involved food quality management programs worldwide for Capsule Laboratories of St. Paul.

Busta is a member of the American Society of Microbiology, Society for Applied Bacteriology, International Association of Milk, Food and Environmental Sanitarians, American Meat Science Association, American Association of Cereal Chemists, National Environmental Health Association, and American Society for Quality Control. He has served on the editorial board of several of these societies.

Busta's research interests include the study of environmental stress on microorganisms, the influence of food systems on growth and survival of microorganisms, utilization of food plant wastes through microbial modification, thermal processing, general microbiological aspects of food processing and hazard analysis critical control point approaches to quality management.

He has contributed over 100 papers to professional publications, 10 chapters in books, and holds two U.S. patents.

## *Adults Need Calcium, Too*

Parents who tell their children to "drink your milk so you can have strong bones," should be telling themselves the same thing.

Adults who don't consume the recommended two servings of dairy products each day may not be getting enough calcium, says Dr. Alice Hunt, a nutritionist with the Texas A&M University Agricultural Extension Service.

This lack of calcium can lead to serious health problems for people as they age, she says. For example, osteoporosis is a painful and crippling bone disease that occurs when bones become so thin and brittle they break very easily. It most often affects post-menopausal women with a history of calcium deficiency, explains Hunt.

Lack of calcium can also cause loss of the bone that supports your teeth, says the nutritionist. This may speed up periodontal disease which leads to a loss of teeth.

Hypertension, or high blood pressure, which may lead to heart attacks or strokes, has also been associated with lack of calcium, says Hunt.

About 75 percent of the calcium in the American food supply comes from dairy products, so the obvious way to increase calcium is to eat more foods from this category, says the nutritionist.

Even if you don't find it very "adult" to drink a glass of milk with meals or you don't like the taste

of milk, there are many other ways to add calcium to your diet with dairy products, Hunt explains.

In addition to eating a well-balanced diet that includes foods from all the food groups, Hunt suggests the following for adults who want to add calcium to their diets:

- Drink cocoa instead of coffee or tea.
- Add cheese to sandwiches.
- Snack on cheese and crackers.
- Use milk instead of water to prepare canned soups.
- Add nonfat dry milk to soups, stews and casseroles.
- Use milk and cheese in casseroles.
- Add grated cheese to Mexican and Italian foods like tacos, lasagna, and ravioli.
- Add cheese to your salads.
- Eat yogurt with meals or as a snack.
- Choose calcium rich desserts such as ice cream, frozen yogurt, cheese with fruit, custards and puddings made with milk.

If you're worried about the calories, stick to the non-fat or low-fat dairy products widely available in the supermarkets, says the nutritionist.

## *Continuous Culture Fermenters Help In Study Of Ruminant Nutrition*

Animal scientists with the University of Minnesota's Agricultural Experiment Station are using continuous culture fermenters, which imitate conditions in the rumen of cattle, in several ruminant nutrition studies.

Marshall Stern, one of the animal scientists involved in the research, says the continuous culture fermenters consist of eight culture flasks. The fermenters are designed to simulate the environment of the rumen. However, conditions inside the flasks are actually less variable than in the rumen, since pH, temperature and liquid dilution rate are kept constant during experiments.

Stern and his co-workers are using the culture flasks to determine the total and essential amino acid profiles that exist when a variety of diets are "fed," a simulation of the amino acid supply to the intestine of a ruminant. The diets are combinations of corn gluten meal, whole soybeans extruded at 148 degrees Celsius, meat and bone meal, and soybean meal. The scientists are also determining the amount of protein degradation in the rumen.

In their research, the scientists add to the culture flasks rumen fluid collected from cattle whose sides have been surgically cannulated. An artificial saliva solution prepared in the lab is infused continuously.

The researchers then add pelleted experimental diets to the flasks so that dry matter makes up seven percent of the volume of the flask. The culture flasks are allowed to stabilize for five days, then they are sampled for three days.

Another study involves the breakdown of methionine, an amino acid, in the rumen. Various methionine sources will be "fed" to the flasks, and the effluent from them will be analyzed for methionine.

"We're also studying rumen degradation of chemically treated soybean meal," says Stern. "We hope to protect the soybean meal from being broken down too much in the rumen. We will use continuous culture fermenters to compare the treated soybeans with a diet of untreated soybeans."

Stern is also using the culture flasks to examine forage tannin levels. Four forages with various levels of tannins will be "digested" in the flasks.

The effect of niacin and cobalt supplementation and the effect of branched-chain volatile fatty acids will also be subjects of studies done with continuous culture fermenters by University of Minnesota animal scientists.

These eight flasks promise to be a powerful tool for the ruminant nutritionist. "Eventually, we will be able to screen diets and processing techniques with these flasks," Stern says.

## ***New Hazard Communications Checklist Featured In Manual***

To meet the new requirements of the federal Hazards Communications regulations which affect manufacturing facilities and chemical manufacturers, 29 CFR 1910.1200, a special supplement with detailed self inspection checklists and compliance program guides, has been added to the OSHA Reference Manual.

The special new supplement also features an overview guide intended to alert managers who may not be skilled in technical safety matters to important details they need to know about the new regulations. Key elements in the recommended program are guides in providing employee training, warning labels, and components of the required material safety data sheets.

Safety program outlines in the OSHA Reference Manual help business owners, managers, and safety directors identify federal occupational safety and health regulations which apply to their industry. New program outlines and self-inspection checklists are being added to the continually expanding reference service that also includes the monthly OSHANEWS

newsletter. The Manual is designed to permit easy adaptation for use as an individualized company operations guide for occupational safety and health compliance, loss control and loss prevention programs. The two-volume, loose-leaf service presents the federal OSHA requirements and standards for General Industry, CFR 1910, subparts A through Z, including the new Hazard Communication Standard on toxic and hazardous chemicals.

The Manual and service are applicable to all firms and operations subject to OSHA compliance requirements. The specific industry outlines in the Manual now include programs for plastics manufacturing, electronics manufacturing, hospitals and medical facilities, and chemical products manufacturing. Outlines are soon to be provided for general manufacturing, fabricated metals, woodworking and oil and gas drilling operations.

The OSHA Reference Manual also features a color-coded index divider system for easy use and quick reference. Subscribers are provided "fill-in" forms for periodic self-inspections, maintenance record-keeping, accident reports and investigations and medical program aids. Also provided are safety and motivation meeting idea notes and training guides and schedules for similar activities. Many of the recommended forms are "camera-ready" copy for duplicating or reprinting as is, or modifying to a company's individual needs.

The mandatory requirements for OSHA compliance are featured in the red-tab section. It includes: information on written records and posting of notices, detailed listings of standards by subpart and item number, and unique self-inspection checklists. Subscribers are also provided with an appendix section containing tables and figures referenced in the OSHA standards.

The yellow-tab section features safety program outlines for specific industries. It also includes guides for developing recommended safety programs, using and maintaining respirator programs, organizing safety committees, and scheduling safety training, medical programs, motor vehicle safety training, and other safety motivation activities.

The blue-tab section provides background data on legal aspects of OSHA inspection procedures, including how to deal with compliance officers, citations and penalties. Also included is information on how to apply for variances, what you may expect from the OSHA Review Commission, and other appeals agencies. The Manual also offers listings of regional and area OSHA offices and related information.

The OSHA Reference Manual is available on a subscription basis for \$235.00. This includes the complete two-volume manual, supplementary update and revision service, and a monthly newsletter with information on case histories, legislative activity, and

events of interest to employers and safety directors. Also included is a quick reading OSHA Compliance Briefing Report designed specifically for the busy executive. For descriptive literature, or to order a Manual, write to the publisher: The Merritt Company, Dept. 3A704, 1661 Ninth Street, P.O. Box 955, Santa Monica, CA 90406. 213-450-7234.



Lawrence B. Osmun, left, receives the Distinguished Service Award from Peter Holm.

## ***Osmun Receives Distinguished Service Award***

Lawrence B. Osmun, assistant general manager of Allen Dairy, received the prestigious Distinguished Service Award presented by the Food Science Department at Purdue University, Midwest Dairy Products Assn., Indianapolis Dairy Technology Society and Tri State Dairy Technology Society.

The award, which was presented during the Indiana Dairy Industry Conference at Purdue, is given for outstanding leadership, contributions and service to the Indiana dairy industry.

According to Peter Holm, Midwest Dairy Products Association and presenter of the award, Osmun was cited for his leadership through the years, not only to Allen Dairy of Fort Wayne, but to the Tri State Dairy Technology Society as well. The society is a professional organization comprised of dairy processors and producers in Michigan, Ohio and Indiana.

"Osmun has played an important role in the survival of the Tri State Dairy Technology Society through the years. His office has been a communications center for the society's activities. He has supplied ideas of all kinds -- for programs, for officers. He has been a strong booster, never wanting to be in the limelight," said Holm, when presenting

the award, "but rather a guiding force behind the scenes."

Osmun has been associated with Allen Dairy and its precursor, Midwest Dairy, since 1952. When Midwest merged with Allen Dairy in 1961, Osmun became manager of the Auburn Branch, then later was promoted to area manager. In 1967, he became a supervisor of the Fort Wayne plant, and in 1972 he became assistant manager of that facility.

Osmun and his wife Betty live in Auburn. They have two daughters: Marsha, who lives in Auburn, and Cathie, who lives in Montana.

## ***U.S.D.A. National Needs Graduate Fellowships***

The Food Science Graduate Program at Kansas State University has 6 doctoral fellowships for students who wish to pursue the Ph.D. degree in the interdepartmental Food Science Graduate Program. Students wishing to apply for one of the fellowships should have a B.S. or M.S. degree in a field related to food science and the desire to have a professional career which utilizes their professional education in food science. The fellowships are for citizens or nationals of the United States.

The stipends are \$15,000 per year. Renewal of support will depend on satisfactory academic progress and the availability of U.S.D.A. fellowship funds. The fellowship program allows for up to 36 months of fellowship support. There are no allowances for dependents, and fellows will need to be enrolled full-time at their expense.

The fellowships will be awarded prior to fall semester, 1985. Some applicants may wish to begin study as early as January, 1985. Because of this, early application is encouraged by all applicants. For fall semester, 1985, applications should be received by March 1, 1985.

The unique aspects of the fellowship program involve the method in which the product or commodity areas of specialization and the analytical areas of food science are combined. The graduate committee for each fellow will involve at least one food scientist with expertise related to the process, product or commodity area to be investigated in the research program, as well as one or more faculty members with expertise in at least one of the analytical areas. The analytical areas to be emphasized are analytical chemistry, statistics, engineering, and sensory analysis. Animal products and cereals are the commodity areas to be emphasized in this program. Each fellowship student will be encouraged to either have co-major professors or to extensively involve his supervisory committee in

his educational and research program. The research will be conducted in one of the participating departments.

Additional details on the U.S.D.A. Food and Agricultural Sciences National Needs Graduate Fellowships may be found in the Federal Register, Vol. 49, No. 94, Monday, May 14, 1984, pp. 20428-20430.

All applications and communication relative to the fellowships should be directed to Dr. Daniel Fung, Chairman, Food Science Graduate Program, Kansas State University, Call Hall, Manhattan, KS 66506. 913-532-5654. Application materials requested include KSU graduate application form, 3 letters of reference, official transcripts, statement of objectives, and GRE scores.

### **Free Publication**

The following publication is now available, at no charge:

*Foodservice Systems: Time and Temperature Effects on Food Quality.* North Central Regional Research Publication No. 293, Illinois Bulletin 779.

Single copies may be obtained by writing: Office of Agricultural Publications, University of Illinois, 47 Mumford Hall, 1301 West Gregory Drive, Urbana, IL 61801.

In Wisconsin, write: Agricultural Bulletin Building, 1535 Observatory Drive, Madison, WI 53706.

### **Three-Day Food Irradiation Update To Be Offered**

Food irradiation is a promising technology for the preservation of a variety of food stuffs. Studies indicate that low dose irradiation can kill microbes and larvae in foods and extend their shelf life. A three-day course in the subject will be offered at the University of California, Davis from March 13-15.

The course is intended as both a review of food irradiation technology and as an update on current practices in the field. It will be coordinated by Dr. W. M. Urbain, Emeritus Professor of Food Science at Michigan State University, and Dr. B. S. Schweigert, Chairman of the Department of Food Science and Technology at UC Davis. They have assembled nationally and internationally known experts to discuss such topics as: an overview of food irradiation; irradiation application to specific commodities such as meats and poultry, seafood, cereal and pulses, and fruits and vegetables;

packaging and related issues such as marketing, labeling, government regulations, and consumer education; the current economics of food irradiation; and international activities in the field. Class participants will also taste irradiated food samples and visit a food irradiator. The course will be of particular value to food engineers and food scientists active in processing, research or product development.

The program will be held at the UC Davis Faculty Club on Old Davis Road. It begins at 9 a.m. on Wednesday and concludes at 4 p.m. on Friday. The \$450 enrollment fee includes instruction, all materials, three lunches and one dinner.

To obtain more information or to enroll, contact Jim Lapsley at 916-752-6021.

### **Semi-Automatic Fossomatic Method Proves Very Satisfactory**

A comparative study of Fossomat-80 (80 samples/hr capacity) with AOAC's Official Optical Somatic Cell Counting Method III (AOAC Methods 1980, 46.105-46.109, pp. 848-9) was published in JAOAC 67:615, 1984. The publication by R. D. Mochrie and D. A. Dickey of North Carolina State University clearly demonstrated that the modified method is equal to the Official Method in precision and accuracy. Further, the Fossomatic-80 Method has been approved for A2 classification by the APHA Technical Committee and will be included in Chapter 12 of the 15th Edition of Standard Methods for the Examination of Dairy Products. Therefore, it is an acceptable method for a confirmatory (or screening) test for somatic cells in milk for regulatory purposes. The Fossomatic-80 instrument may be obtained from the Dickey-john Corp., Box 10, Auburn, IL 62615.

### **Candidates Sought For 1985 Harold Macy Award**

The Minnesota Section of IFT is seeking nominations for suitable candidates from all IFT sections for the 1985 Harold Macy Food Science and Technology Award.

The award, which was established in 1981, is to be given annually for an outstanding example of food technology transfer or cooperation between scientists or technologists in any two of the following settings: academic, government, and private industry. The purpose of the award is to advance the profession and practice of food technology and to honor Harold Macy, dean emeritus of the University of Minnesota and a founding member of IFT. Awardees will be



invited to address the Minnesota Section. The award consists of a \$1,000 honorarium, an appropriate plaque and travel expenses.

Nominations for the award are due by January 15, 1985. Nomination forms are available from Dr. David R. Thompson, Chairperson, Harold Macy Award Committee, Department of Agricultural Engineering, University of Minnesota, 1390 Eckles Avenue, St. Paul, MN 55108.

## ***Food Engineering Award Nominations Open***

Nominations for the 1985 Food Engineering Award are now being accepted by Dairy & Food Industries Supply Association and American Society of Agricultural Engineers, sponsors of the award. Deadline for nominations is January 15, 1985.

The award is presented biennially for original contributions in research, development, design, or management of food processing equipment, or for techniques having significant economic value to the food industry and the public. The award consists of a gold medal, certificate and \$2,000 cash stipend.

Candidates will be evaluated for human performance and progress in food engineering and technology, development of machines, processes or methods for the food industry, and leadership in the professional development of the food industry.

Nominations should include a 500-word statement describing the nominee's achievements and recognition in the food industry. The essay should cover: how the award criteria was met; professional and business history; published works; educational background and organizational memberships.

Nomination may be made in letter form or on the official form, available from James L. Butt, ASAE Executive Secretary, 2959 Niles Road, St. Joseph, MI 49085.

## ***A Call For Articles For The ASEAN Food Journal***

Vol. 1 No. 1 of the ASEAN Food Journal, a scientific and topic-specific publication, is scheduled for launch in March 1985. The Journal will provide a forum for food scientists and technologists in ASEAN to publish the results of the considerable amount of scientific research already carried out in the region.

The Editorial Board is now accepting contributions for Vol. 1, Nos. 1, 2 and 3. These contributions should, in the main, be articles reporting the results

of original research. One or two review articles will also be published in each issue. In addition, contributors are welcome to submit technical information in the form of notes, and short communications. Book reviews may be arranged with the Editor.

In accordance with the practice of similar international journals of science and technology, no writing fees or honoraria will be paid to contributors.

Further details regarding submission of manuscripts, referees and style may be obtained from the Editor, ASEAN Food Journal, ASEAN Food Handling Bureau, 8th Floor Syed Kechik Foundation Building, Bangsar, Kuala Lumpur, Malaysia.

## ***"The Law and The Food Industry" Course To Be Offered***

"The Law and the Food Industry," a two-and-a-half-day course for plant managers and quality control supervisors who must deal with inspections and labeling and food adulteration laws, will be offered at UC Davis, February 25-27.

The class will be taught by two private attorneys and by three state and federal officials responsible for overseeing compliance with regulations in the food industry. Among the agencies represented will be the FDA and the Food and Drug section of the California State Department of Health.

Topics for the course include state and federal food laws, adulteration and misbranding, how to handle an inspection or administrative violation, antitrust and product liability laws, and case studies.

The enrollment fee is \$300. To enroll or to obtain more information, call 916-752-6021.

## ***10th Winter International Fancy Food & Confection Show Coming To LA***

The 10th Winter International Fancy Food & Confection Show will be held at the Los Angeles Convention Center, Los Angeles, California, Feb. 17-19, 1985.

Space for the show is 20% ahead of last year so far, says Peter H. Young of Young's Market Co., Los Angeles, the show chairman. The event is sponsored by the National Association for the Specialty Food Trade.

"In less than a decade, this show has enabled many Western entrepreneurs to sell nationally while allowing exhibitors from other sections of the country

and abroad to reach Western outlets," says NASFT president John H. Hamstra of H. Hamstra Company. Both suppliers and buyers are responding to this unique marketplace, he adds.

For show information, contact Pat Dolson, Manager, IFFCS, P.O. Box 3833, Stamford, CT 06905. 203-964-0000.

For industry information, contact Jean Frame, Executive Director, NASFT, Suite 1606, 215 Park Ave. South, New York, NY 10003. Toll free 800-255-2502 or 212-505-1770.

## ***Cancer Researcher Advocates Teaching Kids Early To Eat Right***

"Because food preferences and dietary patterns developed in childhood stay with us throughout life, young people need to acquire healthy dietary habits that may help them reduce the risk of developing cancer," Dr. T. Colin Campbell told a conference of the American School Food Service Association, in Indianapolis.

"Certain nutrients have been shown to promote tumor growth and others to inhibit it, but young people are unlikely to eat food just because it's good for them," said Campbell, a cancer researcher and professor of Nutritional Biochemistry at Cornell University.

"The biology of nutrient metabolism and cancer growth is exceedingly complex," Campbell continued. "Several scientific groups have now concluded, based on the evidence available, that dietary guidelines to lower cancer risk are warranted," he said.

Campbell, who served on the National Academy of Sciences Committee responsible for the landmark report, "Diet, Nutrition and Cancer," believes the most important dietary recommendations are to reduce the intake of dietary fat to 30% of total calories and increase the consumption of fruits, vegetables and whole grain cereal products.

Campbell told the conference of the 60,000-member association of nutritionists, dieticians, educators and others working in our nation's schools that fats comprise 40% of the calories consumed by most Americans.

"The taste for fat is acquired, beginning in childhood. Using the food exchange system and menu plan just developed by the American Institute for Cancer Research, it is possible to decrease fat consumption even below the recommended 30% level without compromising intake of essential nutrients and still enjoy great food variety," according to Campbell, who is also Senior Science Advisor of the American Institute for Cancer Research (AICR). Campbell says, "If dietary guidelines are to be effective, creative

meal plans will help both youngsters and adults learn to like foods that can maintain their health."

The AICR was the first organization to issue dietary guidelines as a result of the National Academy of Science report.

AICR is a nonprofit organization formed in 1981 to promote research and education on the relationship between diet, nutrition and cancer.

## ***DFISA's 1984/1985 Directory Now Available***

Dairy & Food Industries Supply Association has published its 1984/1985 Directory of Membership Products & Services. DFISA President, Robert L. Nissen, Ladish Co., Tri-Clover Division, said, "The DIRECTORY is available, free of charge, to the food and dairy processing community, government departments, university food and science departments, state trade associations, . . . literally, anyone who requests one."

"The DIRECTORY, updated biennially, is an ideal information source and buyers guide for the dairy and food industry," Nissen said. "It contains an alphabetical listing of all DFISA members, including address, telex and phone numbers, commodity group, voting representative and date joined," he added. DFISA membership is also listed by state and by classified products and services.

The DIRECTORY also identifies DFISA board of directors, past presidents, committees and chairpersons, professional staff, sanitary standards and DFISA meeting dates.

To receive a copy, contact: Dairy & Food Industries Supply Association, 6245 Executive Blvd., Rockville, MD 20852. 301-984-1444.

## ***Nominations For The 1985 ACDPI Research Award Sought***

Deadline for submitting nominations for the 1985 American Cultured Dairy Products Institute Research Award is February 8, according to Institute Vice President/Secretary Dr. C. Bronson Lane. The award (sponsored by Nordica International) consisting of \$1,000 and a permanent plaque, is given annually to a college professor for outstanding research contributions in the cultured products field.

The guidelines for eligibility are as follows:

1. The work (on cottage cheese, buttermilk, sour cream, yogurt or other fluid and semi-fluid products made by the action of cultures) for which the award

is made must have been completed within the past 10 years at a college or university.

2. The recipient must have been a full time faculty member at the college or university during the time the work was done.

3. The person must not be a previous recipient of the ACDPI Research Award.

The individual selected for this year's award will be recognized at the 1985 ACDPI Annual Meeting/Klinik/National Cultured Product Evaluation Sessions to be held in Nashville, Tennessee on March 17-20.

Nomination letters should be sent directly to Dr. C. Bronson Lane, ACDPI, P.O. Box 7813, Orlando, FL 32854.

### **Milk Industry Foundation Announces Dairy Product Sales Up In 1983**

1983 was a record year for dairy product sales, according to figures just released in the 1984 edition of the Milk Industry Foundation's annual publication, *Milk Facts*. Sales of virtually all products were up, with a significant rise in consumption for some that had been in decline for up to twenty years.

Milk consumption was up, along with that in all other categories of dairy products. Figures quoted include:

- Whole milk sales were up 1 percent to 61 quarts per capita, reversing a previous 20 year decline.
- Lowfat milk sales reached a record high of 36 quarts per capita, rising 4 percent.
- Yogurt sales rose 19 percent to a record 51 ounces per capita.
- Buttermilk sales, which had been in decline in previous years, rose for the second year in a row, 6 percent in 1983.
- Heavy cream, light cream and half and half rose 14 percent, 8 percent and 5 percent respectively.
- Sour cream and dip sales climbed 8 percent to a record high of 34 ounces per capita.
- Eggnog sales rose 5 percent to a record 47 million quarts.

E. Linwood Tipton, Executive Vice President of the Milk Industry Foundation, called 1983 a "vintage year" for dairy products. "With the great increase in

sales reported for 1983, we are looking for an even better year in 1984. Both nutritionally and financially, there's no better bargain."

Copies of *Milk Facts* can be obtained from the Milk Industry Foundation offices at 888 16th Street, N.W., Washington, DC 20006, or by calling 202-296-4250.

### **ABC Research Corporation Holds Seminar**

Food Microbiology; Environmental Concerns; New Products for the Food Industry; Update on Special Topics, i.e. Sulfites, Sodium, Protein Fat-Free, Irradiation and Juice Adulteration will be covered in a two-day technical seminar sponsored by ABC Research Corporation, February 26-27, 1985.

The sessions comprising the 11th Annual ABC Technical Seminar will feature experts from the food industry and academic professionals allied with food science and technology, ABC President Dr. William L. Brown said.

The Changing Structure of the Food Industry will be discussed at a banquet prior to the two day session.

A session covering Food Microbiology will examine Emerging Pathogens; Mold Spore Heat Resistance from Juice Products; Salmonella and Antibiotic Resistance, and New Food Spoilage Organisms.

The talks on Environmental Concerns will be on Replacements for EDB; and the Application of GC/MS to Environmental Problems.

A session on New Products for the Food Industry will cover New Fermented Vegetable Products, with a summary of the New Products Conference at Lake Geneva.

The last session will cover Protein Fat-Free; Irradiation; Sulfite - Significance in Foods; Hypertension - Calcium Deficiency or Sodium Excess; and Biotechnology - Practical Food Science Applications.

The final talk will feature Juice Adulteration.

Details concerning the seminar can be obtained by contacting Sara Jo Atwell, Administrative Assistant, ABC Research Corporation, P.O. Box 1557, Gainesville, FL 32602. 904-372-0436.

## New Product News

The products included herein are not necessarily endorsed by Dairy and Food Sanitation.

### Lead-In-Paint Detector

• The Warrington MicroLead I is a micro-computer based x-ray fluorescence spectrum analyzer with data storage, report printing capabilities, and temperature compensation. It features a multi-colored liquid crystal display designed for effective visual interpretation, and has an attractive, no-nonsense keypad that is simple to use. Other features include 8 to 10 useful-life rechargeable batteries, self diagnostics, and a full one-year warranty. The MicroLead I is a fast, easy, reliable and inexpensive way to check for toxic levels of lead to within 0.1 mg/cm<sup>2</sup>.

For more information contact: Jerry Kollath, Marketing Director, Warrington Inc., P.O. Box 15147, Austin, TX 78761. 512-452-2590.

Please circle No. 255 on your Reader Service Page

### "Six Pack" Holds Hudson Valves

• As part of an ongoing program to support its dealers, the Hudson Valve Company has developed an attractive new package for its automatic water control valves. Because it holds one half dozen of Hudson's patented valves, it is called the "Six Pack." The top of the package is designed to stand up, which turns the box into a point-of-purchase display perfect for countertops.

Featured in the display are Hudson's automatic water control valves that are enjoying a great deal of popularity in a variety of uses. Although originally designed for agricultural uses, these valves are now being used in such diverse applications as pools and saunas, chemical production facilities and even a nuclear power plant.

These valves have been operating reliably for over 8 years in agricultural applications. The bell shaped body of glass reinforced nylon resin is virtually indestructible which eliminates costly repairs. Also, these valves have a positive shut-off feature that functions at any pressure from 5 to 150 psi.

During operation, the valve is placed vertically in a tank of water with the bell housing immersed to a depth of approximately 1", depending upon the water pressure. When the water falls below the desired level, a float riding in a vertical track inside the bell drops down and opens the valve. When the water returns to the proper level, the float will seal the control chamber inside the valve, causing the water pressure itself to force a rubber diaphragm against the top of the valve, which shuts off the flow of water.

For complete product and dealer information, contact Hudson Valve Company at Route 3, Box 708, Bakersfield, CA 93309, or call 805-831-6208.

Please circle No. 256 on your Reader Service Page

### US-4001 CM Continuous Motion Coding System

• The Bell-Mark Corporation is introducing its new US-4001-CM Continuous Motion Coding System Series for all continuous motion coding requirements. The US-4001-CM was specifically designed for use on all horizontal flow wrapping equipment commonly found in the bakery and candy industries.

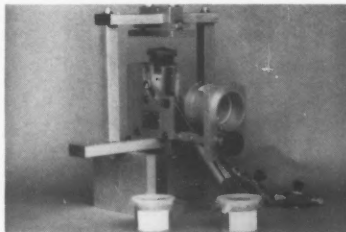
The US-4001-CM is a reciprocating coding system which utilizes a cam action and a sliding print head, enabling it to date code or price mark on continuous moving webs at a speed of up to 150 feet per minute and 300 prints per minute. It also has its own independent drive motor which eliminates both complicated installations into the packaging machine and insures pinpoint print registration. Our range of patented cartridge inking systems makes this coding system ideally suited for printing all non-absorbent surfaces such as glancie and all poly substrates.

All Bell-Mark Coding Systems are complete coding system packages which include our range of patented ink cartridges, custom made type, specialized bracketry and required controls. The US-4001-CM Series offers print areas from 1 1/4" square to 2" square, while our cartridge ink system reduces operating expenses up to 80% as compared to roll leaf coding systems.

In addition, the US-4001-CM also does not use heat, which will provide utility savings of up to \$800 per year.

For further information, please contact: Sandra Haagen, Advertising Director, 800-526-1391.

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US-4001-CM by Bell-Mark Corp.

### Disposable Coveralls Offer Protection In Food Handling

• Disposable coveralls for the catering and food service industries are now available in a full range of models and sizes from Mölnlycke Industrial Products. Included in the M-PRO® line for cafeterias, restaurants, bakeries, butcher shops and other food processing plants are several styles and lengths of cook's aprons, in addition to coats, chef's hats, boat caps, peaked caps and hairnets. Also offered are arm covers and shoe covers.

Each product in the M-PRO line is designed for a specific application and working environment. Most items are made of nonwoven, porous polypropylene materials that breathe for comfort yet protect against liquids and hot fat. One style of cook's apron is laminated with heat resistant fabric, affording protection against hot stoves and ovens up to 175°F. All items are strong enough to be used several times before disposal.

For details and prices, contact Mölnlycke Industrial Products, P.O. Box 125, San Ramon, CA 94583-0125. Phone collect 415-833-2511.

Please circle No. 258 on your Reader Service Page



Hudson Valves "Six Pack"



Coat and cap from Mölnlycke's M-PRO® line of disposable clothing.

## New Post-Pak™ Tray System

• Keyes Fibre Company, Stamford, Connecticut, recently introduced a new molded fiber tray system created with their patented Post-Pak™ design for use in the shipment of cultured dairy products.

This tray system offers the rigidity of molded fiber and, coupled with the Post-Pak™ design, offers effective cup separation, easier set up and loading, and at a cost that is below most conventional tray systems.

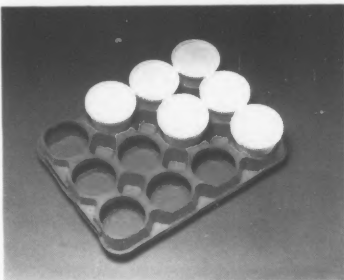
The Post-Pak™ design has a system of rigid full depth supports to protect your products and insure that they reach the consumer in perfect condition. Each tray is also molded to specific standards for trouble-free machine or hand loading.

Post-Pak™ trays are shipped to your plant flat and are nested together. The tray is simply folded in half along the molded score line and is ready for easy loading.

The 12 compartment 8 oz. tray will be followed by a series of sizes to accommodate most cup sizes.

For additional information, contact: Keyes Fibre Company, Packaging Products Division, 3003 Summer Street, Stamford, CT 06905. 203-357-9100.

Please circle No. 259 on your Reader Service Page



Post-Pak™ Tray System

## New Uni-Temp Tank Cars

• Archer Daniels Midland, one of the world's largest food-processing companies, is purchasing 25 Uni-Temp tank cars, designed to provide even heating of transported commodities during the unloading process, from San Francisco-based PLM Railcar Maintenance Company. Spokesmen for ADM say the Uni-Temp design, unveiled at RailExpo '84 here today, is expected to revolutionize transportation of a number of liquid commodities.

The non-insulated cars are retrofitted with a PLM-patented interior heat plate. ADM's cars are retrofitted 20,000-gallon capacity cars modified to a new capacity of 18,200 gallons.

"Our tests have shown this car is suitable for crude and refined vegetable oils, corn syrups, molasses, and other edible commodities," says Steven L. Pease, president of PLM Railcar Maintenance Company. "It's also ideal for tallow and fats, and a whole range of petrochemical and petroleum products."

ADM Transportation Company president James Feddick said the initial order of cars will be used primarily for corn syrups, including high-fructose, which has been transported in many of the ADM-PLM in-service tests.

"Our in-service tests have shown the Uni-Temp car has been successful in cutting temperature damage caused by uneven heating of sensitive products like fructose," Feddick says. "This heat-exchange system allows greater control of heat applied to fluidize the commodity for unloading. It results in more complete unloading, eliminating the build-up of residues, or 'boot,' common to high-viscosity commodities. Boot can add to the shipper's car-cleaning expense.

"Very importantly, Uni-Temp evenly heats commodities for unloading in one-fourth to one-half the time required with conventional cars. The customer saves energy and manpower in the unloading process, and does not lose product due to the building up of 'boot.'"

Feddick says that unlike the current generation of heat systems, which heat the exterior of the car in order to heat the commodity, the Uni-Temp system heats the product directly. He says this new technology also produces a natural 'roll' or agitation in the product, which circulates the commodity through convection and heats the product evenly.

"We've witnessed the use of everything from compressed air to nitrogen to produce the roll of commodities," Feddick says. "ADM has a reputation for innovation, and we think the Uni-Temp purchase is consistent with that reputation. Tests indicate it will help protect the quality of our products in transportation, and both ADM and its customers will benefit." Please circle No. 260 on your Reader Service Page

## Warmth From New Heating Panels

• Hard-to-heat areas can be made comfortably warm and production stabilized with Mor-Mar electric radiant heating panels. Ceiling or wall installation keeps the panels out of the way of operators and equipment. Radiant heat can be directed and restricted to work areas without wasting heat on unoccupied areas, and there are no flames or high temperatures to cause accidents. Special sealed models are available for Class II & III hazardous and NEMA 12 locations. Sizes are from 2' x 2'-6"; 120/240 and 480 VAC, 1125 W. Underwriters Laboratories listed. For more information contact: Mor-Mar Products, Inc., 908 Niagara Falls Boulevard, North Tonawanda, NY 14120.

Please circle No. 261 on your Reader Service Page

## Safe, Cost-Effective EPA Approved Exterior Rodent Bait Station

• Dr. Charles Knote, a leading U.S. rodent researcher and inventor, announces the new MAJ-ik-BOX exterior-interior bait station invention. N.I.P.M. (National Institute of Pest Management), 33 N. Frederick Street, Cape Girardeau, MO 63701, manufactures the mouse MAJ-ik-BOX.

Dr. Knote says the MAJ-ik-BOX has unique safety and cost-cutting features. It utilizes a locked-in-place fastener (no pilferage) plus a locked-in bait drawer for safe exterior or interior control. The mouse, the technician with the special-safety-key, and "elephants" are the only things that can touch the rodent bait inside. EPA rates the MAJ-ik-BOX as "tamper proof." Knote rates it "tamper resistant."

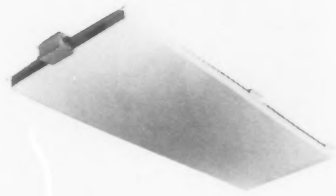
N.I.P.M. and Dr. Knote have performed 108 laboratory research tests over eleven years to perfect the safety of the station. During the last five years, exterior field tests were run to prove the MAJ-ik-BOXES' effectiveness against mice.

They proved that the MAJ-ik-BOX exterior control system stops from 85% up to 100% of the total mice problems on the exterior before they contaminate the interior of buildings. Furthermore, exterior MAJ-ik-BOXES kept the bait dry and clean for over 120 days. The station takes full advantage of the filthy mouse's basic needs for a dark, warm, dry, secure hiding place to eat the bait.

Two research tests proved: (1) In a 35 day exterior feeding test the MAJ-ik-BOX surpassed a rat-sized metal bait station by a 49 to 1 ratio of bait consumption, and (2) mice ate 11 times more bait from it than from an open plastic bait tray.

Cape-Kil Pest Control technicians who have field tested it for 2 years say, "We reduced bait station placements by 60% when using the MAJ-ik-BOX system. We saved 60% of our service time and bait. We didn't need to use expensive, time consuming glue boards, and we still obtained 100% control."

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Mor-Mar Electric Radiant Heating Panel  
(Moisture-Sealed)

# Food Science Facts

## For The Sanitarian

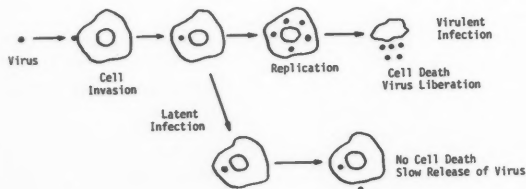


**Robert B. Gravani**  
 Cornell University  
 Ithaca, NY

### VIRAL FOODBORNE DISEASE

The word virus probably brings to mind the cause of an illness that nearly everyone has experienced. Actually, viruses are non-cellular parasites that invade the cells of people, animals, plants and bacteria, and cause disease. Viruses are submicroscopic in size and are much smaller than bacteria. They are so small that they cannot be seen under an ordinary microscope, but must be viewed under the powerful electron microscope.

Viruses are inert and do not carry out any functions outside of a cell; they begin to replicate after invading living cells. New viruses are then liberated and infect other cells. This cycle is shown in the diagram below.



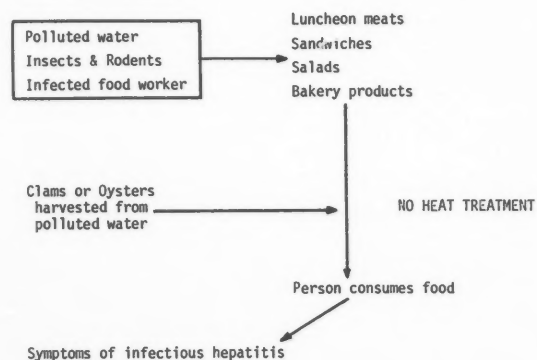
Viruses vary in size, shape, chemical composition, cells they infect and kinds of damage they do to cells. They cause a variety of diseases including colds, influenza, mononucleosis, infectious hepatitis, rabies, measles, mumps, polio, smallpox and many more.

Some viruses can be transmitted through foods that become contaminated in their growing environment, during processing, storage, distribution, or at the time of their final preparation. These viruses are found in the intestinal tracts of infected humans and are transmitted from person-to-person through food that has been contaminated with fecal material. Several intestinal viruses affect humans, but the one that has been involved in a number of outbreaks is Hepatitis A virus.

### Hepatitis A Virus

Hepatitis A virus causes a disease of the liver called infectious hepatitis. This virus can be found in water that has been contaminated with raw sewage and in shellfish harvested from fecally contaminated waters. Shellfish, such as clams and oysters, feed by filtering water and nutrients through their systems and can accumulate viruses from polluted water. In food processing plants and during storage, contamination of products can take place when polluted water is used or through infestations of fecally contaminated insects and rodents. Infectious hepatitis can also be a problem in food service operations, delicatessens, sandwich shops, bakeries and other places where prepared foods are intimately handled by an infected worker and then consumed without cooking.

Foods that have been involved in viral foodborne disease outbreaks include water, milk, sliced luncheon meats, salads, sandwiches, fruits, raw or uncooked clams and oysters, and bakery products. The hepatitis A virus does not grow or multiply in the food, but is carried on the food and is transmitted to people who consume the product(s). The diagram below illustrates how viral foodborne disease occurs.



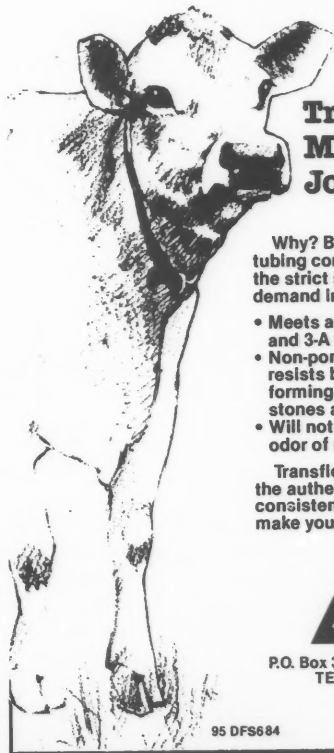
Symptoms of infectious hepatitis occur from 15 to 50 days (usually 28-30 days) after eating the contaminated food. The symptoms include fever, nausea, vomiting and

abdominal discomfort followed by enlargement of the liver. Jaundice, or a yellowing of the skin, occurs in many cases and is due to the way the virus affects the liver.

Infectious hepatitis can be easily prevented by:

- Identifying workers that are obviously ill and not permitting them to handle food.
- Practicing good personal hygiene and instructing workers to wash hands often, but especially after using the toilet.
- Handling foods with utensils.
- Proper cooking of foods.
- Obtaining shellfish from approved, inspected sources and not from fecally contaminated waters.

Although viruses have been responsible for only 2.6% of the confirmed foodborne disease outbreaks from 1975 to 1979, it is an area where awareness and training can reduce these numbers even further. Through good sanitation, viral foodborne disease can be prevented.



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**N.M.C.**

NATIONAL MASTITIS COUNCIL

Rapid Penicillin Tests Comparison  
*Steve Watrin, Land O'Lakes, Inc.*

The 21st article of the NMC column reviewed the Bacillus Stearothermophiles Disc Assay Test and said it carried official sanctions. In this article the Delvo and Penzyme tests will be reviewed using the same format.

### Delvo

This test also checks for the inhibition of bacteria impregnated in agar medium. If milk is free of penicillin, the bacteria (*Bacillus stearothermophilus*) will grow and produce acid. The acid will change the agar color from purple to yellow. If penicillin is present, bacteria will not grow and the agar will remain purple. This test is presently in widespread use by several dairy operations. The incorporation of official test organisms in agar medium allows for the detection of all penicillins with a sensitivity of 0.005 units per ml. The stability of test products is good under refrigerated conditions. It is convenient for both farm and field use with low capital requirements. Some difficulties do exist with interpretation of the color reactions. In addition, other inhibitors present in milk may cause a false positive. This test also takes two to three hours for completion, with a per test cost of about \$.80.

### Penzyme (Smith Kline)

This enzymatic reaction is measured by color. White represents a positive of .017 units per ml. and pink represents a negative of .008 units per ml. or less. Recently the test time was decreased to ten minutes, although some sensitivity was lost. The official test has a time requirement of 25 minutes. It requires moderate capital investment and is adaptable to laboratory or farm use. It takes minimal technician involvement and is sensitive to all beta-lactams. However, the color is hard to define, especially for color blind individuals. In addition, the presence of chlorine at one ppm will result in a negative test result. Also, the test reagents have some stability problems; therefore, standardization checks account for part of the per test cost of approximately \$2.00.

Next month we will complete our comparison by reviewing the Charm and Spot tests.

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Arlington, VA 22201  
703-243-8268



# Dairy Quality

by Darrell Bigalke, Food & Dairy Quality Mgmt., Inc., St. Paul, MN

## COTTAGE CHEESE QUALITY— THE IMPORTANCE OF INGREDIENTS QUALITY

The assurance of ingredients quality is a necessary function to achieve production of quality products. This is especially true for the production of dairy products. To assure ingredients quality, establishing receiving standards for ingredients is necessary. Therefore, the subject of this newsletter is establishing receiving standards for monitoring and maintaining ingredients quality for the production of quality cottage cheese.

If quality is defined as conformance to standards, quality raw milk must be defined as a product that conforms to established standards. These standards can be legal standards established by regulatory agencies or standards established by a dairy processor. Standards must be established for microbiological quality, flavor, presence of foreign substance, receiving temperature, and other factors.

Raw milk microbiological standards should include standards for (1) Total Plate Count, (2) Lab Pasteurize Count, (3) Psychrotrophic Bacteria Count, and (4) possibly Coliform Counts. Since legal standards have been adapted for Total Bacteria Count and Thermoduric Counts, a cottage cheese processor may wish to adapt these standards. However, many processors have adapted standards that include lower counts than the established legal standards. When a processor establishes standards that are higher than legal standards (lower bacteria count), these standards should be achievable. However, meeting the standards should require the milk producer to provide care in milk production and handling.

Establishment and maintenance of a standard for Psychrotrophic Bacteria Count of raw milk is a very important function of a cottage cheese manufacturing quality assurance department. High populations of psychrotrophic organisms in raw milk can lead to product defects in cottage cheese. Quality defects occur primarily through production of putrid and bitter flavors with subsequent storage of cottage cheese. These flavors can develop due to

heat stable enzymes produced by psychrotrophic organisms found in raw milk. For example, Cousin and Marth (2) found cottage cheese that was made from raw milk pre-incubated with psychrotrophic bacteria to be unacceptable to taste panelists. In addition, high populations of psychrotrophic organisms in raw milk can lead to reduced yields in cottage cheese production.

Organoleptic standards should also be established for raw milk. Organoleptic standards should be "no detectable off flavors" present in milk when it is received at the processing plant. Testing of milk should be conducted by trained personnel. To minimize health risks concerning organoleptic evaluation of raw milk, procedures outlined by Bodyfelt (1) should be followed. These procedures include heat-treating the milk and discarding the milk sample after tasting.

Standards for receiving temperatures of raw milk are also important in controlling raw milk quality. The dairy may wish to place receiving standards of 40F to 45F and establish the policy of not accepting milk at a temperature greater than the established receiving standard.

Standards should also be established for the presence of foreign material in raw milk supplies. These standards should include "no inhibitory substances, water, pesticides, or other hazardous substances should be present in the raw milk supplies." Enforcing these standards is a function of routine testing and rejecting supplies that violate the standards.

When establishing standards for Psychrotrophic Bacteria Count in raw milk or cream, consideration must be given to the difficulty in testing for these organisms. The standard test used for psychrotrophic organisms calls for an incubation time of ten days at 45F. Because of the expense and difficulty of this testing procedure, many dairies have adopted an indirect method of psychrotrophic bacterial testing. Preliminary incubation is one of the most popular methods used; however, other methods have been suggested. These methods were discussed in previous DAIRY QUALITY UPDATE, Vol. 2 No. 7 (3). The method used for testing psychrotrophic organisms may depend on laboratory facilities, personnel, and other parameters. However, it is important that some testing standards be established for these organisms.



The final ingredient to consider in establishing ingredient standards is starter activity. Starter culture activity testing can be conducted as outlined by Kosikowski (4). This procedure includes inoculating 1/ml of starter into 10/ml of antibiotic free, previously highly heat-treated milk and incubating at 95F (35C). An acceptable starter activity would produce an acid curd and a titratable acidity of 0.70% at the end of four hours. Other standards concerning culture activities should include: no contaminating organisms present, and proper flavor development.

Table 1 below lists proposed ingredient standards for quality cottage cheese manufacturing. This is not an exhaustible list; however, it does point out some of the parameters that should be measured for ingredients quality for cottage cheese manufacturing.

Next month's DAIRY QUALITY UPDATE will discuss proposed standards for process control for the manufacture of quality cottage cheese.

#### REFERENCES

- (1) Bodyfelt, F. W., 1979. Flavor is the Voice of Milk. Dairy Record, Sept., 1978.
- (2) Cousin, M. A., and E. H. Marth, 1977. Cottage Cheese and Yogurt Manufactured from Milk Pre-cultured with Psychrotrophic Bacteria. Cultured Dairy Prod. J., 12: 15-18, 30.
- (3) DAIRY QUALITY UPDATE (Capsule). Volume 2, Number 7, July, 1980.
- (4) Kosikowski, Frank, 1970. Cheese and Fermented Milk Foods. 3rd Ed., Edward Brothers, Inc., Ann Arbor, Michigan.

TABLE 1. Proposed ingredient standards for quality cottage cheese manufacture.

Raw Milk		Cream (Raw)	
SPC	<50,000/ml	SPC	<50,000/ml
LPC	<1,000/ml	LPC	<1,000/ml
Psychrotrophic bacteria	<1,000/ml	Psychrotrophic	
Flavor	No off flavors present	bacterial	<1,000/ml
Foreign substances	none present	Coliforms	<10/ml
Inhibitors	none detected	Flavor	none detected
Temperature	<40-45F	Foreign substances	none detected
		Inhibitors	none detected
<i>Culture</i>			
Contamination organisms	none		
Activity (flavor and acid)	development of .70% T.A. in 4 hrs.		

## Fifth Annual Joint Education Conference Held In Wisconsin

The Fifth Annual Joint Education Conference of the Wisconsin Milk and Food Sanitarians, Dairy Plant Field Representatives, Dairy Technology Society and Environmental Health Association was held in Plover, Wisconsin on September 12-13, 1984. Kathy Hathaway, Executive Secretary of IAMFES, was an attendee. Clifford Mack, Field Representative of A.M.P.I.-Madison, was named Sanitarian of the Year.

Speakers included Sue Fridy on Legislative Process; Dora Mae Coleman, Pillsbury Co., on Food Processing-Nutrition; Dr. Andy Johnson, D.V.M., on Mastitis Control; and more.

Social entertainment included an awards luncheon and a Spanferkel Extravaganza.



1985 WAMFS Executive Board from left to right: Neil Vassau, Secretary/Treasurer; Jon Dresser, Past President; David Myers, President; Eugene Lindauer, Vice President; and Dale Hachmann, 1st Vice President.



Merry Christmas and a Blessed New Year from your International Staff. Back row, left to right, Kathy R. Hathaway, Amber Nordine, and Kate Wachtel. Front row, left to right, Suzanne Trcka and Kim Breault.

## Wyoming Public Health Sanitarians Association Annual Conference

The Wyoming Public Health Sanitarians Association held its annual educational conference September 25-27 in Rock Springs. In attendance were state and local public health sanitarians and Department of Agriculture inspectors from around Wyoming.

Conference topics were presented by key industry people from around the United States. "Quality Control in the Kitchens of Sara Lee" was presented by Susan Nied, Quality Control Manager. Tom Chestnut, Director of Quality Control for Red Lobster Inns of America, discussed their quality assurance program. In addition, Debbie Kovac of the Environmental Protection Agency spoke on "Safe Drinking Water in Wyoming"; Jerry Bjork of the U.S. Consumer Product Safety Commission told about their program, and several speakers from the University of Wyoming and Wyoming State Government officials had presentations on topics such as insects, meat processing, civil defense, fire safety and Indian health services.

The following new officers were elected at the annual meeting: Gary Hickman, Cheyenne/Laramie County Health Department, President; Kathy Johnson, Casper/Natrona County Health Department, President-elect; Sandra Knop, Wyoming State Health Department, Green River, Secretary; and Sandra Palmer, Cheyenne/Laramie County Health Department, Treasurer.

The Wyoming Public Health Sanitarians voted to affiliate with the International Association of Milk, Food and Environmental Sanitarians.



Officers of the Wyoming Public Health Sanitarians Association for 1985 are left to right: Sandra Knop, Green River, Secretary; Gary Hickman, Cheyenne, President; and Kathy Johnson, Casper, President-elect. Absent from the picture is Sandra Palmer, Cheyenne, Treasurer.



Susan Nied, left, Manager Quality Services, Kitchens of Sara Lee, visiting with Howard Hutchings, Director of Environmental Health, Wyoming Dept. of Health, and Sandra Knop, Wyoming Dept. of Health, Food Survey Officer.

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**Quality Without Tears: The art of hassle-free management.** Philip B. Crosby. McGraw Hill Co., New York, New York. 1984. 205 pages. \$18.95.

"A 'hassle' company is one in which management and employees are not on the same side. The 'hassle-free' company offers pleasant working relationships, a smooth-system, and happy employees. It also produces an environment for maximum profit and growth potential."

In his previous best seller book, *Quality is Free*, Philip Crosby laid out the approach he used to install a quality improvement process in companies throughout the world for the past 28 years. This book, *Quality Without Tears*, shows how he has helped hundreds of corporations, large and small, to achieve quality and eliminate hassle. Beginning with the profile of companies that always have problems with quality and discussing why most companies fail to achieve improvement, the book covers the ingredients necessary to prepare and administer the "Quality Vaccine." To prepare the vaccine and administer it continually to the corporation requires a strategy that includes three distinct management actions: determination, education and implementation. The Crosby vaccination serum ingredients include: a) Integrity; b) Systems (quality, education, financial, services); c) Communications; d) Operations; and e) Policies.

Crosby discusses his absolutes for Quality Management: 1) Quality has to be defined as a conformance to requirements, not as goodness; 2) The system for causing quality is prevention, not appraisal; 3) The performance standard must be zero defects, not "that's close enough"; 4) The measurement of quality is the price of nonconformance, not indexes.

"Quality can be caused by deliberate management action since management itself is the clear cause of all the problems."

"Demotivation is unconsciously used by the short-range-oriented managers who are trying to make things better."

The book shows—in a clear, down-to-earth, and logical manner—exactly what is involved in making quality improvements happen:

\*Determination - What does management have to do to show that it is serious about quality? How can it gain the necessary credibility?

\*Education - Who needs to know what, and how do they learn it?

\*What is quality?

\*What is the system?

\*What is the performance standard?

\*What is the measurement?

\*Implementation - What do you do about it? What steps are necessary to establish the communications and actions necessary to make quality part of the woodwork?

Quality can be measured in cold, clear financial terms. Quality College research shows that manufacturing companies have a price of nonconformance of over 25 percent, and that service companies average 40 percent of their operating costs. It is necessary to spend only a few percent on the preventive and educational actions necessary to cause quality.

The hassle that management lays on its employees adds to the problem of quality. Getting things done right the first time is much more difficult if employees feel they must combat their management as well as the job.

Management throughout the world has for several years been struggling with the problem of quality. In this book, *Quality Without Tears*, Crosby points out that many quality problems occur as a result of deliberate management action. When management hassles the employee, knowingly or unknowingly, it greatly affects the company's quality results. *Quality Without Tears* provides a practical approach to ending that struggle. The book shows in a clear, down-to-earth manner, exactly what quality improvement involves and the concepts that make it happen: determination, education, implementation.

*Quality Without Tears* is for the individual who is interested in causing quality to happen and eliminating hassle in the process. This is a very easy reading book, full of suggestions for quality improvement. It is a must book for all individuals involved in QA/QC in the food industry, QA/QC consultants and academic professionals involved in quality education for quality professionals in the food industry. The book is very reasonably priced, but the paperback should be available soon at a much reduced price.

**Ricardo J. Alvarez, Ph.D.**

Director, Quality Assurance  
Tone Brothers, Inc.  
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**Spices Volume II: Morphology and Histology, Chemical Composition, Photomicrographs.** John W. Perry. Chemical Publishing Company, Inc., New York. Second Edition 1983. 245 pages.

Volume II of *Spices* is written very differently than Volume I. It is a more technical volume. The author states that the purpose of this volume is to serve as a short reference book on the structure and chemical composition of spices, to provide helpful information for those whose responsibility is to examine samples of spices with the microscope; to provide a guide to the microscopy of spices for students of food analyses; to interest students of plant histology and others willing to make a reasonable expenditure of time and study in the structure of spices; to provide information on the structure and chemical composition of spices for the use of

all those engaged in, or associated with, the production, manufacture, and distribution of spices; and to convey to the general reader some idea of the external form, the complex but interesting internal structure, and the chemistry of spices.

The book is divided into three parts: morphology and histology, chemical composition and photomicrographs.

Part 1 includes an exhaustive enquiry into the anatomy of the parts of spice plants. An attempt is made by the author to describe as clearly and simply as possible the most important features of the external form and internal structure of the various spices. This section is technically dense. To individuals in spice companies, this section will be perceived as long and dry.

Part 2 deals with the chemical composition of spices. The basic chemical composition of spices is much like that of many other plants. However, their volatile oils, oleoresins, pigments, glucosides, and, in some, fixed oils, are chemical compounds of special interest. It is these that make the spices so desirable as food-flavoring agents. These substances have been a matter for investigation by a great number of people over a very long period of time, and are still the subject of enquiry by many capable chemists. Much is known, and much is yet to be learned, about the complex organic chemical compounds contained within the spices. No attempt has been made by John Perry to discuss the chemistry of the numerous complex chemical compounds involved. This section is of extreme importance to the spice industry. Perhaps the author should have devoted more time to this section. The effect of food processing on the flavoring components of various spices is not discussed. Also, modern spice processing methods influence some of the spices' chemical components and perhaps more important, affect the ultimate effect of the spice in a food system. This is not addressed by the author. Spices are an important value added flavor component of foods. The importance of specific chemical components to food flavoring should have been discussed.

Part 3 consists of photomicrographs of the spices. The photographs were not changed in this new edition. Many changes in microscopic techniques have taken place since first publication of this book. This section does not add value to the technical content of this edition.

The second edition has added chapters on chervil and tarragon and has added new information on essential oils of spices. A very short bibliography is included.

This volume would be of interest to spice manufacturers and food companies who purchase or sell a large volume of spices. The chemical composition of spices could be the subject of a separate book. This is a dynamic area for spice growers, manufacturers, distributors, food chemists and biochemists.

**Ricardo Alvarez, Ph.D.**

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*Dairy India 1983*. Preface by Dr. V. Kurien, Chairman, National Dairy Development Board. Edited by Dr. R. M. Acharya, Dr. R. P. Aneja, Mr. Praful H. Bhatt, and Dr. R. K. Patel. P. R. Gupta, 2C/34 New Rohtak Road, New Delhi 110005.

Can a cooperative relationship among two million producers, each selling only a few quarts of milk a day, result in the development of a viable network of milk collection and processing centers? Can such a scheme provide milk of good quality to 680 million people in a country with exceedingly limited resources?

These are questions that the dubious dairyman of the Western World would surely entertain on reading *Dairy India 1983*. The book provides an historical perspective of India's dairy industry, tracing developments since 1940 and highlighting Operation Flood of the 1970's. It also reveals plans for the 1980's.

Dairying in India differs markedly from the industry in the Western nations. Average farm size is only 2 hectares (5 acres). Bullocks provide draught power for most farm operations and transportation, and most of India's cows are kept primarily to maintain a population of 70 million bullocks. These cows produce low quantities of milk, about one-half as much as do the 30 million female buffalo. Feedstuffs are quite limited in quantity and quality and the resources of cattle owners are exceedingly small. The genetic capacities of the cattle to produce milk is poor, and natural selection for resistance to tropical diseases and parasites appears to have been detrimental to milk production.

In the face of these and other significant problems Indian leaders have undertaken a series of cooperative dairy development schemes with the objectives of enhancing the livelihood of rural milk producers and furnishing badly needed nutrients.

This is a portion of the setting that *Dairy India 1983* describes. But it goes much farther to show how through bold organization of dairy cooperatives the hopes of millions are raised.

The scope and detail of *Dairy India 1983* are large. Therefore, many readers may want to concentrate on specific portions of the book. Especially enlightening are sections on cooperative organization, the limits of breeding Indian cattle to Western bulls, the rationale of feeding dairy animals, the comprehensive description of cattle diseases and the cottage-scale technology of manufacture.

The chapter entitled "Conversion Efficiency in Dairying for National Diet" is especially well done. It considers policy options and concludes that "India's animal-food production complements its food-crop production."

The section on hygienic practices is disappointing in its treatment of cleaning and especially of disinfection. Only three pages are devoted to "Preventive Maintenance" and the information would better be obtained from

the operator's manual of equipment suppliers. The glossary of nearly 500 words and terms is valuable.

About one half of the 500 page book is devoted to a directory of the entire industry, including associated governmental offices, and to a listing of Who's Who in the Indian Dairy Industry.

Leaders of dairy industries in many developing countries would do well to study the Indian experience as given in *Dairy India 1983*.

**Robert T. Marshall, Professor**

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***Disinfection, Sterilization and Preservation***, Edited by Seymour R. Block. Lea and Febiger Publishing Company, Philadelphia, PA, 1983. 1053 pages.

*Disinfection, Sterilization and Preservation*, edited by Seymour R. Block, Ph.D., is a third edition of the classic text first published in 1968. The book is one of the best texts written dealing with the subjects of disinfection, sterilization and preservation available today. Block has put together information submitted by himself and 57 other renowned scientists from the United States, Europe and Australia dealing with the subject. The text is divided into seven sections totaling 51 chapters and 1053 pages. Reference sections are included at the end of each chapter which totally provide thousands of references for anyone wanting to know more about the subject matter presented.

The first part of this book deals with chemical and physical sterilization. A discussion of subjects including sterilization by heat, filtration, ultraviolet irradiation, and ionizing irradiation is presented. Sterilization using glutaraldehyde, ethylene oxide and other gasses is also examined.

Part two of the text discusses antiseptics and disinfectants by chemical type. Information is presented on chlorine and chlorine compounds, iodine and iodine compounds, phenolic compounds, alcohols, hydrogen peroxide, chlorhexidine, and nitrogen compounds. Also, surface active agents including quaternary ammonium compounds, acid-anionic compounds and amphoteric compounds are reviewed. Mercurials, silver, and other heavy metals are discussed. The second section deals with antiseptics and disinfectants by type of microorganisms. Information is presented on pseudomonas, control of tuberculosis, viral inactivation, fungistatic and fungicidal compounds, and finally, antiprotozoan and antihelminthic compounds.

Part three deals with medical and health related applications of disinfection, sterilization and preservation. These chapters are of particular interest to the field sanitarian. Information is presented on chemical disinfection of medical and surgical materials, surgical antiseptics and also sterilization, disinfection, and asepsis in dentistry. Other chapters cover material involving infectious hospital waste treatment and disposal, epidemiology and prevention of nosocomial infections, and a review of hazardous infectious agents in microbiologic laboratories. These chapters offer an up-to-date discussion of disinfection and sterilization techniques and principles for institutions, which is of great importance today. Finally, the last chapter in this section deals with disinfection of drinking water, swimming pool water, and treated sewage effluents. Procedures and chemicals covered include chlorine compounds, bromine, iodine, ozone, silver, ultraviolet radiation, ionizing radiation and heat methods of disinfection. This chapter provides a good review of the subjects presented.

Part four deals with antimicrobial preservatives and protectants. Information is presented dealing with antimicrobial preservations in pharmaceuticals, cosmetics, industrial products, chemical food preservatives, and finally antimicrobial agents in crop production. The chapters dealing with chemical food preservatives and crop protection present excellent information for the field sanitarian. Reviewing these chapters would help refresh the reader's memory on many preservation and antimicrobial agent concepts.

Part five discusses the mode of action of disinfectants and presents information on principles of antimicrobial activity, principles of thermal destruction of microorganisms, and finally on physical factors influencing the activity of antimicrobial agents.

Part six deals with miscellaneous topics which include regulation of disinfectants in the United States, facilities for control of microbial agents, definition of terms, historical review, and finally a business and marketing overview of antimicrobial agents.

The last part of the text deals with methods of testing for effectiveness of disinfectants. Information is presented on methods of testing for sterility, methods of testing disinfectants, antiseptics, sanitizers and bacteriostatic substances, virucides, fungicides, and finally, methods of testing protozoacides and anthelmintics.

A large index at the end of the book allows for easy page identification of topic areas of interest.

This book is an excellent reference text for any practicing sanitarian, teacher, or beginning student. Block is a renowned authority on disinfection and sterilization and has done a masterful job of editing information presented by the contributors to the book.

**Vay A. Rodman, Dr.P.H.**

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Abstracts of papers in the December Journal of Food Protection

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**Method to Rapidly Enumerate *Salmonella* on Chicken Carcasses**, S. G. Hawa, G. J. Morrison and G. H. Fleet, School of Food Technology, University of New South Wales, P.O. Box 1, Kensington, New South Wales, Australia 2033

*J. Food Prot.* 47:932-936

A method for rapid enumeration of *Salmonella* on chicken carcasses was developed. Carcass rinses were centrifuged to sediment and concentrate *Salmonella* and other microbial cells. After washing and resuspending the pelleted cells to 1.0 ml, *Salmonella* was selectively isolated and differentiated from other species by plating onto newly developed dulcitol bile novobiocin agar. Rapid lysine decarboxylase and ONPG tests were developed for biochemical confirmation of presumptive *Salmonella* colonies. Fully confirmed *Salmonella* counts were obtained within 48 h. The new method gave *Salmonella* counts and detection rates that were significantly higher than those found by conventional enrichment, plating procedures.

**Three Systems for Biochemical Characterization of Lactobacilli Associated with Meat Spoilage**, B. H. Lee and R. E. Simard, Research Station, Agriculture Canada, St-Jean-sur-Richelieu, Québec, Canada J3B 6Z8 and Département de Sciences et Technologie des Aliments et Centre de Recherche en Nutrition, Université Laval, Québec City, Québec, Canada G1K 7P4

*J. Food Prot.* 47:937-942

Three methods (APIZYM, Minitex and VPI systems) were compared for their ability to characterize some of lactobacillus isolates from anaerobically spoiled meats. Nineteen authentic lactobacillus cultures obtained from various sources were also compared. Greening spoilage isolates from frankfurters were identified as *Lactobacillus viridescens* by the APIZYM and Minitex tests. Lactobacillus isolates from spoiled veal were identified as *Lactobacillus plantarum* by one of the three methods. Other isolates which could not be assigned to a generic level appeared to be atypical streptobacteria or betabacteria. Except for some disagreement in the identity of lactobacilli among the three systems, they proved useful in distinguishing between the different lactobacilli.

***Campylobacter jejuni* and *Campylobacter coli* Production of a Cytotoxic Toxin Immunologically Similar to Cholera Toxin**, Barbara A. McCardell, Joseph M. Madden and Eileen C. Lee, Division of Microbiology, Food and Drug Administration, Washington, D.C. 20204, and Department of Biology, The Catholic University of America, Washington, D.C. 20064

*J. Food Prot.* 47:943-949

An enzyme-linked immunosorbent assay (ELISA) based on binding to cholera toxin (CT) antibody was used to screen cell-free supernatant fluids from 11 strains of *Campylobacter jejuni* and one strain of *Campylobacter coli*. Positive results for seven of the eight clinical isolates as well as for one animal and one food isolate suggested that these strains produced an extracellular factor immunologically similar to CT. An affinity column (packed with Sepharose 4B conjugated to purified anti-CT IgG via cyanogen bromide) was used to separate the extracellular factor from cell-free supernatant fluids. Both unconcentrated supernatant fluids and affinity-purified material caused rounding in a Y-1 mouse adrenal cell assay, suggesting that the factor was a cytotoxic toxin. Rounding of Y-1 cells caused by cell-free supernatant fluids, affinity-purified toxin or CT was neutralized by preincubation with CT or *Campylobacter* cytotoxic toxin (CCT) antiserum. CCT and CT showed a reaction of partial identity by gel immunodiffusion, using IgG from CT antiserum. Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS PAGE) of purified CCT produced one band at 70,000 daltons. Cell-free concentrates were positive in the rabbit skin permeability test and caused fluid accumulation in rabbit ileal loops. However, cell-free supernatant fluids and concentrates heated at 90°C for 15 min and tested by the suckling mouse assay produced no fluid accumulation in the intestines of mice.

**Critical Control Points of Hospital Foodservice Operations**, Frank L. Bryan and Jeanette B. Lyon, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Atlanta, Georgia 30333 and Maryland State Department of Health and Mental Hygiene, Baltimore, Maryland 21201

*J. Food Prot.* 47:950-963

Hazard analyses were made of hospital dietary cook/freezer, cook/chill, assemble/serve, and cook/hold-hot operations. These analyses consisted of measuring temperatures of foods during thawing, cooking, hot-holding, chilling, transporting foods to hospital units, reheating, and delivery to patients and observing food-handling activities for sources and modes of contamination. Identified critical control points in the cook/freezer and cook/chill operations were cooking, cooling, and handling after cooking; in the assemble/serve operation was the incoming foods, and in the cook/hold-hot operation was cooking and hot-holding. No hazards were observed during thawing. Foods were usually cooked to temperatures that would have killed vegetative forms of foodborne pathogens. Either the periods of hot-holding were short or the temperatures were high enough to preclude multiplication of these bacteria. Cooling of foods of similar kind, size, and weight was much more rapid in a rapid-chill refrigerator than in walk-in refrigerators. In the cook/hold-hot operations, temperatures of foods continued to decrease in spite of attempts to keep them hot by placing heated metal pellets under plates and covering the dished-up meal in covered carts during transport from kitchen to patients. Microwave reheating could be a critical control point whenever used, but monitoring is difficult because of considerable variation of temperatures throughout a serving of a particular food and differences between different foods on the same plate.

**An Indirect Enzyme-Linked Immunosorbent Assay for T-2 Toxin in Biological Fluids**, Titan S. L. Fan, Guang S. Zhang and F. S. Chu, Food Research Institute and Department of Food Microbiology and Toxicology, University of Wisconsin, Madison, Wisconsin 53706

*J. Food Prot.* 47:964-967

An indirect enzyme-linked immunosorbent assay (ELISA) which can detect 0.2 to 1 ng of T-2 toxin per ml in urine, serum and milk was developed. T-2 hemisuccinate was conjugated to polylysine which was then coated to a microtiter plate and incubated with rabbit anti-T-2 antibody and sample extract. The amount of anti-T-2 antibody bound to the plate was then determined by reaction with goat anti-rabbit IgG-peroxidase complex and by subsequent reaction with the substrate. Samples spiked with T-2 toxin were subjected to a simple cleanup procedure by passing them through a reversed-phase Sep-Pak cartridge (C<sub>18</sub>). The recoveries of tritiated T-2 toxin added to the urine, serum and milk samples were between 71 to 90% after the cleanup step. In the ELISA, significant interference was observed when more than 5 µl of sample, without cleanup treatment, were used in each analysis. After cleanup, extracts equivalent to 50 µl of serum, urine or milk per well did not significantly interfere with the assay. The recoveries of T-2 toxin added to serum (1 to 10 ng/ml), urine (0.2 to 10 ng/ml) and milk (0.2 to 10 ng/ml) after cleanup treatment as determined by the indirect ELISA were found to be 51 to 82%, 73 to 82% and 80 to 83%, respectively.

**Tissue Iodine in Sheep Fed Diets Containing Ethylenediamine Dihydriodide**, David D. Wagner, Bruce D. Bradley, Norris E. Alderson and Marian L. Schutz, Center for Veterinary Medicine, Food and Drug Administration, Beltsville, Maryland 20705

*J. Food Prot.* 47:968-970

Twenty-four male lambs, produced by crossing commercial blackfaced ewes with purebred Suffolk rams and averaging 40.1 kg body wt., were fed one of two ethylenediamine dihydriodide (EDDI)-supplemented diets. A total of eight pens (four pens per treatment) containing three animals each were assigned at random to the two diets. Dietary treatments consisted of a basal diet containing 0.79 ppm I as EDDI and EDDI-supplemented diets providing an additional 12 mg of EDDI/head/d. The diets were fed for 42 d, after which the animals were slaughtered and various tissues collected for I analysis. Iodine concentration in the serum of sheep fed the EDDI-supplemented diet increased fivefold (62 vs. 12 µg/dl) over the control animals within a week and this difference was maintained throughout the experiment. There was a trend toward increased I in semimembranosus, psoas major, longissimus and trapezius muscles, although this was statistically nonsignificant. Increases ( $P < 0.01$ ) in the I concentration in liver (0.085 vs. 0.166 µg/g) and kidney (0.143 vs. 0.409 µg/g) were observed. Analysis of thyroid tissue indicated no increase in I concentration (1732 vs. 2166 µg/g). Based on these results, it is concluded that feeding EDDI to sheep at 12 mg/head/d until slaughter increased I in edible tissues. The rate at which iodine depletes from these tissues is unknown.

**Survey for *Clostridium botulinum* in Nine Selected Canneries**, Mitzi L. Kibler, Warren E. Anderson and Sandy L. Wells, Michigan Fruit Canneries, P.O. Box 68, Benton Harbor, Michigan 49022; Curtice Burns, Inc., 1 Lincoln First Square, P.O. Box 681, Rochester, New York 14603 and Comstock Foods, P.O. Box 670, Rochester, New York 14602

*J. Food Prot.* 47:971-974

Nine canneries and eight labeling operations, located across the United States, were surveyed for mesophilic anaerobic spores including *Clostridium botulinum*. Particular attention was given to processing and cooling water, surfaces of processing equipment, and post-processing can handling operations. Of the 571 samples that were cultured, about 33% yielded viable spores of mesophilic anaerobic bacteria. None, however, contained *C. botulinum*.

**Restructured Beef Steaks Manufactured Using Carbon Dioxide, Oxygen and Carbon Monoxide Gas**, D. L. Huffman, N. R. Ottaviano, J. C. Cordray, W. R. Jones and C. F. Ande, Department of Animal and Dairy Sciences, Alabama Agricultural Experiment Station, Auburn University, Auburn, Alabama 36849

*J. Food Prot.* 47:975-977

Restructured beef steaks were manufactured from boneless, tenderized USDA Utility inside cow rounds (semimembranosus) and USDA Choice beef plates which were treated with oxygen, carbon dioxide or a combination of carbon monoxide and nitrogen gas during the mixing stage of the manufacturing process. Treatments were preformulated to 15% fat and mixed for 15 min during which time the various gas atmospheres were incorporated into the mixer. All treatments received 2% water and 0.75% sodium chloride during the mixing cycle. Proximate analysis, objective and subjective color, mechanical shear and binding strength were examined. Gaseous treatments had no effect ( $P>0.05$ ) on moisture, fat or protein percentages. Carbon monoxide (10.01% carbon monoxide mixed with nitrogen) treatment increased Hunter "a" and "b" and reflectance (685 nm) values. Oxygen treatment had no effect ( $P>0.05$ ) on Hunter "L", "a" or "b" values or reflectance (685 nm) values. Carbon dioxide decreased ( $P<0.05$ ) both Hunter "b" and reflectance (685 nm) values. Subjective scores indicated more discoloration ( $P<0.05$ ) for the carbon dioxide treatment than the carbon monoxide or oxygen treatments, but none of the treatment groups was different from the control. Shear (Kramer) and binding (Instron) values were unaffected ( $P>0.05$ ) by the treatments.

**Analysis of the Major *Alternaria* Toxins**, John E. Schade and A. Douglas King, Jr., Western Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture, Berkeley, California 94710

*J. Food Prot.* 47:978-995

Some physical and chemical properties of 40 secondary metabolites produced by *Alternaria* are tabulated along with literature references. Analytical methodology for three of the several classes of these potential toxins is reviewed in depth, because compounds in these classes are produced in relatively large amounts by many *Alternaria* and/or are apparently very toxic or mutagenic. Tenuazonic acid, alternariol and alternariol monomethyl ether represent the major toxins in terms of both quantity produced and toxicity. The altertoxins, although produced in very small amounts, are included because of their apparent toxicity/mutagenicity. Published methods used to isolate and purify or analyze these important toxins are grouped for comparison according to similarities in extraction, isolation and analysis. Methods used for quantitative analysis are separated from those used primarily for preparation and purification. Published detection limits and recoveries are compared. Analytical needs and prospects are discussed.

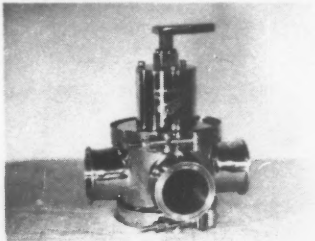
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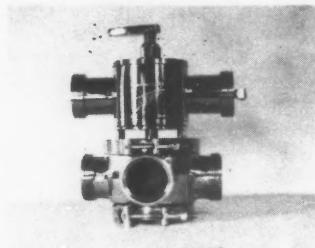
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116	136	156	176	196	216	236	256	276	296	316	336	356
117	137	157	177	197	217	237	257	277	297	317	337	357
118	138	158	178	198	218	238	258	278	298	318	338	358
119	139	159	179	199	219	239	259	279	299	319	339	359
120	140	160	180	200	220	240	260	280	300	320	340	360

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1985

January 3-5, **MILLING FOR CEREAL CHEMISTS SHORT COURSE**, to be held at Kansas State University, Manhattan, KS. For more information and registration form contact: Dotty Ginsburg, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121. 612-454-7250. Deadline for registration is Dec. 12, 1984.

January 7-11, **TECHNOLOGY OF BAKERY PRODUCTION SEMINAR**, to be held at the American Institute of Baking, Manhattan, KS. For more information contact: Mrs. Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

January 14-25, **BAKING FOR ALLIED AND NON-PRODUCTION PERSONNEL**, to be held at the American Institute of Baking, Manhattan, KS. For more information contact: Mrs. Donna Mosburg, Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

January 28-31, **BASIC FOOD PROCESSING SANITATION**, to be held in Manhattan, KS. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

January 29-30, **ENERGY MANAGEMENT IN DAIRY PROCESSING WORKSHOP**, to be held in the Agricultural Research Bldg., Purdue University, West Lafayette, IN. For more information contact: James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907. 317-494-8279.

February 4-8, **MILK MANUFACTURING SHORT COURSE**, North Carolina State University. For more information contact: John Rushing, 919-737-2956, or Bruce Winston, 919-737-2261.

February 5-6, **FOOD PROCESSORS SANITATION WORKSHOP**, to be held at Mission De Oro, Santa Nella, CA. For more information contact: Bob Pearl, 916-752-0980.

February 13-14, **DAIRY AND FOOD INDUSTRY CONFERENCE**, The Ohio State University. For more information contact: John Lindamood, Department of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210-1009.

February 14-15, **MEAT PROCESSING CONFERENCE**, to be held at the San Francisco Hilton, San Francisco, CA. For more information contact: Shirley Rexroat or Wade Brant, 916-752-2191.

February 15-17, **NATIONAL MASTITIS COUNCIL ANNUAL MEETING**, to be held at the Frontier Hotel, Las Vegas, NV. For more information and registration materials contact: John Adams, National Mastitis Council, 1840 Wilson Blvd., Arlington, VA 22201. 703-243-8268.

February 17-19, **10TH WINTER INTERNATIONAL FANCY FOOD & CONFECTION SHOW**, to be held at the Los Angeles Convention Center, Los Angeles, CA. For show information contact: Pat Dolson, Manager, IFFCS, P.O. Box 3833, Stamford, CT 06905. 203-964-0000. For industry information contact: Jean Frame, Executive Director, NASFT, Suite 1606, 215 Park Ave. South, New York, NY 10003. 800-255-2502 or 212-505-1770.

February 25-27, **THE LAW AND THE FOOD INDUSTRY**, a course to be held at UC Davis, CA. For more information call: 916-752-6021.

February 26-27, **11TH ANNUAL ABC RESEARCH CORPORATION TECHNICAL SEMINAR**. For more information contact: Sara Jo Atwell, Administrative Assistant, ABC Research Corporation, P.O. Box 1557, Gainesville, FL 32607. 904-372-0436.

March 6-7, **SECOND ANNUAL CHEESE RESEARCH AND TECHNOLOGY CONFERENCE**, to be held at the Sheraton Inn and Conference Center, Madison, WI. For more information contact: Norman F. Olson, Walter V. Price Cheese Research Institute, Department of Food Science, University of Wisconsin-Madison, Madison, WI 53706. 608-263-2001.

March 11-12, **PRINCIPLES OF SANITATION FOR WAREHOUSEMEN**, to be held in Manhattan, KS. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

March 13-15, **FOOD IRRADIATION UPDATE**, to be held at the UC Davis Faculty Club, Old Davis Road, UC Davis, CA. For more information, or to enroll, contact: Jim Lapsley at 916-752-6021.

March 17-20, **AMERICAN CULTURED DAIRY PRODUCTS INSTITUTE ANNUAL MEETING AND CONFERENCE/KULTURES AND KURDS KLINIC/NATIONAL CULTURED PRODUCT EVALUATION SESSIONS**, to be held at the Opryland Hotel, Nashville, TN. For more information contact: C. Bronson Lane, ACDPI, P.O. Box 7813, Orlando, FL 32854.

March 20, **INDIANA DAIRY INDUSTRY CONFERENCE**, to be held at Stewart Center, Purdue University, West Lafayette, IN. For more information contact: James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907. 317-494-8279.

March 25-27, **PRINCIPLES OF QUALITY ASSURANCE**, to be held in Manhattan, KS. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

March 25-29, **MID-WEST WORKSHOP IN MILK AND FOOD SANITATION**, The Ohio

State University. For more information contact: John Lindamood, Department of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210-1009.

March 26-27, **WESTERN FOOD INDUSTRY CONFERENCE**, to be held at Freeborn Hall, University of California, Davis, CA. For more information contact: Shirley Rexroat, 916-752-2191, or Bob Pearl, 916-752-0980.

April 14-17, **66TH DFISA ANNUAL CONFERENCE**, Marriott's Marco Beach Resort, Marco Island, FL. For more information contact: Bruce L. D'Agostino, Director, Public Relations, Dairy and Food Industries Supply Assoc., Inc., 6245 Executive Boulevard, Rockville, MD 20852-3938. 301-984-1444, Telex: 908706.

April 14-18, **INTERNATIONAL FOOD FAIR OF SCANDINAVIA - TEMA 85**, the 8th international fair for food and beverages, held together with the 5th international hotel, restaurant and catering fair. For more information contact: Leslie Christensen, General Manager, Bella Center A/S, Center Boulevard, DK-2300 Kobenhavn, Denmark.

April 15-16, **ADVANCED PEST CONTROL**, to be held in Manhattan, KS. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

April 15-19, **STATISTICAL QUALITY CONTROL SHORT COURSES - STATISTICAL METHODS APPLIED TO PRODUCTIVITY IMPROVEMENT AND QUALITY CONTROL - FOR THE FOOD PROCESSING INDUSTRY**, to be held at the University of California, Davis. For more information contact: Robert C. Pearl, Food Science & Technology Dept., University of California, Davis, CA 95616. 916-752-0980.

May 6-7, **MOLD MONITORING AND CONTROLS SPECIAL COURSE**, to be held in Manhattan, KS. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

May 8-10, **SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSOCIATION meeting**. To be held in Spearfish, South Dakota. For more information contact: Cathy Meyer, President S.D.E.H.A., PO Box 903, Mitchell, SD 57301. 605-996-6452.

May 13-16, **ASEPTIC PROCESSING AND PACKAGING WORKSHOP**, to be held at Purdue University, West Lafayette, IN. For more information contact: James V. Chambers, Food Science Department, Smith Hall, Purdue University, West Lafayette, IN 47907. 317-494-8279.

May 14-16, **CONFERENCE ON INFANT FORMULA**, to be held at the Sheraton Beach Inn & Conference Center, Virginia Beach, VA. For more information contact: Dr. James T. Tanner, Food & Drug Administration,

HHF-266, 200 C Street S.W., Washington, DC 20204. 202-472-5364.

May 20-23, **FOODANZA '85**, joint convention of the Australian and New Zealand Institutes of Food Science and Technology. To be held at the University of Canterbury, Christchurch, New Zealand. For more information contact: D. R. Hayes, Convention Secretary, 394-410 Blenheim Road, PO Box 6010, Christchurch, New Zealand.

May 21-23, **INTERNATIONAL DAIRY FEDERATION SEMINAR**, Progress in the Control of Bovine Mastitis, to be held at Bundesanstalt für Milchforschung, D-2300 Kiel, FRG. For more information contact: Prof. Dr. W. Heeschen, Bundesanstalt für Milchforschung, Institut für Hygiene, Hermann-Weigmann-Strabe 1, P.O. Box 1649, D-2300 Kiel / FRG. Telephone: (0431) 609-392 or 609-1. Telex: 292966.

May 24, **DFISA INTERNATIONAL TRADE SEMINAR**, to be held at the Key Bridge Marriott, Washington, D.C. For more information contact: Bruce L. D'Agostino, Director, Public Relations, Dairy and Food Industries Supply Assoc., Inc., 6245 Executive Boulevard, Rockville, MD 20852-3938. 301-984-1444, Telex: 908706.

June 17-20, **BASIC FOOD PLANT MICROBIOLOGY**, to be held in Manhattan, KS. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

June 23-26, **CANADIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY 28TH ANNUAL CONFERENCE**, to be held at the Royal York Hotel, Toronto, Ontario, Canada. For more information contact: Mr. Bill Munns, Conference Chairman, Canada Packers Inc., 95 St. Clair Avenue W., Toronto, Ontario M4V 1P2, Canada. 416-766-4311.

August 4-8, **IAMFES ANNUAL MEETING**, to be held at the Hyatt Regency, Nashville, TN. For more information contact: Kathy R. Hathaway, IAMFES, Inc., P.O. Box 701, Ames, IA 50010. 515-232-6699.

August 25-30, **9TH SYMPOSIUM OF WAVFH**. The World Association of Veterinary Food Hygienists (WAVFH) will hold their 9th Symposium in Budapest, Hungary. For more information contact: 9th WAVFH Symposium, Organizing Committee, Mester u. 81, H-1453 Budapest Pf 13, Hungary.

September 9-12, **ASEPTIC PROCESSING AND PACKAGING OF FOODS**, sponsored by The International Union of Food Science and Technology Food Working Party of the European Federation of Chemical Engineering, to be held in Tylosand, Sweden. For more information contact: Ann-Britt Madsen, Kurssekretariat, Lund Institute of Technology, P.O. Box 118, S-221 00 Lund, Sweden.

September 30-October 2, **ADVANCED SANITATION PROGRAM**, to be held in Chicago, IL. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

October 1-3, **STORAGE LIVES OF CHILLED AND FROZEN FISH AND FISH PRODUCTS**, to be held at The Conference Centre, University of Aberdeen, Aberdeen, Scotland. For more information contact: IIR Conference Organiser, Torry Research Station, PO Box 31, 135 Abbey Road, Aberdeen AB9 8DG, UK.

October 5-9, **DFISA FOOD & DAIRY EXPO '85**, to be held at the Georgia World Congress Center, Atlanta, GA. For more information contact: Bruce L. D'Agostino, Director, Public Relations, Dairy and Food Industries Supply Assoc., Inc., 6245 Executive Boulevard, Rockville, MD 20852-3938. 301-984-1444, Telex: 908706.

October 21-25, **69TH ANNUAL SESSIONS OF THE INTERNATIONAL DAIRY FEDERATION**, to be held in Auckland, New Zealand. For more information contact: H. Wainess, Secretary, U.S. National Committee of the IDF (USNAC), 464 Central Avenue, Northfield, IL 60093. 312-446-2402.

October 28-30, **PCO RECERTIFICATION**, to be held in Manhattan, KS. For more information contact: Shirley Grunder, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. 913-537-4750.

## 1986

April 14-18, **FRUIT AND FRUIT TECHNOLOGY RESEARCH INSTITUTE INTERNATIONAL CONFERENCE** to be held at the CSIR Conference Centre, South Africa. For more information contact: Symposium Secretariat S.341, CSIR, P.O. Box 395, Pretoria 0001, South Africa. Telephone: 012 869211 x 2063. Telex: 3-630 SA.

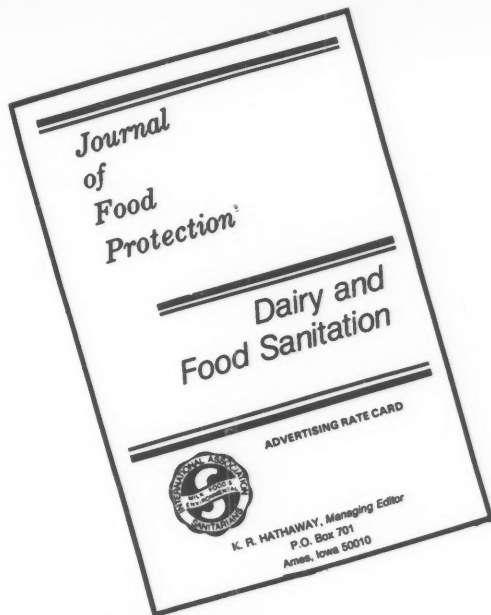
May 26-31, **2ND WORLD CONGRESS FOODBORNE INFECTIONS AND INTOXICATIONS** will take place in Berlin (West) at the International Congress Centre (ICC). For more information contact: FAO/WHO Collaborating Centre for Research and Training in Food Hygiene and Zoonoses, Institute of Veterinary Medicine (Robert von Ostertag-Institute), Thielallee 88-92, D-1000 Berlin 33.

June 29-July 2, **29TH CONFERENCE OF THE CANADIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY**, to be held in Calgary, Alberta, Canada. For more information contact: Terry Smyrl, Ph.D., Alberta Horticultural Research Center, Brooks, Alberta, Canada, T0J 0J0. 403-362-3391.

August 3-7, **IAMFES ANNUAL MEETING** to be held at the Radisson South, Minneapolis, MN. For more information contact: Kathy R. Hathaway, IAMFES, Inc., P.O. Box 701, Ames, IA 50010. 515-232-6699.



Your International Staff on a normal day. (Actually dressed in the Halloween spirit!) Left to right, Suzanne Trcka (punk), Amber Nordine (bag lady), Kate Wachtel (blue cow, inside joke), Kathy R. Hathaway (martian) and Kim Breault (clown).



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1/8 page	\$110	\$101	\$92	\$80

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2/3 page	\$519	\$492	\$464	\$416
1/2 page	\$458	\$438	\$418	\$365
1/3 page	\$297	\$282	\$268	\$238
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1/8 page	\$166	\$153	\$139	\$120

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General Sanitation	21%
Laboratory	16%
Teaching - Research	5%
Industry	7%
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The circulation of the *Journal* is international and averages 3500 copies per month. *Dairy and Food Sanitation* circulation averages 3000 copies per month.

# THE NEW SURGE MILK TANK. IT TAKES A LOT MORE THAN OUR NAME TO MAKE IT A SURGE.

Tank is insulated from base.  
No more sweating tank legs.

Milk contact surfaces  
are highly polished  
18/8 stainless steel,  
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for maximum  
cleanability.

Automatic Response  
Cooling (ARC)  
constantly adjusts  
refrigerant flow to milk  
flow for peak efficiency.

Both inner and outer  
tank shells are rust-  
resistant stainless steel.

Precision welds and close  
tolerances in critical areas  
such as the cold-wall provide  
a more efficient flow of  
refrigerant.

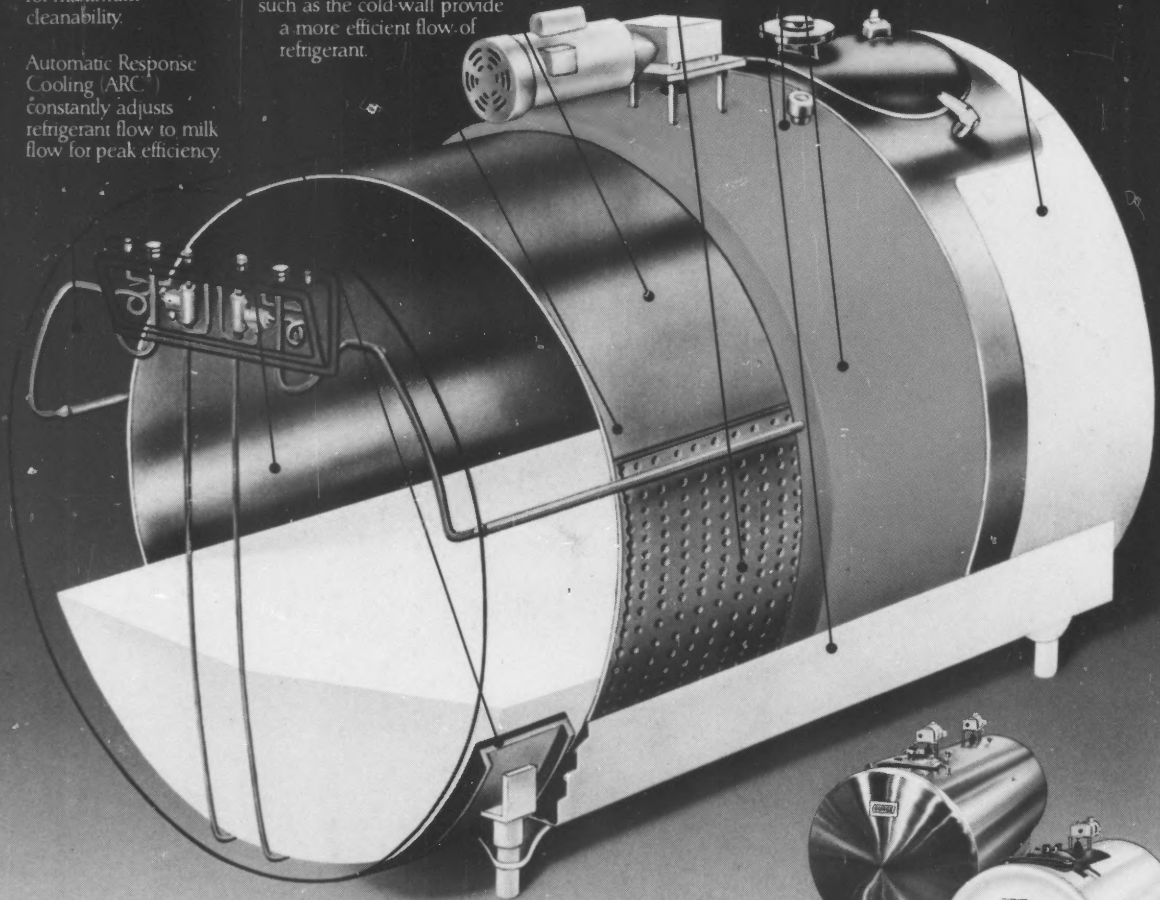
Stable base provides  
calibration accuracy  
guaranteed for five years.

New cold-wall design  
maximizes heat removal,  
provides more even  
cooling.

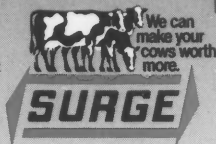
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Extra-dense polyurethane  
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The Surge ARC Cooling Tank is designed for today's top dairyman. It is energy efficient, very easy to clean, and engineered for long, dependable operation. The gleaming white, incredibly smooth Polane finish is as beautiful as it is practical. Call your Surge dealer today. Or write Babson Bros. Co., 2100 South York Road, Oak Brook, Illinois 60521.



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