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# Dairy and Food Sanitation

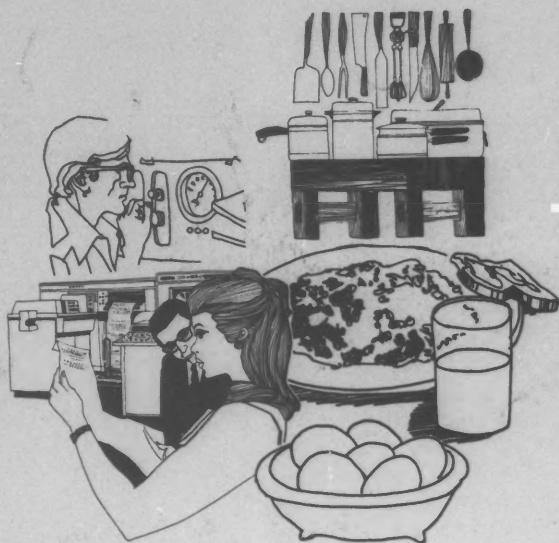


A Publication of the International Association of Milk, Food and Environmental Sanitarians, Inc.

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# Sweet Water and Glycol Coolants as Potential Sources of Dairy Product Contamination

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*How often does a fluid milk plant run into keeping quality problems which are spotty in nature, quite unpredictable, and in no way anticipated by most routine quality control procedures commonly applied? How often does an early spoilage problem occur in some few containers of a day's run, with the remaining product from the same run free of hint spoilage? How often does a shelf-life problem simply defy all logical and reasoned approaches to correct it?*

Answers to the above questions may reflect more than one kind of contamination problem, but very often -- perhaps more often than you think -- the HTST unit may lie at fault, and not because of inadequate cleaning. Rather, pin holes, microscopic cracks, and other openings so small as to be almost impossible to find, allow cross-contamination of pasteurized products with contaminated sweet water and/or glycol refrigerant.

But that won't occur, you say. It can't -- not as long as a higher pres-

sure is maintained on the milk than coolant side of the plates in the HTST unit. If a pin hole exists, direction of flow will be from milk to refrigerant, not the other way around. Besides, how often is the refrigerant that badly contaminated? What if a drop or two of contamination does occur?

Thus the argument goes, nothing is done and, not infrequently, problems in keeping quality continue to nag the operation.

### *Some Points to Ponder*

First, it is true that the HTST unit may not be the site -- or the only source -- of contamination of finished products. Some small number of gram-positive, psychrotropic, spore-forming organisms present in raw milk may survive pasteurization; they may indeed constitute a keeping quality problem, especially in products requiring a shelf-life of 14 to 21 days or longer. Because raw milk is the source of contamination, corrective measures involve farm sanitation and raw milk handling and storage equipment.

Post-pasteurization contamination is the other major cause of poor keeping quality of fluid products. Sources of problems in this respect include poor sanitation, airborne and waterborne contaminants, contaminated packaging materials, etc. At the same time, the HTST unit should not be overlooked as a possible -- even likely source of trouble. Data in Table 1 indicate the relative frequency of contamination of sweet water/glycol coolants with psychrotropic organisms. Such organisms, usually gram-negative rods, are so

often present as to be common sources of potential contamination of pasteurized milk after it leaves the HTST holding tube. Granted, conditions have to be just right, but our contention is that such conditions not only exist, but exist far more often than might be expected.

First, there must be pin holes, or small cracks or crevices in the HTST plates. Experience suggests that such holes and fissures not only occur, but are often impossible to detect by visual means and may not even be readily apparent with dye-staining techniques. Secondly, psychrotropic bacteria must survive both in sweet water and glycol. Table 1 gives ample evidence of that ability. Thirdly, pressure on the glycol or sweet water system usually exceeds the pasteurized milk pressure. Lastly, the contaminating bacteria must have true and rapid growth potential in cold storage. Those psychrotrophs often found in coolants have this ability, and to the extent that even very low levels of contamination are likely to result in significantly reduced shelf-life, i.e., less than nine days.

In addition, you should carefully consider the kind of data used to evaluate the microbial quality of your sweet water/glycol systems. A regulatory agency is required only to determine presence of coliform organisms. If this is the extent of data made available to you, it will be of limited value. Not even a Standard Plate Count (SPC) will tell you what you need to know. The kinds of organisms that can cause spoilage of milk at cold temperatures do not grow well at temperatures used to in-

cubate SPC plates. Data in Table 2 demonstrate that fact very clearly. In the final analysis, only a test for psychrotrophs -- incubation of culture plates for 10 days at 7° C -- will provide truly meaningful counts. Such data, at any rate, will not lull you into a false sense of security, as a coliform and/or SPC count may well do.

But even a psychrotropic count made on the sweet water/glycol system in itself is not sufficient. After

all, it is contamination of the milk *per se* that is of importance. And, to get at this aspect, an analysis must be done on the milk itself, and at a point in the processing line immediately following the pasteurizer. For this purpose, an aseptically obtained sample must be taken, and on a regular basis. A reasonable quality control effort might include a daily sample of 50 to 100 mls. On this amount of milk you can run a SPC, a 7-day Moseley keeping quality test,

and a coliform analysis. Evidence implicating the HTST unit includes (1) presence of coliform organisms, (2) a Moseley count twice that of the day-1 SPC, and, if further evidence is needed, (3) presence of gram-negative rods found in colonies growing on Moseley plates.

#### A Sampling of Data

Table 1 shows the results of a recent Minnesota Department of Agriculture, Dairy Industries Division

TABLE 1. Results of a bacteriological survey of sweet water and glycol coolant systems in Minnesota dairy plants<sup>(1)</sup>.

Sample No.	Glycol Systems		Sweet Water Systems	
	Coliforms (MPN/100 ml)	Psychrotrophs (CFU per ml)	Coliforms (MPN/100 ml)	Psychrotrophs (CFU per ml)
1	<2.2	<1	2.2	4,300
2	<2.2	4,300	<2.2	>60,000
3	<2.2	<1	>16.0	>60,000
4	<2.2	9	<2.2	5
5	<2.2	<1	<2.2	<1
6	<2.2	<1	<2.2	<1
7	<2.2	420	9.2	<1
8	<2.2	<1	16.0	18,000
9	<2.2	1,100	<2.2	2,900
10	<2.2	4,800	<2.2	63
11	<2.2	5,400	<2.2	<1
12	<2.2	<1	>16.0	<1
13	<2.2	<1	<2.2	>60,000
14	<2.2	10,000	<2.2	<1
15	<2.2	<1	<2.2	<1
16	<2.2	4,800	<2.2	650
17			<2.2	3
18			<2.2	2
19			<2.2	24
20			<2.2	520
21			<2.2	490
22			9.2	>60,000
23			>16.0	>60,000
24			>16.0	>60,000
25			<2.2	<1
26			>16.0	>60,000
27			<2.2	16
28			>16.0	33,000
29			<2.2	>60,000
30			<2.2	<1
31			<2.2	20
32			<2.2	>60,000
33			<2.2	270
34			>16.0	>60,000
35			<2.2	<1
36			<2.2	31,000

(1) Data provided by William Coleman and Gary Olson of the Minnesota Department of Agriculture.

TABLE 2. Results of a bacteriological survey of sweet water and glycol systems of several fluid milk plants.

Plant No.	Coolant System	Coliform <sup>a</sup> (per ml)	SPC <sup>b</sup> (per ml)	Psychrotrophs <sup>c</sup> (per ml)
1	swt. water	<1	32	NC <sup>d</sup>
	glycol	<1	38	1
2	glycol (unit 1)	<1	56	2
	glycol	<1	160	38
4	glycol	<1	2	NC
	swt. water	<1	2,700	110,000
5	swt. water	<1	12,000	81,000

<sup>a</sup>Counts determined on violet red bile agar.

<sup>b</sup>Standard Plate Count.

<sup>c</sup>Counts determined by plating at 7°C, 10 days incubation.

<sup>d</sup>No count.

survey of sweet water and glycol systems. Coliform determinations were made using the Most Probable Number (MPN) and confirmatory methods outlined in Standard Methods for the Examination of Water and Waste Water, 14th edition. Psychrotropic counts were made at 7°C, ten days of incubation, as indicated in Standard Methods in the Examination of Dairy Products, 14th edition.

No glycol samples in this survey showed coliform counts in excess of 2.2 MPN/100 ml. However, 50% of these samples showed psychrotropic contamination, with counts ranging from 9 to 10,000 CFU/ml. Sweet water systems are another matter. Nearly one-third showed evidence of

coliform contamination, and almost three-fourths of the samples were contaminated with psychrotrophs. In this latter respect, counts ranged from 2 to over 60,000 CFU/ml. Overall, considering both glycol and sweet water samples, 21% gave evidence of coliform contamination, 40% were contaminated with psychrotrophs in excess of 1000 CFU/ml, 27% with counts over 10,000 CFU/ml. The bottom line reads 45% of samples as possible cause of milk contamination.

Data in Table 2 reflect a much smaller survey, but provide strong evidence of the need to evaluate sweet water/glycol systems by methods indicating numbers of psychrotrophic organisms. Counts might be

expected to increase significantly over those observed using the SPC. One sample in this study showed nearly a 7-fold increase, another close to 41-fold increase.

Evidence of the kind presented in the tables makes a strong case for regular microbiological evaluation of both coolant systems used in HTST pasteurization and milk samples taken aseptically directly following pasteurization. Data from such testing could well uncover a source of keeping quality problems heretofore ignored. Better yet, such data might make it possible for a dairy plant to greatly reduce the number of spasmodic outbreaks of unusually early off-flavor development in fluid milk products.

### Ex-Sanitarian Seeks to Return to the Fold.

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# Self-Inspection of Food Service in the U.S. National Park System

O.D. (Pete) Cook, M.S., M.P.H., R.S.

Park Sanitarian  
National Park Service  
Yellowstone National Park, Wyoming

*Self inspection by concessioners in the U.S. National Park System is a good tool in improving sanitation and food protection practices in park system food service facilities. Food protection practices in parks are often influenced by the character of the park as well as inherent operational difficulties. Development of the self-inspection program uses the epidemiological approach, risk assessment methods and manager certification in sanitation. Special concerns focus on controlling food temperature abuse through the use of rapid chill methods, good rare roast beef cookery practices and monitoring special activities. Self-inspection is effective with food protection practices where there is commitment by the organization.*

## INTRODUCTION

One of the highest priorities of the National Park Service is public health protection for visitors and employees. Provision of food services to the public in the system is through a series of contracts with concessioners. Administration of food protection measures is accomplished through a program known as the Concession Evaluation Program.

This report will review in detail: a) The difficulties of providing food service and food protection in a large national park; b) Development of a concessioner self-inspection program; c) The special food protection concerns; and d) A discussion on the effectiveness of a self-inspection program.

## HISTORY OF FOOD PROTECTION PROBLEMS

Large western national parks in the United States, such as Yellowstone, have certain difficulties created by the character of the park which influences food protection problems.

These difficulties include:

1. The size of the park--Yellowstone is 3,400 square miles (5540 sq.km) in size--This is larger in combined land area than Rhode Island, Delaware and Washington, D.C. in the United States or, the province of Prince Edward Island. It is isolated from major metropolitan areas by at least 500 miles (800 km). Some 46,000-50,000 meals are served daily during peak season.

2. Facility types--Facilities tend to be in isolated clusters throughout the park. Facilities are often 30 to 70 miles (48-112 km) from gateway communities. A particular problem is that many facilities are historical structures over 50 years old. This may create problems in organizing kitchens physically to be effective and efficient in safe food production practices.

3. Food service personnel--a majority of food service personnel (80-90%) are untrained, seasonal food workers which must be trained, retained and their replacements trained again. This introduces a potential high degree of risk in food protection practices.

4. Length of season--Operating seasons in most western national parks vary from 60 to 180 days. Within one park separate facilities may operate within this time frame. This means each facility must train its employees, open up, operate, close down and winterize its operation. In Yellowstone, we have one facility which may operate the last two weeks in April, operate June to Labor Day, reopen two weeks in late October, and operate mid-December to mid-March during winter operations.

In 1977, the National Park Service developed a food sanitation rating system for its concessions contractors under the concessions Evaluation Program (2). This system used the sanitation rating provision for satisfactory food protection was a major issue between 1976-79. The hiring of a summer seasonal sanitarian in mid-season 1978, by the concessioner, dramatically improved conditions. However, a new major concessioner (TW Services) was awarded an interim contract during the fall of 1979. Prior to this award, the NPS terminated the possessory interest of the previous concessioner, according to law. Now the NPS owns the structures and their furnishings. In 1981, a long-term contract was awarded to the interim concessioner. As part of their bid, they would spend 22% from gross receipts on projects approved by NPS.

## DEVELOPMENT OF THE SELF-INSPECTION PROGRAM

The development of the self-inspection program began in 1978. Several serious problems in food protection and cleanliness were existent. Food temperature abuse was occurring with a 75% frequency. The overall concessioner rating score was unsatisfactory. Action taken by the Superintendent resulted in the concessioner reinstating the company sanitarian's position. A retired PHS Commission Corporation officer was hired for this effort.

The company sanitarian's responsibilities consisted of food protection and sanitation evaluation, sanitation training of employees and management, detailing food protection procedures and accompanying the NPS sanitarian on formal sanitation evaluations.

In working with the company sanitarians between 1978-1980, the epidemiological method (4,5,18,19,20) and risk assessment techniques (3,6,7,8) were used to establish priorities in providing a good self-inspection program.

The epidemiological data generated by Bryan (4,5) and Todd (18,19,20) regarding contributing factors to food-borne disease outbreaks was established as our top priority. That is, provision for proper cooling practices, provision for other good temperature control practices and concentration on good personal hygienic practices. This need was, also, introduced by the reality of poor physical plants.

A concurrent priority was the establishment in 1979-80 of a risk assessment system (3,6,7,8). The system included prioritizing our more hazardous operations according to risk and the introduction of the Hazard Analysis, Critical Control Point (HACCP) with concessioner management.

Recommendations were made to initiate a quality assurance system (17). This system was fully implemented by 1981. This system features each location food manager conducting a weekly, self-inspection of their kitchen. Weekly reports are submitted to the company headquarters. In addition, company food and beverage speciality personnel also conduct their own ratings three times seasonally. This effort is in addition to the company sanitarian.

The final priority was training and certification for food management in sanitation (9,10,11,12). Management training in sanitation has been conducted since 1979. Certification for managers in sanitation began in 1983 through the implementation of the National Institute for the Food Service Industry, (NIFI) sanitation certification course.

An additional recommendation was made to institute microbial auditing of the preparation operations (12). This recommendation involves using the suggested food sampling regimen by the International Commission of Microbiological Specifications for Foods (ICMSF) (15). Procedures from the FDA's Bacteriological Analytical Manual have been recommended for laboratory methods (1).

A major contributing need for the self-inspection program was poor physical plants in the kitchens. A continuing goal for NPS is to assure safe production until physical plant problems can be resolved. The combined efforts of both the NPS and concessioner have helped assure this goal. The NPS upon obtaining ownership of the kitchens immediately sought funding to renovate physical plant problems. A long-term program, 1981-1986, has been funded for nine kitchens. Design concerns reflect priorities established in the self-inspection program as well as NPS priorities. A unique opportunity existed to design product flows to include epidemiologic and risk assessment factors. Adequate cooling, rapid chilling, rare roast beef cookery, adequate hot holding facilities and preparation space were given priority.

## SPECIAL CONCERNS FROM THE SELF-INSPECTION PROGRAM

The major goal has been controlling temperature abuse problems. Figure 1 shows the difficulties in controlling temperatures. Food temperature abuse was as high as 75% by mid 1978. By the end of 1980 it was down to 5%. We experienced a slow increase to 20% in 1982. NIFI certification program and intense effort by the concessioner reduced abuse to 4% in 1983. Data for 1984 is incomplete.

The rehabilitation program has introduced several types of equipment to enhance temperature protection. First and foremost is the rapid-chill refrigerators (Fig. 2). The self-inspection program has introduced the use of 2-4 inch pans for rapid chilling. Two-thirds of our major facilities now have these. Preliminary data indicates a 14-18 lb. (6.3-8.1 kg) left over whole prime rib without the rack will cool to 45° - 50°F (7°-10°C) in 4 hours. Liquid and semi-liquid foods have been cooled from 140° F (60° C to 45 F (7° C) or colder within 4 hours (Fig. 3,4).

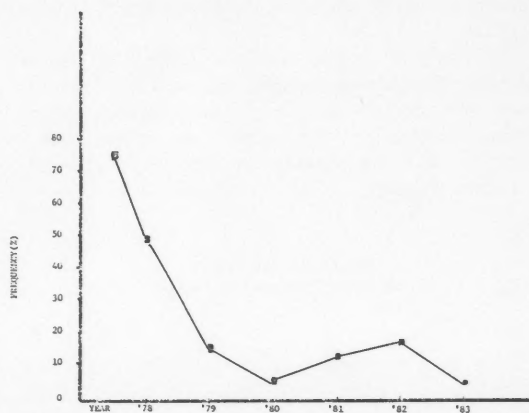


Figure 1. Frequency of observed food temperature abuse.

High humidity, commercial Alto-Shaam ovens have been introduced into the rehabilitated kitchens. The ovens have given us better control over rare roast beef cookery. The concessioner has adopted FDA requirements of cooking to 130° F (55° C) for 2 hours as a policy statement (Fig. 5,6).

One unique food protection problem has been a steak cookout. Meat and other potentially hazardous foods are



Figure 2. Exterior of a rapid chill refrigerator. Note the temperature probe selection package at the upper right front of the equipment.

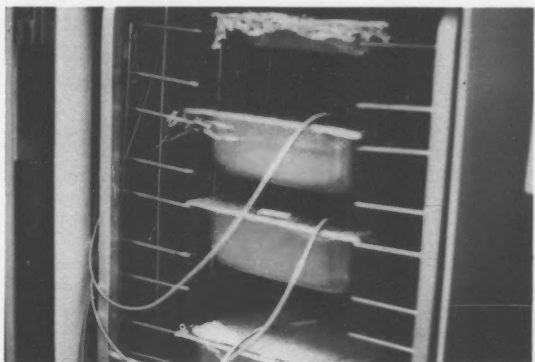


Figure 3. Temperature probes placed in various foods.



Figure 4. Rapidly cooling food temperatures can be monitored by a food service operator on the food probe temperature scale (second from right).



Figure 5. A high humidity, low temperature roasting oven.

transported to the cookout site in a chuckwagon containing stainless steel refrigerator units. The units are prechilled prior to use and maintain product temperatures during transportation and service.

Another unique problem has been winter operations. Facilities are operated at Old Faithful during a three month winter season. All perishables and supplies are provided by oversnow vehicles over a 30 mi (48km) route. There are two major side hazards to providing food protection during the winter a) Wind chill may be experienced to -130° F (-54° C) even when properly protected and b) Bison on the snowmobile road which one must avoid (Fig. 7).

#### EFFECTIVENESS OF SELF-INSPECTION

Our experience indicates self-inspection works when 1) there is sincere commitment by the chief executive of the organization to make it work, 2) when location managers know they are as responsible to their own organization as well as a public agency, 3) in our case, the 22% fund

creates a shared responsibility more so that current licensing or permitting practices, 4) it improved attention to procedural detail which is important in prevention of foodborne disease, 5) when the concessioner realizes that fair, thorough, reasonable regulation by a public agency takes place at frequent intervals. This includes giving rat-



Figure 6. Roast beef can be roasted to 130°F for 2 hours without serious shrinkage or undue loss of rareness under high humidity, low temperature cookery procedures.



Figure 7. Bison are often encountered on the road while making winter rounds on a snowmobile.

ing scores that reflect comparably to the thoroughness of a concessioner's effort.

Self-inspection is a good tool in food protection practices. It has helped sanitation performance in Yellowstone and other NPS areas where it is practiced. It should not be viewed as a panacea. Problems we have experienced include: 1) where program commitment waivers, food protection problems do occur but usually not to the serious level as if there were not a system in place, 2) where commitment waivers because projected budget levels may not be easily obtained, a similar result is seen.

#### ACKNOWLEDGEMENTS

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The products herein are not necessarily endorsed by the National Park Service and the United States Government.

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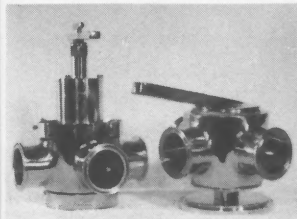
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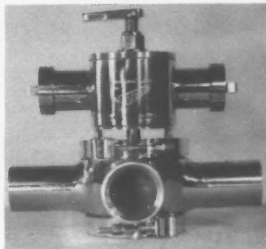
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## Rapid Methods and Automation in Microbiology Workshop

A Rapid Methods and Automation in Microbiology Workshop will be held July 13-20, 1985, at Kansas State University.

Rapid methods and automation is a dynamic area in applied microbiology dealing with the study of improved methods in the isolation, early detection, characterization, and enumeration of microorganisms and their products in clinical, food, industrial, and environmental samples.

This workshop, "Rapid Methods and Automation in Microbiology," will focus on the practical application of conventional and new commercial systems of rapid identification of microorganisms from medical specimens, foods, water, and the environment.

Workshop participants will receive eight days of intensive theoretical and hands-on training in microbiological automation utilizing the experience and skills of Dr. Daniel Y. C. Fung, an internationally known authority in the field. Dr. N. A. Cox, United States Department of Agriculture, and Dr. M. C. Goldschmidt, University of Texas, will also lend their expertise.

The workshop is designed for microbiologists, food scientists, medical technologists, quality assurance and control managers, consultants, laboratory directors, and researchers.

The 1985 Rapid Methods and Automation in Microbiology Workshop is certified for 7.2 American Society for Microbiology Continuing Education units to be granted upon successful completion.

For more information, contact Jan Hurley, Conference Coordinator, at 800-255-2757 (outside Kansas), or 913-532-5575 (in Kansas or outside the U.S.). Enrollment in the 1985 Rapid Methods and Automation in Microbiology Workshop is limited.

## Planning For Profits In Dairying

Milk production may increase April 1 when the federal diversion program ends. Increased production, along with lower milk prices, will require careful planning for cost control, says Dr. Alfred Lane of Stephenville, dairy specialist with the Texas Agricultural Extension Service, Texas A&M University System.

With food as the largest expense, three critical items should be considered for the feeding program: 1) forage production and utilization, 2) forage replacement feeds, and 3) ration balancing.

Plan for a year-round forage supply, says Lane. This supply may be raised or purchased but must be planned carefully. Winter forages grow during higher rainfall periods and are the highest quality forages grown in Texas. Wheat, rye and triticale produce more during the winter months, while oats, ryegrass and legumes produce more in the late spring. Winter forages can be harvested as pasture and silage or hay. Pasture produces the lowest feed cost, while stored forage offers greater returns per acre, notes Lane.

For lowest feed costs, consider these points:

- A well-planned, year-round forage program.
- Forage is the key for any feeding program.
- Forage quality affects feed cost.
- Pasture produces the lowest cost milk.
- Stored forage returns the most value per acre.
- A combination small grain grazing and silage program can be valuable.

Forage can be supplemented or partially replaced with industry by-products including wet and dry brewers grains, cotton products, soy hulls and rice bran, advises Lane. These by-products can reduce food costs by supplementing forage when certain guidelines are followed:

- Provide a minimum of 1 pound of long or coarsely chopped forage per hundred pounds of body weight.
- Maintain 17 percent crude fiber or 21 percent acid detergent fiber in the total dry matter.
- A suggested daily intake per cow is 35 pounds wet brewers grains, 10 pounds cottonseed hulls, 7 pounds whole cottonseed, 9 pounds soy hulls and 5 pounds rice bran.

Buffers improve utilization of limited forage supply, says Lane. They neutralize the rumen acid and maintain fat test.

Ration balancing is required for maximum digestion of forage in the dairy cow's diet. Maximum production can be obtained only if all required nutrients are fed in the correct proportions, explains Lane. Laboratory analysis of forage can be used in combination with industry by-products to formulate a balanced, least-cost ration.

The balanced ration can be fed in two ways to improve feed efficiency, says Lane. One way is to divide the herd into two or more production groups to adjust feed intake in the milking parlor. A second way is to use a total mixed ration in which all feeds are mixed and fed together.

"Planning for profit in dairying in 1985 will be more critical than in the past because of possible lower milk prices," says Lane. Planning should include:

- A year-round forage supply.

- Using winter forages for pasture and/or stored feed.
- Using industry by-products as forage replacement products.
- Adding buffers to low forage rations.
- Feeding balanced rations to production groups or using a total mixed ration.

## ***Fat Consumption Linked to Cancer***

The relationship of dietary fat to cancer is one of the most important and challenging areas of research in cancer and an issue that is particularly confusing for laypeople concerned about the relationship of diet and nutrition to cancer, according to the American Institute for Cancer Research (AICR).

At an AICR interview, T. Colin Campbell, Ph.D., and David Kritchevsky, Ph.D., illuminated the controversy and research about dietary fat, one nutrient that many researchers now believe is linked to cancer incidence.

"Large amounts of fat -- either saturated or unsaturated -- are now believed to increase the risk of developing cancer," according to Dr. Campbell, Professor of Nutritional Biochemistry at Cornell University.

Cancers of the breast, colon and prostate are particularly linked to high fat consumption, although both Dr. Campbell and Dr. Kritchevsky caution that nutrition is only one factor affecting cancer incidence, and that more studies of nutrients are needed before research in this area can be considered conclusive.

The interview highlighted the controversy over the role of saturated and unsaturated fats. Many people have reduced their consumption of saturated fats following the linking of heart disease to high consumption of saturated fats.

"The overriding factor affecting the risk of cancer believed attributable to fat consumption is the total amount of fat in the diet. But research on animals treated with carcinogens suggests that in a low fat diet, the risk associated with unsaturated fat may be higher than the risk associated with saturated fat," says Dr. Kritchevsky of the Wistar Institute.

According to both scientists, these research findings might present a dilemma to consumers who have switched to unsaturated fats to reduce the risk of developing heart disease.

"Total fat reduction in the diet is the optimal way of decreasing the risk of developing either heart disease or cancer from dietary fat," advises Dr. Campbell.

Dr. Campbell and Dr. Kritchevsky served on the National Academy of Sciences Committee on Diet, Nutrition and Cancer, which issued the first broad guidelines on diet and cancer in 1982. The American Institute for Cancer Research was the first organization to distribute these dietary guidelines widely, through its publication, "Dietary Guidelines to Lower Cancer Risk." Both guidelines advocate reduced intake of both saturated and unsaturated fats. Dr. Campbell is Senior Science Advisor to AICR; Dr. Kritchevsky is a member of AICR's grant review panel.

## ***Workshop in Food Flavor***

A course titled "Workshop in Food Flavor: Development, Manufacture and Use" will be offered at the University of Minnesota, St. Paul, MN, October 2-4, 1985. The registration fee for this course is \$500.00.

This course is intended for individuals in either the food or flavor industry. The emphasis of this course will be in providing "hands on" experience. The course will be divided nearly equally between lecture and laboratory. Laboratory sessions will include the formulation of simple flavors, manufacture of oleoresins, essential oils and absolutes as well as flavor emulsions and spray dried products. Laboratory time will also be devoted to the correct usage of a flavor in the finished product.

This course will be taught by Drs. Paul Perry (Flavor Consultant) and Gary Reineccius (Professor). Due to the laboratory nature of this class, enrollment is limited. For more information contact Joanne Parsons, Office of Special Programs, University of Minnesota, 405 Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108, or call 612-373-0725.

## ***Aseptic Packaging Company Adopts New Name -- Tetra Pak Inc.***

On January 1, 1985, Brik Pak Inc. joined its sister companies around the world by changing its corporate name to Tetra Pak Inc. In doing so, the company will further capitalize on the firm's international reputation and technical support.

The Tetra Pak Group of Companies was originally named after the shape of the first package, the tetrahedron, which was developed for commercial use. In 1952, a TETRA PAK machine was commissioned



at a Swedish dairy to package cream in completely filled, triangular-shaped cartons called Tetra Standard packages. Less than 10 years later, the first aseptic packaging machine was introduced, and a packaging revolution began. TETRA PAK cartons came into use around the world.

A United States packaging firm became a licensee of The Tetra Pak Group in 1961. In connection with the licensing agreement, the company secured the right to market the Tetra Standard Packaging System while using the Tetra Pak name and trademark in the U.S. and its territories.

When The Tetra Pak Group decided to establish its own U.S. company in 1976, negotiations began to regain the trademark rights. While negotiations continued, the Tetra Pak organization opened its facility in Dallas, Texas. The company has operated in the United States as Brik Pak Inc. since 1977. Having regained use of the trademark, Brik Pak Inc. will become Tetra Pak Inc. in 1985.

## *Innovations in Milking Equipment Can Help in Mastitis Control*

A number of equipment innovations have recently been introduced to the dairy industry. Application of most of these milking system additions or improvements are limited to parlor milking systems. While some can help in mastitis control, others are less effective, says Bob Appleman, dairy specialist with the University of Minnesota's Agricultural Extension Service.

For example, backflushing is proving to be an effective tool in the prevention of mastitis when it is used in conjunction with a good herd health program, according to Appleman. He says, "Research has shown backflushing aids in the prevention of most mastitis causing organisms that are transferred from one cow to another via the milking unit. To control the environmental organisms during milking, it is important to milk clean and dry teats and udders." Backflushing of the milking units, however, isn't yet available to the stall-barn operator.

Other innovations, such as clawless milkers, intramammary devices, and triangular inflations, have varied success in reducing mastitis infections.

With the clawless milker, milk from each teat goes into a separate hose, each about three feet long, instead of being combined at the conventional claw. "It is likely the consequences of vacuum fluctuations can be minimized in this manner," Appleman says.

Research continues on the effectiveness of inserting an intramammary device into the test cistern to

induce leukocytosis and to help prevent new mastitic infection. Preliminary results obtained under controlled conditions suggest that a roughened intramammary device provides protection against new infections, Appleman says. However, he points out, there is a tendency toward lowered milk production when intramammary devices are inserted. "Until further research confirms its effectiveness, an intramammary device should not be considered anything more than experimental. It does, however, show promise and deserves more research and development," says Appleman.

Information on the use and efficacy of other milking innovations, as well as on dairy nutrition and how to maintain a competitive edge in dairying, is available in the "1984-1985 Minnesota Dairy Report," published by the Minnesota Agricultural Extension Service. Copies of the report, item number AG-BU-2235, can be ordered for \$1.50 from the Distribution Center, 3 Coffey Hall, 1420 Eckles Ave., University of Minnesota, St. Paul, MN 55108, or from a county extension office.

## *United Dairy Industry Association Chief Executive Officer Steps Down*

John Sliter, Chief Executive Officer of United Dairy Industry Association (UDIA) has tendered his resignation effective January 31, 1985. Sliter has been CEO of UDIA for the last eleven years.

Citing a variety of reasons including interests involving the dairy industry on an international scale, Sliter said, "There comes a time in everyone's career when you'd like to pursue new ventures and challenges. I believe that I have reached a plateau and, because of that decision, submitted my resignation."

Sliter's resignation was announced by James P. "Tom" Camerlo, Chairman of the Board of Directors for UDIA. Camerlo said that, "I have regretfully received and accepted the resignation of John Sliter which will become effective upon action of the Board of Directors at their January 31st meeting. John has served the dairy industry in a variety of major contributory roles over the last 24 years, and all of us at UDIA are deeply grateful for John's years of service to our organization.

"Although we respect and honor John's wishes to resign, we will deeply miss his leadership and hard work on behalf of UDIA. As Chairman of the Board, it has been my pleasure to work with John for the past several years. I know everyone at UDIA

joins me in wishing John well in his new endeavors."

Camerlo also announced that he has asked Edward Peterson, Executive Vice President of Operations, to serve as Acting Chief Executive Officer, effective immediately. "Ed is a most capable administrative officer, and will play an important role in guiding our organization through a period of change in executive leadership. It is my feeling as well as that of the Board of Directors that the organization will be most capably run and directed during this very critical period of increased promotion by U.S. dairy farmers."

### **Workshop Announced**

A one-day workshop on the microbial aspects of food safety will be held at the Eastern Regional Research Center, USDA, Philadelphia, PA, on April 17, 1985.

Assurance of microbial safety of foods requires constant updating of knowledge about microorganisms. The 1985 Workshop focuses on traditional and emerging pathogens, their epidemiology, and growth. Developments in new detection techniques such as enzyme-linked immunosorbent assays (ELISA), concerns about antibiotic residues in the food supply, and the viewpoints of industry and government concerning current practices and regulations will also be discussed.

For further information contact: Marianne Bencivengo at 215-233-6524. The cost is \$30, which covers lunch and refreshments. There is no registration fee.

### **1985 Joint Annual Meeting of ADMI and WPI Will Be In Chicago**

The 1985 Joint Annual Meeting of the American Dry Milk Institute and the Whey Products Institute will be held on Wednesday and Thursday, April 17 and 18, at the Hyatt Regency O'Hare Hotel, River Road at the Kennedy Expressway, Chicago, IL. This will be the 60th Annual Meeting for ADMI and the 14th Annual Meeting for WPI.

All dry milk and whey product manufacturers, allied industry friends interested in the processing, marketing, and utilization of these products, and

representatives from government and universities, are cordially invited to attend the meeting.

The General Sessions program will present knowledgeable speakers from industry, government, universities and the Institute's staff, who will discuss topics of current interest to manufacturers and users of dry milk and whey products.

An interesting program also is being planned for spouses attending this Annual Meeting.

Additional information about this joint Annual Meeting may be obtained by contacting Dr. Warren S. Clark, Jr., Executive Director of both organizations, 130 N. Franklin St., Chicago, IL 60606.

### **Devery Joins DFISA Staff**

Lisa M. Devery, a December '84 graduate of the University of Maryland's School of Journalism, has accepted the position of Public Relations Representative for Dairy and Food Industries Supply Association (DFISA), a new post at the association.

In announcing Ms. Devery's appointment, Executive Vice President Fred J. Greiner said Ms. Devery's responsibilities will include editing DFISA's bimonthly newsletter, the *REPORTER*, updating the *Industry Publications Guide*, assisting in promotional activities for Food and Dairy Expo '85, and assisting in general media relations.

### **Patterson Enterprises Chosen For New Project**

Patterson Enterprises of Jacksonville has been selected to design, engineer and construct a dairy processing and distribution facility for Affiliated Foods in Baton Rouge, LA.

Affiliated Foods, headquartered in Broussard, LA, is a grocery cooperative operating in Louisiana, according to Sonny Taunton, Affiliated president. Taunton said that Affiliated serves 176 independent supermarkets in the state.

Affiliated Gulf, Inc., as the new Baton Rouge facility will be called, will process milk and fruit drinks.

The dairy will be constructed of insulated panels and masonry. The facility will include 2,000 sq. ft. of office space; 9,000 sq. ft. of cooler; and 19,000 sq. ft. of process area.

A central ammonia refrigeration system also will be designed and installed by Patterson Enterprises.

Serving as Patterson's project manager for the dairy is Dave Parlin. Frank Sharpe has been named general superintendent and Ed Teague will serve as insulation superintendent.

The new dairy is the third project Patterson Enterprises has been selected to handle for Affiliated Foods. Patterson also designed the company's 23,400 sq. ft. distribution center in Broussard in 1980. In addition, Patterson designed and built a 34,000 sq. ft. perishable addition at the Broussard facility in 1982.

Patterson Enterprises, headquartered in Jacksonville since 1929, is a design/build, general contractor specializing in industrial and commercial facilities. Patterson's services include complete engineering design as well as construction.

Patterson services also include commercial real estate brokerage; fabrication of miscellaneous steel products; industrial refrigeration parts and services; and public cold storage warehousing.

## *Pizza Can Be Good For You!*

Pizza's reputation as a low-nutrition "junk food" is undeserved, and the popular view of it as an unusually high-calorie food isn't entirely correct either, according to an article in the January/February issue of ACSH NEWS & VIEWS, a publication of the American Council on Science and Health (ACSH), an independent scientific organization.

"Pizza pulls its weight, nutritionally," said ACSH Research Associate Kathleen A. Meister. "Plain cheese pizza provides substantial amounts of protein, calcium, vitamin A, thiamin, riboflavin, niacin, and iron. Of the eight key nutrients usually listed on nutrition labels, the only one that's in short supply in a cheese pizza is vitamin C. And that's easily corrected if you include some red or green peppers in the toppings on your pizza. Peppers are very high in vitamin C."

The protein and calcium in pizza come from the cheese; the thiamin, niacin, and iron from the crust; the vitamin A from the cheese and tomato sauce; and the riboflavin from both the cheese and the crust, the ACSH NEWS & VIEWS article states.

"Many people think of pizza as a diet-wrecker, but it doesn't have to be one," Mrs. Meister said. "The problem with pizza is that many of us eat it in rather large quantities -- as much as half a pizza per person. You can't fit that kind of 'serving' of pizza into most weight-loss diets, but pizza-by-the-slice is an entirely different matter.

"One slice of plain cheese pizza provides about 150 calories. If you add toppings, such as sausage, meatballs, onions, or mushrooms, that increases the calorie count, but it's still not likely to exceed 250 or 300 calories per slice," she said. "Most calorie-counters could afford to have two slices of plain cheese pizza for lunch or dinner, or one slice with added toppings, without wreaking havoc on their diets."

Pizza can easily be incorporated into low-fat diets, the ACSH NEWS & VIEWS article states, but it's more of a problem for individuals on low-sodium diets, because the basic pizza ingredients, particularly tomato sauce and mozzarella cheese, contain substantial amounts of sodium.

"It's hard to understand how something like pizza, which is basically a combination of wholesome foods from the Basic Four Food Groups, ever got the reputation of being a 'junk food,'" said ACSH Executive Director Dr. Elizabeth M. Whelan. "Perhaps it's because some people believe that anything that's popular can't possibly be good for you. And pizza is extremely popular. It's the fastest-growing restaurant food in the U.S., and it's America's best-selling frozen food as well."

The American Council on Science and Health is an independent, nonprofit consumer education organization promoting scientifically balanced evaluations of food, chemicals, the environment, and health.

Copies of ACSH NEWS & VIEWS can be obtained from ACSH, 47 Maple St., Summit, NJ 07901.

## *Milk Price Influences Replacement Dairy Cow Prices*

Prices of replacement dairy cows go up and down with milk prices. Owners of replacement dairy animals benefit when milk prices go up. But they see the value of their replacement stock go down when milk prices decline, says Earl Fuller, farm management economist with the University of Minnesota's Agricultural Extension Service.

From a loan standpoint, there are two problems when milk prices go down, Fuller says. First, a lower milk price means less cash flow to cover the principal. Second, asset values go down but the debt doesn't. This increases risks for both dairy farmers and lenders.

"Now and then we hear that a milk quota system would be the answer," Fuller says. If there were a milk quota system, there might be less fluctuation in both milk and dairy cow prices. However, the value of the quota might still go up and down with the milk price, due to quota demand factors.

Winners would be those who owned quota -- first at the start of the quota system -- then at the time the milk price went up. Losers would be people trying to get into the business or those expanding their business. In both cases, they would need to acquire quotas.

"It seems there are residual claims to the value of any price change," Fuller says. "And there are winners and losers according to who has that resource and who demands it."



Scott Geyer with F.I.S.A.  
Marketing Support Award

## ***F.I.S.A. Marketing Support Award Goes To Tri-Clover***

Ladish Co., Tri-Clover Division was named by the Food Industries Suppliers Association as "1984 Outstanding Manufacturer."

The award specified excellence in terms of advertising, training programs, and field sales support to food industry distributors.

Tri-Clover Division of Kenosha, Wisconsin markets an extensive line of stainless steel sanitary flow control equipment and systems to the food processing industries through a nationwide network of distributors.

The recognition award was announced at the Eighth Annual Distributor/Manufacturers Conference, sponsored by the Food Industries Suppliers Association. The conference was held September 24-26, at the Opryland Hotel, Nashville, Tennessee.

Scott Geyer, Tri-Clover Sales Manager, received the award.

Ladish Tri-Clover is the only supplier to receive this award twice. The first presentation was made in 1977.

## ***Green Spot Flavurence***

Green Spot Company of South Pasadena, California, has announced the formation of a new company, Green Spot Flavurence Company, to market flavors to the food and beverage industry. Green Spot Flavurence will enable Green Spot, who recently celebrated fifty years in the food and beverage business, to expand its line of industrial food products.

For more information contact: Green Spot Flavurence at 1-800-624-7371.

## ***Calcium Link To Prevention And Treatment Of High Blood Pressure Revealed***

Recent survey work conducted by a leading health science university has correlated the lack of calcium with the incidence of high blood pressure. Dr. Cynthia Morris, Medical Research Instructor with Oregon Health Science University, documented and illustrated this link, and ways in which increased calcium intake can combat the most prevalent medical illness in the U.S., at the recent annual meeting of the MIF and IAICM in San Francisco, CA. Dr. Morris pointed out that initial research in this area showed that hypertensives consumed 25% less calcium on average than normotensives, with all other nutrient intakes being equal. The majority of this difference came from a variance in consumption of dairy products, with significantly more hypertensives reporting no milk consumption at all.

Subsequent national research has further indicated that calcium intake is the best nutritional predictor of blood pressure -- across all age, race and sex groups. As seventy-five percent of exposure to calcium comes from dairy products, the implications for increasing calcium intake as a potential therapy or prevention of hypertension is great. As Dr. Morris pointed out, "Currently, hypertensives are frequently told to cut their sodium intake by avoiding all milk, milk products and processed cheeses. However, this

creates a deficiency of calcium and may exacerbate a nutritional problem rather than relieving it."

Copies of Dr. Morris' remarks may be obtained from the MIF/IAICM, 888 Sixteenth Street, N.W., Washington, D.C. 20006. 202-296-4250.

## ***Saccharin Is A Safe Food Additive, New Report States***

Saccharin should be regarded as a safe food additive, according to a new report by an independent scientific organization.

"Extensive scientific research has failed to confirm the suspicion that the use of saccharin might increase the risk of bladder cancer in humans," states the report *Low-Calorie Sweeteners*, published by the American Council on Science and Health (ACSH).

In 1977, the safety of saccharin was questioned after a Canadian scientific study showed that rats fed very large doses of saccharin for a lifetime, starting at the time of conception, had an increased bladder cancer rate. The U.S. Food and Drug Administration proposed banning saccharin, but Congress imposed a moratorium on that action. The moratorium is still in effect. In Canada, a ban on most uses of saccharin was imposed in 1977.

"Our organization first evaluated saccharin in 1979, and we concluded then that the overall evidence did not justify a ban. Several important new scientific studies have been completed since our first evaluation. Their results have been uniformly reassuring. They further strengthen the case for saccharin's safety," said ACSH Executive Director Dr. Elizabeth M. Whelan.

The U.S. National Cancer Institute (NCI) completed a study in 1980 which compared low-calorie sweetener use by bladder cancer patients with that of healthy people. The study found no association between low-calorie sweetener use and bladder cancer in men, women, or both sexes combined, the ACSH report states.

"In research of the type conducted by NCI, the more people you study, the more likely you are to detect an association between a substance and a disease, if there really is such an association. The NCI study involved almost 9,000 people, making it one of the largest studies of this type ever performed. So its failure to find an association between saccharin use and bladder cancer is very reassuring," said ACSH Research Associate Kathleen A. Meister.

A major study of saccharin and bladder cancer in rats, completed by the International Research and Development Corporation (IRDC) in early 1984, also provides evidence in favor of saccharin's safety, according to the ACSH report.

"This study showed that the bladder cancer rate in saccharin-fed rats falls off very rapidly when the dose of saccharin is decreased, so that the risk of bladder cancer is essentially nonexistent when you get down to the amounts of saccharin that people can logically consume," said ACSH Associate Director Dr. Richard A. Greenberg.

The American Council on Science and Health is an independent, non-profit consumer education organization promoting scientifically balanced evaluations of food, chemicals, the environment and health.

A single complementary copy of *Low-Calorie Sweeteners* can be obtained by sending a stamped (37 cents postage), self-addressed, business-size (#10) envelope to Low-Calorie Sweetener Report, ACSH, 47 Maple St., Summit, NJ 07901.

## ***Ice Cream Production Up In 1983***

Figures reported in the 1984 edition of the International Association of Ice Cream Manufacturers' publication, "The Latest Scoop," show production of ice cream and related products reached a record high volume of 1.29 billion gallons in 1983, a 3.5 percent increase over 1982. This figure includes ice cream, ice milk, sherbet, water ices and mellorine. The upward trend has continued into the first five months of 1984, with production up 3 percent compared to the same period last year. The 1983 wholesale value of ice cream, ice milk, sherbet and water ices was estimated to be \$3.7 billion, up 5 percent over 1982.

John F. Speer, Jr., President of the International Association of Ice Cream Manufacturers remarked, "It's no surprise that ice cream production is up. It's America's favorite food, and on top of that, it's good for you."

Per capita consumption of ice cream and related products was 22.1 quarts in the U.S. for 1983, up 2.6 percent from 1982.

Canada had the fourth largest per capita production at 32.5 pints; total production was 372 million

gallons in 1983. The province of Manitoba had the highest per capita production at 20.3 liters per capita.

In 1983, June displaced July as the number one month for ice cream production. However, July will continue to be celebrated as "National Ice Cream Month." In July of 1984, the month was celebrated with festivities all over the country as part of the International Association of Ice Cream Manufacturers' "Ice Cream for America" promotion.

Looking at ice cream from an economic standpoint, in 1983 it took the average American worker 14.7 minutes to earn a half-gallon of ice cream. This figure is up only 11 percent over the last ten years while the same worker's wages increased 116 percent over the same period of time.

Copies of "The Latest Scoop" are available from the International Association of Ice Cream Manufacturers at 888 16th Street, N.W., Washington, D.C. 20006, or by calling 202-296-4250.

## IDF Publications

The International Dairy Federation offers, at a charge, 36 bulletins and 27 Standards.

The bulletins include:

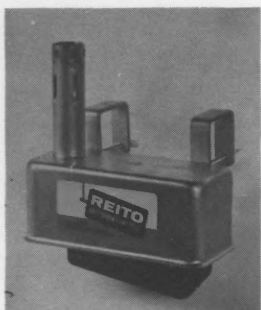
- Technical guide for the packaging of milk and milk products
- The world market for cheese
- Dairy ingredients in food products
- Corrosion in the dairy industry
- Recommended methods for somatic cell count in milk.

A few of the IDF Standards available are:

- Milk-Determination of freezing point-Thermistor cryoscope method
- Butter-Determination of water dispersion value
- Characteristic microorganisms in yogurt.

For a complete listing plus prices, contact: Harold Wainess, Secretary, USNAC, 464 Central Avenue, Northfield, IL 60093.

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



CEM System 100

## Solids/Fat Analysis

• The System 100 is the newest CEM system for the rapid determination of solids and fat in all types of liquid dairy products. Major applications include milk, ice cream mix and creams, with potential analysis for the full range of dairy products. Complete determination requires 6 minutes, with accuracy and precision comparable to standard test methods.

For more information contact: CEM Corporation, P.O. Box 9, Indian Trail, NC 28079. 704-821-7015.

Please circle No. 271 on your Reader Service Page



Charles Supper Company Capillary Tubes

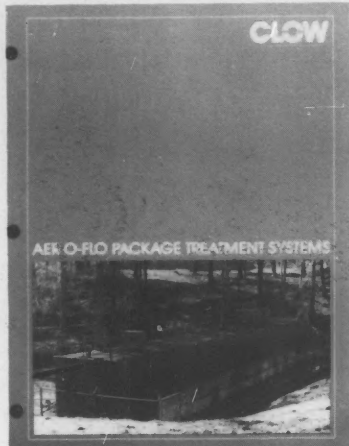
## Capillary Tubes Sealed By Match Flame

• A line of capillary tubes for sampling and instantly sealing liquids and fine powders is being introduced by Charles Supper Company, Inc. of Natick, Massachusetts.

Charles Supper Capillary Tubes are made from glass and can be broken and resealed by an ordinary match flame or conventional wax methods. Permitting multiple samples from a single tube, each one is 89 mm long with a 0.01 mm wall and 3.0 mm funnel at the top.

For more information contact: Charles Supper Company, Inc., Lee Supper, Marketing Director, 15 Tech Circle, Natick, MA 01760. 617-655-4610.

Please circle No. 272 on your Reader Service Page



Clow Corporation Brochure



Model 1352 Cylinder Weighing Scale from Capital Controls Co.

## Dual Cylinder Digital Scale

• Capital Controls Company, Inc., Colmar, PA, manufacturers of equipment for water disinfection, introduces the Model 1352 Cylinder weighing scale available with a 4-20 mAdc output.

The Model 1352 is specifically designed to weigh and indicate the content of liquefied gas in cylinders. The output signal allows the capability of linking to a recorder or other device to maintain a permanent record of chemical consumption.

For more information, contact: CAPITAL CONTROLS COMPANY, INC., P.O. Box 211, Colmar, PA 18915. 800-523-2553 (outside PA), 800-242-7590 (in PA), 215-822-2901 (outside U.S.).

Please circle No. 273 on your Reader Service Page

## New Brochure From Clow Corporation

• Clow Corporation, Waste Treatment Division, has made available its new Aer-O-Flo Package Wastewater Treatment Systems brochure. This updated brochure features graphics and text which describe in easily understood terms the extended aeration principle which is the basis for the package plant design. The brochure also describes in detail how the various features of these units function.

The Aer-O-Flo Package Treatment System is used in the treatment of domestic waste from a variety of facilities. Typical applications that have used Clow Aer-O-Flo systems include subdivisions, trailer parks, recreation facilities, construction labor installations, logging facilities, factories, off-shore oil rigs, schools, and small townships and villages, as well as other applications. These units fulfill the need for domestic sewage treatment at facilities that must meet either federally or regionally dictated discharge guidelines, but do not have access to a municipal treatment system.

For additional information, contact Steve Deiters, Manager, Marketing Services, Clow Corporation, Waste Treatment Division, Florence, KY 41042. 606-283-2121.

Please circle No. 274 on your Reader Service Page

## First Line Of Defense Against Contaminated Milk

• Until now there has never been a practical way to test for antibiotics before the product is shipped off. Now there is a quick, easy and accurate way to screen milk for antibiotics on the farm.

The 6-minute CHARM Field Test is based on the original CHARM TEST that is used by most processing plants to screen tankers at the plant before they are unloaded. The CHARM Field Test brings to the farm the same accuracy and completeness that the original CHARM TEST brought to the industry almost 7 years ago. The main differences between the 2 tests are that the CHARM Field Test is faster, easier and more compact because it can be plugged into a cigarette lighter.

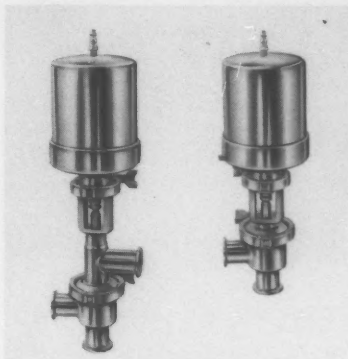
Like the original CHARM TEST, the Field Test gives results in an absolute number; provides a permanent record of each test; is inexpensive (\$1.50 per test); flexible - run it on the tanker or in the milk farm. And, best of all, it's very easy to run.

At the producer's barn, the hauler, producer or fieldman is able to run the test, before any milk is commingled.

For more information contact: Shirley Charm at Penicillin Assays, 36 Franklin St., Malden, MA 02148.

Please circle No. 275 on your Reader Service Page





*New Thomsen Air Valves shown for shut-off and divert applications*

### **Thomsen Offers Low-Pressure Pneumatic Sanitary Valves**

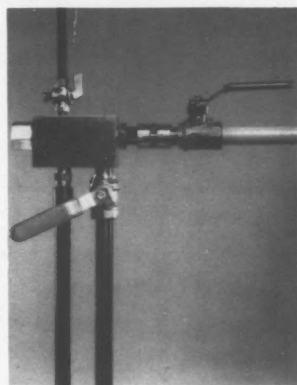
• The new Thomsen low-pressure, pneumatic-actuated sanitary valves operate on 30 to 50 psi air pressure. The all-stainless valves carry the 3A mark of quality. Thoroughly field tested, the design has evolved from more than 50 years of development by Thomsen, Inc.

The valves are available in multiple inlet and outlet configurations. The air actuator is adjustable to allow air to open, air to close, or both. Adjustment is made through a quick change internal piston and caged spring.

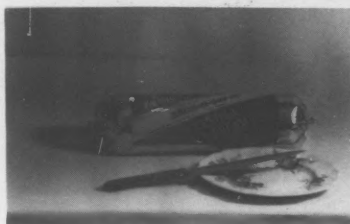
Other advantages of the valves include: quick disconnect cup for fast stem removal to permit CIP operations, self-cleaning parts, heavy-duty clamps for fast takedown and assembly, choice of seats to meet any application and sanitary requirement.

Thomsen is a long-time leading supplier of stainless sanitary products to the dairy, food, processing, chemical and pharmaceutical industries. Products include fittings, pumps, transverters, and sight gauges. For further information, contact THOMSEN, INC., 1303 - 43rd Street, Kenosha, WI 53140. 414-652-3662.

*Please circle No. 276 on your Reader Service Page*



*MIH Hot Shot 5-40 Cleaner*



*Ice Cream Package for Pine State Dairy by Venture Packaging*

### **New Packaging For Ice Cream**

• Venture Packaging of Charlotte, North Carolina, has created an eye-catching package to meet the needs of a new ice cream product being distributed by Pine State Dairy.

Pine State, headquartered in Raleigh, North Carolina, is a large regional ice cream and dairy manufacturer which distributes its products in the Carolinas and Virginia. Strong in manufacturing specialty items, Pine State was interested in the European method of packaging ice cream called the "Chub Pack." Kartridge Pak Co., of Davenport, Iowa, supplied the equipment. Next, all Pine State needed was the perfect wrap.

After interviewing several converters for their packaging ideas, Pine State selected Venture Packaging.

Chub Pack ice cream is now in production with four flavors available: vanilla in a blue package; chocolate, dark brown; cherry, red; and butter almond in rust.

For more information contact: Frank McSwain, 704-588-0220.

*Please circle No. 277 on your Reader Service Page*

### **MIH\* Hot Shot 5-40 Cleaner**

• MIH\* PRODUCTS DIVISION of JORDAN EQUIPMENT COMPANY introduces the New MIH\* HOT SHOT 5-40 Cleaner. It produces hot water output from low pressure steam (40 to 100 psi) and cold water. There are no pumps, motors or moving parts. Output is a high velocity stream of hot water (135° minimum). The output capacity is dependent upon the steam input pressure: from 2.5 to 4 gallons per minute. Detergent is automatically added at a variable rate determined by the operator. Material is brass throughout. The cleaner can be used in food plants, hospitals and refineries--virtually any facility requiring hot water cleaning.

For more information contact: MIH\* PRODUCTS DIVISION, JORDAN EQUIPMENT CO., INC., 10115 Brighton, Houston, Texas 77031. Phone 713-498-6212, 1-800-231-9879. All Canada, call collect 713-498-6212.

*Please circle No. 278 on your Reader Service Page*

### **Monarch Introduces Super-Jet™ Cleaner**

• Super-Jet™ cleaner, a new highly alkaline chlorinated foaming cleaner for use in the dairy, canning, beverage, and meat industries, has been introduced by the Monarch Division of H. B. Fuller Company.

Super-Jet cleaner has been specially formulated by Monarch to eliminate the need for buying and mixing several different products for foam cleaning applications. In Super-Jet cleaner, the chlorine foaming agent and alkaline cleaning power are combined into one product to provide maximum performance and eliminate worries over improper mixing and over-use.

Applications for Super-Jet cleaner include processing equipment, tanks, walls, and floors.

Super-Jet cleaner is one of the family of quality cleaning and sanitation products developed by Monarch Division. With a new production facility in Tulare, California, Monarch Division offers cleaning products and specialized customer service to the food processing industry across the United States.

For more information contact: Andy Marti, H. B. Fuller Company, Marketing Department, 3530 Lexington Avenue North, St. Paul, MN 55112. 612-481-1588.

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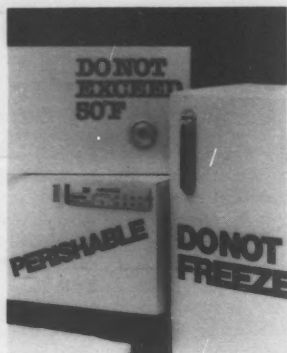
### **High Accuracy Gas Delivery System Cuts Product Rejects**

• MG Industries has designed a high accuracy gas delivery system for Carolina Chocolates Division of White Rock Products, Washington, North Carolina, resulting in a major reduction of product rejects, and eliminating the need for low pressure nitrogen cylinders used in the operation of a Reynolds injector. To replace the cylinders, a remote low pressure bulk tank with a modified sub-cooler was installed at the plant site. With the new system, liquid nitrogen is delivered through an insulated pipeline, and a valve is simply opened when nitrogen delivery to the injector is required. Product rejects have been reduced by a factor of seven; safety has been increased; and pressure fluctuations, which occurred when the portable cylinders were used, has been eliminated.

MG Industries is a leading nationwide supplier of bulk and specialty gases for industrial, medical, scientific and welding applications. In addition to producing and supplying a wide variety of gases, MG Industries engages in research, engineering and development of applications technology.

For further information contact MG INDUSTRIES, 2460 Boulevard of the Generals, Valley Forge, PA 19482. 215-630-5400.

*Please circle No. 280 on your Reader Service Page*



3M MonitorMarks

### 3M Appoints U.S. Marketing Representative

• 3M announces their appointment of Telatemp Corporation as U.S. Marketing Representative for 3M MonitorMark™ Time/Temperature Products.

3M MonitorMarks are convenient, label-like tags that, after activation, provide a visual record of time-temperature exposure of the products to which they are attached. A bright color irreversibly moves across the tag's scale to indicate temperature exposure above a pre-set level.

A second product line, the newly developed 3M MonitorMark Freeze Indicator, provides an irreversible visual record of temperature exposure below freezing. These indicators consist of a specially designed, liquid-filled glass bulb and tube in a transparent plastic enclosure, which changes color after exposure below 32 °F.

Typical applications for MonitorMarks include shipment and storage of frozen food, draft beer, and confectioneries.

Telatemp Corporation will stock all MonitorMark Time/Temperature Tags for immediate delivery, as well as the new Freeze Indicator. They also will be available for consultation regarding custom applications of the 3M patented technology.

In addition to marketing the 3M MonitorMarks, Telatemp Corporation manufactures their own line of temperature recorders and infrared thermometers for marketing throughout the world.

For further information contact R. E. Darringer at 714-879-2901.

Please circle No. 281 on your Reader Service Page



Comark Electronics 2000 Series

### New Hand-Held Digital Temperature Measurement Instruments

• The experience of twenty-five years of field applications and advanced instrument manufacturing technology has produced the Comark Electronics Inc. 2000 Series temperature and humidity measurement instruments. These low cost units, successfully introduced in Europe, are sealed against moisture, dust and dirt, and are designed to withstand shock and vibration.

The 2000 Series units have been subjected to stringent environmental tests that have proven that the units are reliable under the most adverse conditions. The accuracy of the units is unaffected by corrosion, short circuiting and the other problems caused by the build-up of moisture and grime, because of their unique ABS plastic outershell.

There is a wide range of standard thermocouple sensors available for the Series 2000 instruments. If standard sensors do not solve your temperature measurement problems, a specialist sensor division is capable of designing sensors to the customer's requirements in any configuration.

Full information and specifications for the 2000 Series are contained in a brochure which is obtainable from Comark Electronics Inc., 10521 Rosehaven Street, Suite 202, Fairfax, VA 22030. 703-352-3405.

Please circle No. 282 on your Reader Service Page

### E.I.L. Announces New Control

• E.I.L. Instruments has developed Model TDC-64, a 64 channel Microprocessor-Based Temperature & Defrost Control, ideal for use wherever controlled refrigeration energy expense is vital to reducing operating costs, such as in a supermarket or frozen food manufacturing plant.

With its new microprocessor design, E.I.L.'s TDC-64 offers a simple, low-cost alternative to complex and expensive computer-based systems.



Closure Lining Specialties Pull Tab Liner™

### Contract Lining Firm Offers New Pull Tab Liner™

• Closure Lining Specialties (CLS), a firm that lines caps and closures on a contract basis, is now capable of lining caps using the innovative Pull Tab Liner™. The unique "Pull Tab" allows the entire innerseal to be easily removed. There's no longer any need to pierce it with a finger nail or sharp object, thus risking contamination of the product. The pull tab innerseal can be removed without sacrificing its tamper-evident features.

According to CLS, the pull tab innerseal is ideal for cosmetic, food and pharmaceutical applications. Designed for induction sealing, the pull tab innerseal can be a foil liner or similar material, depending on the needs of the product.

CLS is offering test runs at special prices so that its customers may examine the pull tab innerseal under actual conditions. For additional information, contact: Closure Lining Specialties, P.O. Box 198, Elmwood Park, NJ 07407. 201-791-5850.

Please circle No. 283 on your Reader Service Page

The improved control, now with communications ability, offers the option of 32 additional temperature inputs. Used in conjunction with the standard 32 channels, the additional sensors may be used for defrost termination, temperature control, or additional alarms. In addition, through a data logging option, up to 24 selectable temperature probes can be logged for a 24 hour period at 3 minute intervals. Logs are displayed on a remote terminal in both tabular and graphic format.

Remote communication allows maintenance and store personnel to readily monitor refrigeration case temperatures and adjust setpoints from a central location, further reducing servicing and maintenance expense.

Further information on Model TDC-64 may be obtained by requesting free copies of Bulletin TDC from E.I.L. Instruments, Inc., Systems & Products Division, 10 Loveton Circle, Sparks, MD 21152, or by calling 301-771-4800. Telex: 87797. Cable: EIL INSTRU.

Please circle No. 284 on your Reader Service Page

# Food Science Facts

## For The Sanitarian



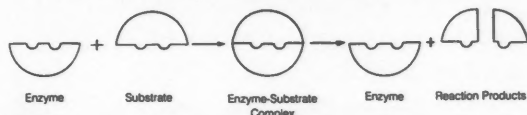
**Robert B. Gravani**  
Cornell University  
Ithaca, NY

### FOOD DETERIORATION AND SPOILAGE CAUSED BY NATURAL FOOD ENZYMES

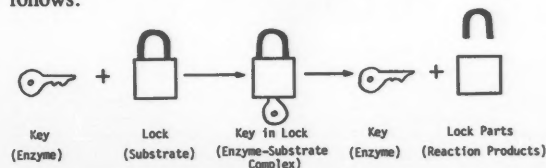
In addition to microorganisms, food deterioration and spoilage can result from enzymes naturally present in foods.

Enzymes are complex proteins produced by living cells. They function by accelerating the rate of chemical reactions within these cells without being "used up" or altered. Enzymes are called biological catalysts because they catalyze reactions or help get them started. There are thousands of different enzymes found in humans, bacteria, yeasts, molds, plants and animals. They are involved in the reactions associated with life processes. Without enzymes, life would be impossible because most biochemical reactions would not occur without them. Enzymes are responsible for the ripening of fruits and vegetables, and since they are involved in a variety of reactions, they can affect the flavor, color, texture and nutrient content of many foods.

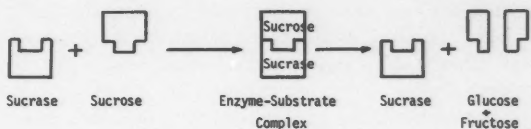
Enzymes function in a very unique way. These proteins combine with the substance they will act on (called a substrate) and form an enzyme-substrate complex. The reaction occurs and the products are then freed from the enzyme. The enzyme can then react with more substrate. This process is shown in the simple diagram below.



If the process seems difficult to understand, think of a lock and key, with the enzyme being the key and the padlock being the substrate. The reaction would occur as follows.



A specific example of an enzyme reaction would be the breakdown of table sugar. Table sugar or sucrose is a disaccharide and is made up of two simple sugars -- glucose and fructose. Sucrose is broken down into glucose and fructose by the enzyme sucrase. Here's how it occurs.



Enzymes have interesting properties that are vital to their function. Enzymes are:

1) Inactivated by heat and chemicals. Since they are proteins, enzymes can be inactivated or denatured by high heat or certain chemicals.

2) Very specific in their action. They will usually be involved in only one particular reaction. Enzymes recognize certain chemical groups and will only react with these groups. Since there are a tremendous number of reactions that occur, a vast array of enzymes are necessary.

3) Most efficient at optimum temperatures and pH. Each enzyme has a set of conditions (temperature and pH) where it operates most efficiently. A deviation from these optimum conditions results in a significant reduction of enzyme activity.

4) Not changed after reaction. Enzymes are not "used up" or altered after reaction and can break down the same compound again.

5) Effective in small quantities. Enzymes are active even when present in very small amounts.

Enzymes are usually named for the substance that they react with or the reaction that they carry out. The ending --ase is added to the substrate name to identify the enzyme that breaks down that particular compound. Some enzymes were identified many years ago and have names that don't end in --ase. Some of these exceptions and other enzymes that are important in the food industry are listed below.

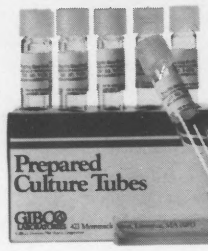
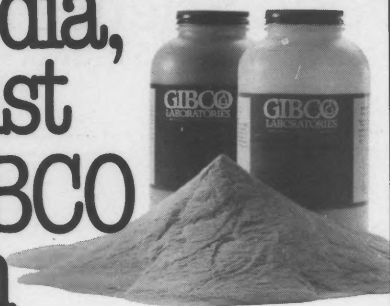
<i>Enzyme</i>	<i>Substance Broken Down</i>
Sucrase	Sucrose
Lipase	Lipids
Protease	Proteins
Lactase	Lactose
Papain	Protein
Amylase	Starch
Pectinase	Pectin
Pepsin	Protein
Cellulase	Cellulose

Enzymes can be extracted from a variety of biological materials, purified and added back to foods to produce desirable changes in these products. Enzymes are used in the food industry to make cheese, tenderize meats, clarify beer, wines and fruit juices and to perform many other important functions.

Enzyme activity is finely controlled and balanced in normal, functioning plant and animal cells, but this balance is changed when the plant is harvested or the animal is slaughtered. Enzymes can continue to function in these products as well as in many natural and manufactured food products.

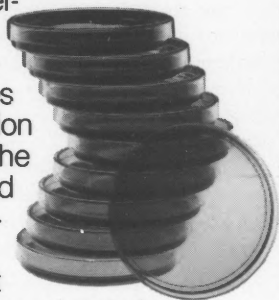
When fruits and vegetables are harvested, naturally occurring enzymes must be destroyed by heat, chemicals or other means. If they are not destroyed, the enzymes will continue the ripening process which may result in product spoilage. Overripe tomatoes or soft melons are good examples of this phenomenon. In aging beef, natural tenderizing of the muscles by enzymes is desirable, but carried too far, this can result in poor quality product. When these ripening processes go beyond the desirable stage, weakened tissues become vulnerable to microbial attack, and spoilage can occur. If enzymes are not inactivated, they will continue to carry out chemical reactions in foods. Food industry personnel must be aware of these important enzymes and understand how to prevent undesirable reactions that can result in food deterioration and spoilage.

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# Dairy Quality

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

## POST PASTEURIZATION CONTAMINATION CASE HISTORY #1

The intent of this month's Dairy Quality Article is to point out how an effective monitoring program can identify sources of post pasteurization contamination. This case history is a typical example of a fluid milk plant faced with a post pasteurization contamination problem and the difficulties involved in identifying and correcting the problem.

A fluid milk plant in the midwest was faced with a common problem—short shelf life, high seven day counts, and consumer complaints. The loss of quality did not occur overnight. It was a gradual change over about a two-year period of time. Previous to that time consumer complaints were rare and concerned primarily with packaging problems. Product keeping quality test results were acceptable and the flavor at the end of code was acceptable. With no apparent quality problems occurring, the dairy management and quality control management concentrated their efforts on other problems.

For about a two-year period of time quality diminished and consumer dissatisfaction increased to a point where it was necessary to solve the current problem. After a meeting with plant management, production and quality control management, it was agreed that a concentrated effort would be undertaken to regain the quality of the fluid milk products and re-establish the company's reputation for quality. Microbiological testing was increased, meetings were held with sanitation personnel to re-emphasize the importance of sanitation, raw milk supplies were re-examined and a commitment was made by all concerned to solve the current quality problems.

The intense effort to solve the quality problems continued for six months. During that time some improvement was realized, however, consumer complaints continued and many samples continued to show high seven day counts, and off flavors near the end of code. The situation became critical. Management, quality control management, sanitation personnel, the sales force; all became extremely frustrated. The intense effort was not resulting in desirable change.

Faced with a do or die situation, management decided to seek help. Capsule Laboratories' consulting service was procured. Capsule's efforts began with a review of all available data and initiated environmental microbiological testing and line analysis. Following that, plant sanitation audits were conducted and production procedures were reviewed.

After examining the available data and preliminary results from the additional tests, it was apparent that post pasteurization contamination was the cause of the quality defects. Review of the available data indicated that:

1. Initial Standard Plate Counts were acceptable.
2. A few percent of samples showed coliforms initially.
3. Raw milk quality appeared adequate.
4. Tabulation of available data indicated that a high percentage of samples were showing high seven day counts regardless of product or filler.
5. Additional tests indicated that gram negative rods were responsible for the high seven day counts.
6. Bitter and fruity flavors were found as part of defects at the end of code.
7. The psychrotrophic population of the glycol was greater than 10,000 per ml.

After three weeks of accumulating data from line analysis, the data were tabulated. Fifty percent (50%) of the line samples taken from the HTST, from the pasteurized storage tank, and from the valve cluster indicated high seven day counts. Plant sanitation audits were conducted indicating minor areas of possible post pasteurization contamination. A review of plant production procedures indicated possible problems with fill temperatures and distribution temperatures control. In addition, review of the production procedures indicated pressure of the glycol to have exceeded 60 PSI compared to pasteurized milk pressures of 40 PSI.

Based on the data available and review of the production and sanitation procedures, it was speculated that this post pasteurization contamination was occurring at the HTST. With this in mind, concentrated effort was conducted to determine if cracks were present in the cooling section of the HTST. With the use of a dye testing procedure, cracks were discovered in the plates in the cooling section of the HTST.

A decision was made to replace the plates in the cooling section of the HTST, resulting in increased quality

of the fluid milk produced at this plant. The plant implemented a program of process control (controlling temperatures, storage times, monitoring pressures of coolants, chlorination of plant water supplies), and a system of post process monitoring using line analysis. Capsule Tru-Test Aseptic Sampling Systems were installed. Samplers were installed at the HTST, at pasteurization storage tanks, at valve clusters, and sights above each filler. In addition, more intense product evaluation was initiated including monitoring organoleptic parameters. With the increased efforts of the quality control and quality assurance department, this midwest dairy began to realize an increase in quality of the product and regain its reputation for quality.

Effective line analysis was the key to solving this post pasteurization contamination problem. While the contamination rate occurring at the HTST was quite low (presumably less than one organism per 10 ml) the psychrotrophic nature of the contaminant (rapid growth at refrigeration temperatures) resulted in product spoilage. Because of the low contamination rate, identification of the problem was difficult. However, with proper line analysis the problem was identified and corrected. Proper line analysis must include: (1) proper sample size 50 ml, (2) aseptic sampling, (3) proper incubation and microbiological analysis of the sample.

Next month's Dairy Quality Article will discuss another case history.



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#### **Bulk Tank Somatic Cell Counts**

*Steve Watrin, Training Specialist  
Land O'Lakes, Inc.*

Many dairy processors report bulk tank somatic cell counts to their dairymen. Some misunderstanding exists as to the value, interpretation, and general purpose of this information.

The bulk tank count serves as a general indicator to udder health in the herd. In addition, it provides a method for increasing the dairymen's awareness of subclinical mastitis. Overall, bulk tank counts under 250,000 cells/ml. indicate a good level of udder health, and counts over 500,000 cells/ml. indicate subclinical mastitis in the herd. Bulk tank somatic cell counts are related to the rate, duration, and severity of infections. Therefore, elevations in counts may be from a few cows with exceptionally high counts or a general increase of counts in many cows.

In general, elevated somatic cell counts indicate production losses resulting from subclinical mastitis. Although, many losses are associated with mastitis, such as: discarded milk, veterinary fees, drug costs, loss of genetic progress, increased replacement costs, and extra labor. The National Mastitis Council has estimated that mastitis losses from reduced milk production alone amount to over one billion dollars in the U.S. annually.

Studies have demonstrated that subclinical mastitis results in increased blood constituents and a decreased level of milk components. For example, high cell count milk has lower levels of fat and solids-non-fat and increased levels of sodium, chlorides and free fatty acids. Hence, the economic consequences of shifts in composition and quality of the finished product have resulted in premium prices being paid for low cell count milk. Therefore, bulk tank somatic cell counts have become widely used to measure milk quality.

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## Kopp Heads Illinois Affiliate

Jerald Kopp, Corporate Director, Quality Assurance, Dean Foods Company, was installed as president of the Associated Illinois Milk, Food and Environmental Sanitarians.

Other officers installed and elected include Kenneth Anderson, from Harold Wainess and Associates, as president-elect; Robert Crombie, Illinois Department of Public Health, as first vice president; Joe Byrnes, Dart-Kraft, as second vice president; Clem Honer, *Dairy Record*, as secretary-treasurer; Wayne Bell, Dean Foods Company, as sergeant-at-arms; and Charles Price, FDA, Region 5, and Sondra Schrank, Illinois Department of Public Health, as auditors.

Outgoing president Carl Ziesemer turned the gavel over to Kopp during the October 1984 Fall educational seminar and annual business meeting held in Elgin, Illinois.

The educational seminar papers included, "Use of the Bactometer for Monitoring Dairy Quality," Martin Tricarico, Bactomatic; "What's Happening in the Ice Cream Industry Today," Bob Anderson, Fantasy Flavors; "Advancements in Radiation Technology and Its Application to Food Sterilization," Tom Mates, Radiation Sterilization, Inc.; "Pre-inoculation of Raw Milk," Robert Sellers, Chr. Hansen's Laboratories; "Effect of Quality on Merchandising of Dairy Products," Robert Mariano, Dominick Foods; "New Product Development," Joseph Sclaro, Babson Bros.; and "Stray Voltage is Shocking to Cows," Ralph Johnson, University of Illinois.



Left to right; Clem Honer, Carl Ziesemer, Robert Crombie, Sondra Schrank, Ken Anderson (behind Sondra), Joe Byrnes, Phil Hermsen, and Jerry Kopp.

## IAMFES Membership Contest

Congratulations to Roger Hulbert of Milwaukee, WI who recruited the 1st new member in the IAMFES Membership Contest for both International and Wisconsin affiliate membership.

Gregory Jach from Environmental Service Co., Milwaukee, WI, was recruited by Roger Hulbert.

Keep up the good work members!

## PA Dairy Sanitarians - Laboratory Directors' Conference

The annual conference of dairy sanitarians (regulatory and industry field staff) and laboratory directors will be held at the Keller Conference Center on the University Park Campus of The Pennsylvania State University in State College, PA, May 13-15, 1985. Joint sessions of sanitarians and laboratory directors will be held Monday afternoon and Tuesday morning. The two groups will meet in separate sessions on Tuesday afternoon and Wednesday morning. There will be a Monday evening laboratory session and a joint banquet on Tuesday evening.

Nearly 50 speakers will participate in the panels and presentations of the program. Topics include component testing and pricing, prevention of chemical runoff, changes in dairy regulations, manufactured milk standards, laboratory evaluation, Acid Degree Value procedure, stray voltage, milk diversion program, dairy situation, thermometer checking, ice cream ingredients, timing a HTST unit, laboratory safety, cleaning plant equipment, and farm inspection - how and why.

There will be six panels with three or four speakers each on the following topics: screening loads of milk, screening tests for antibiotics, raising fluid milk standards, demonstrations of four new pieces of laboratory equipment, raising farm inspection scores and protecting farm water supplies.

For a copy of the program, contact the Agricultural Conference Coordinator, 409 J. O. Keller Building, The Pennsylvania State University, University Park, PA 16802. 814-865-9547. Or call Sidney E. Barnard, program chairman, 814-863-3915.

## FAMFES

The Florida Association of Milk, Food and Environmental Sanitarians Officers for 1984-85 were incorrectly listed in Dairy and Food Sanitation.

Officers and Board Members are: President, James Strange of Tallahassee; Vice President, Cliff Muncy of Miami; Past President, Dr. Ken Smith of Gainesville; Secretary/Treasurer, Dr. Franklin Barber of Ft. Myers; Directors, Richard Jolley of St. Petersburg, Jane Foes of Tallahassee, Dave Fry of Orlando, Janet Johnson of West Palm Beach, and Cleo Cooke of Winter Haven.

The Florida Association's Annual Educational Conference will be held April 17-19, 1985 at the Quality Inn, Cypress Gardens.

For more information contact: Dr. Franklin Barber, 1584 Cumberland Ct., Fort Myers, FL 33907, 813-936-4769.

#### OUTBREAK OF SCARLET FEVER IN A DAY-CARE CENTRE - QUEBEC

On 31 January 1984, the director of a day-care centre, located in a residential area of Montreal, reported 4 cases of scarlet fever to the Community Health Department of the Montreal General Hospital. The cases involved 3 children (1, 2 and 4 years of age) and a 31-year-old staff member.

Public health personnel visited the centre on 1 and 2 February. Of 68 children present, 14 had pharyngitis and approximately 27 had non-specific symptoms such as fever, cough, coryza or vomiting. Four staff members had been complaining of sore throat during the previous weeks.

Group A streptococci were isolated from 39 of 68 children and 2 of 13 adults. The distribution of positive cultures by age shows highest prevalence (37/55 or 67%) for the 2 to 5-year age group. Confirmation in 62% of symptomatic and 39% of asymptomatic individuals cultured suggested that the illness was caused by this agent. All those from whom streptococci were isolated received a 10-day course of oral penicillin.

During the month of February, 5 other children had scarlet fever: 2 were 1 year of age, 1 was 2 years old, and 2 were 4 years of age. These children had been absent when throat swabs were taken and had not received prophylactic medication. No further cases were identified among the treated group.

Group A streptococci isolates from the children and staff were confirmed by the capillary precipitin test using Lancefield's hot HCl extracts and specific antiserum. The isolates were serotyped using Griffith's T and Lancefield's M typing methods. Serum opacity reaction of the supernatant from Todd-Hewitt's broth cultures was tested on horse serum agar. Serotype T1 was found in 33 out of 41 throat swabs (80%) and 78% of these were MIT1. This further implicates the streptococci group A as the etiologic agent of the epidemic.

**Discussion:** Many cases of scarlet fever and streptococcal pharyngitis were seen in the Montreal urban area during the 1983-84 fall-winter season. Streptococcal infection normally strikes children 5 to 15 years of age. The outbreak described is unusual because of the young age of those affected. Most were between 2 and 5 years which is the usual age of the population attending day-care centres. It highlights the increased risk of transmission of infection when children are grouped together. Intervention in this outbreak appeared to be effective. None of the penicillin-treated children developed disease, while it did appear again among untreated children a few weeks later. There are few published studies demonstrating the effectiveness of control measures on the propagation of streptococcal diseases in such institutions; further control studies are needed. (*Canadian Diseases Weekly Report* 9/15/84).

#### POULTRY GIBLET-ASSOCIATED SALMONELLOSIS - MAINE

In November 1982 and October 1983, two unrelated outbreaks of foodborne salmonellosis caused by improperly cooked poultry giblets occurred in Maine. The two restaurants involved were located 50 miles apart but were part of the same restaurant chain. Reports of the outbreaks follow.

**Outbreak 1:** One hundred twelve culture-confirmed cases of *Salmonella enteritidis* serotype enteritidis were identified follow-

ing exposure to this restaurant over the Thanksgiving weekend, November 25-27, 1982. A univariate analysis was unable to differentiate five of 42 foods associated with illness (roasted turkey, chef's dressing, giblet gravy, mashed potatoes, and apple cider) ( $p=0.0001$ ). Further analyses of food histories associated the giblet gravy most strongly with illness ( $p < 0.0001$ ). All items served with the turkey dinner had been used by the time the investigation was initiated. Food from five "doggy" bags was retrieved following the outbreak, but the contents contained a nonsegregated mixture of the turkey dinner. Nevertheless, turkey from two bags was positive for *Salmonella*, as were mashed potatoes from the third bag.

A review of the method used to prepare the giblet gravy revealed that, 3 days before Thanksgiving, the giblets had been removed from forty-three 22 to 24 pound turkeys, which had been thawed at room temperature for 36 hours before cooking. The giblets were refrigerated, with instructions reportedly given to boil them the day before Thanksgiving at the time the stock was being prepared. However, when each of the 18 foodhandlers was questioned individually, no one admitted to cooking the giblets or recalled seeing the giblets being boiled. The uncooked giblets were ground in a blender and added to a thickened, hot stock mixture. The gravy was not returned to a boil after addition of the ground giblets, so the thickened mixture would not scorch. The mixture was stored on the counter behind the stove at room temperature throughout Thanksgiving Day. Leftover gravy was used for turkey luncheon specials offered November 26 and 27.

**Outbreak 2:** Seven persons, all of whom were culture-positive for *Salmonella* serotype heidelberg, became ill after eating at the second restaurant on October 17, 1983. In univariate analysis of the latter outbreak, eating liver paté was associated with illness ( $p=0.003$ ). No paté remained for laboratory analysis, since the restaurant had been alerted to the problem by a customer and had stopped making the paté 2 days before the investigation. The paté was prepared October 15. Four 5-pound containers of frozen chicken livers had been defrosted under refrigerated conditions for 4 days before use. They were sautéed in a 20-quart vessel and ground in a food processor. After addition of seasoning and diced boiled eggs, the mixture was poured into a large storage pan and refrigerated. The paté was served in a small crock on the salad bar, which was replenished from the refrigerated storage container as needed from October 16 to October 19.

**Editorial Note:** Poultry products are a frequent source of *Salmonella* infections, and reported outbreaks from turkey increase markedly during the Thanksgiving and Christmas holiday seasons. Culture surveys of poultry flocks and market poultry have demonstrated that salmonellae may be recovered frequently, a fact that is often not known or is overlooked during rushed holiday preparations.

The outbreaks described here were unusual in that they involved giblets that had been stored under refrigeration for several days and that, because they had oxidized, appeared to have been cooked. Domestic and commercial foodhandlers should be aware of the misleading appearance of giblets and other poultry organs that have been refrigerated for prolonged periods. (*Morbidity and Mortality Weekly Report* 11/9/84).



OUTBREAK OF RESPIRATORY  
ILLNESS AMONG EMPLOYEES  
IN LARGE OFFICE BUILDINGS  
TENNESSEE, DISTRICT OF COLUMBIA

Recurring outbreaks of respiratory illness among office workers have led to epidemiologic and environmental investigations and to relocation of some or all occupants of the affected office areas. Outbreaks in two cities are summarized below.

**Knoxville, Tennessee:** An outbreak of febrile illness began during the afternoon and evening of September 21, 1981. About 40% of the 325 office workers in a seven-story building met the case definition of at least three symptoms (headaches, muscle aches, fever, chills, cough, or wheezing) and a time of onset after 11 a.m. (use of this time of onset helped to exclude individuals with pre-existing respiratory conditions that were unrelated to exposures in the building). In most affected individuals, these symptoms subsided by the following morning. Subsequent outbreaks of febrile illness occurred in this same building on October 13 and October 15. After the latter outbreak, building occupants were moved to other office facilities.

In each outbreak, a temporal relationship was observed between starting the heating, ventilation, and air-conditioning (HVAC) system and the onset of symptoms. The HVAC system in this building contained two air washers (components of an air-handler unit that emit a water spray) and was contaminated with bacteria, fungi, protozoa, nematodes, and mites. No single microbial agent could be established as responsible for the outbreaks. The HVAC system was the mode of transmission for the organisms. The building remains vacant.

**Washington, D.C.:** In late January 1982, a persistent, influenza-like illness was reported among occupants of a large office suite on one floor of an eight-story building. Twelve of 41 employees working in the suite met the case definition of at least two of the following symptoms: headache, muscle aches, chest tightness, feverishness, chills, or nausea occurring on consecutive work days, including the last work day (Friday), with relief on weekends. Tests of the carbon-monoxide-diffusing capacity of affected individuals showed that individuals with two or more symptoms had lower single-breath, carbon-monoxide-diffusing capacities than did controls.

The suite was located directly beneath the kitchen of a cafeteria and had been subjected to a series of "floods" from drainage lines, including a drain from the cafeteria dishwasher. Numerous microorganisms, including *Acanthamoeba polyphaga* and *Thermoactinomyces vulgaris*, were isolated from the office and the HVAC system. However, attempts through serologic testing to link these agents specifically with illness in individuals produced inconclusive results. Epidemiologic evidence

suggested that environmental contaminants present in the water drainage were associated with illness. All workers were removed from the affected office, the office was completely refurbished and is presently being reoccupied. There has been no recurrence of illness.

**Editorial Note:** Outbreaks of hypersensitivity pneumonitis (HP), humidifier fever, and similar syndromes among office workers have been described since 1970. Symptoms include headache, fatigue, muscle aches, chills, and fever. Manifestations of pulmonary disease, such as chest tightness, coughing and wheezing, were also observed. These outbreaks have been attributed to thermophilic actinomycetes, nonpathogenic amoeba, several fungi, and endotoxins. Sources of microbial contamination included humidifiers, air washers, and contaminated filters in air-handling units.

Since October 1981, the National Institute for Occupational Safety and Health has conducted environmental studies in six large multistory office buildings in which HP-like syndromes were reported or were alleged to occur, including those reported here. Results of these studies suggest that moisture incursion into occupied spaces and into HVAC system components may have been common to these outbreaks. Engineering measures thought to prevent the occurrence of such outbreaks are straightforward, feasible, and inexpensive. They include: (1) promptly and permanently repairing all external and internal leaks; (2) maintaining relative humidity below 70% in occupied spaces and in low-air-velocity plenums (at higher levels of humidity, the germination and proliferation of fungal spores is enhanced); (3) preventing the accumulation of stagnant water under cooling-deck coils of air-handling units through proper inclination and continuous drainage of drain pans; (4) using steam, rather than recirculating water, as a water source for humidifiers in HVAC systems; however, such steam sources should not be contaminated with volatile amines; (5) replacing filters in air-handling units at regular intervals (these should have at least a moderate efficiency rate -- 50% or more -- as measured by the atmospheric-dust spot test and should be of the extended-surface type; prefilters -- e.g. roll type -- should be used before air passage over the higher-efficiency filters); (6) discarding, rather than disinfecting, carpets, upholstery, ceiling tiles, and other porous furnishings that are grossly contaminated; (7) providing outdoor air into ventilation systems at minimum rates per occupant of at least 20-cubic feet per minute in areas where occupants are smoking and at least 5 cubic feet per minute in non-smoking areas. These activities should be considered in on-going preventive-maintenance programs. (*Morbidity and Mortality Weekly Report* 9/14/84).

## New Members

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Abstracts of papers in the March Journal of Food Protection

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**Efficacy of Freezing in Eliminating Infectivity of *Trichinella spiralis* in Boxed Pork Products**, W. J. Zimmerman, D. G. Olson, A. Sandoval and R. E. Rust, Veterinary Medical Research Institute and Department of Animal Science, Iowa State University, Ames, Iowa 50011

*J. Food Prot.* 48:196-199

The relationship of storage time and temperature to loss of infectivity for *Trichinella spiralis* was evaluated. Ground trichinous pork was stuffed into casings, packed in boxes, and frozen in tiers of five boxes at four selected temperatures. Trichinae became non-infective between 6 to 10 d when stored at -17.8°C and between 11 to 15 d when stored at -12.2°C. Infective trichinae were obtained in final samplings after 56 d of freezing at -9.4°C and 71 d at -6.7°C. Little or no effect on infectivity was evident in trichinae frozen at -6.7°C throughout the 71-d period. Position of the box in the tier was a factor at -17.8°C and -12.2°C, as infectivity decreased more rapidly in top and bottom boxes than in other boxes.

**Vacuum-Packaged Trimmings as a Source for Ground Beef Patties: Changes During One Year of Frozen Storage**, J. J. Smith, S. C. Seideman, R. L. Rosenkrans and J. L. Secrist, U.S. Army Natick Research and Development Laboratories, Natick, Massachusetts 01760

*J. Food Prot.* 48:200-203

Vacuum-packaged beef trimmings were stored for four time periods of 0, 1, 2 and 3 wk (4 lots) at 5°C. After the storage period, the four lots of trimmings were evaluated for chemical, microbial and sensory properties. Each lot was then made into beef patties. Two lots of patties (0 and 1 wk of storage at 5°C) were further stored at -18°C for 0, 3, 6, 9 and 12 months and used to determine sensory properties. The two lots prepared from trimmings stored for 2 and 3 wk were evaluated for chemical properties at 0, 6, 9 and 12 months of -18°C frozen storage. Patties prepared from vacuum-packaged beef trimmings stored for 2 and 3 wk had significantly lower sensory ratings as compared to ratings for patties made from trimmings stored for 0 or 1 wk. Microbial counts indicated that bacterial action could be more important than oxidative rancidity as the cause for these changes. Increased length of frozen storage time did not markedly affect sensory properties.

**Characteristics of Maple Syrup Processed from Bleach-Treated Sap**, Maria Franca Morselli, Mary Lynn Whalen and Kelly L. Baggett, Maple Research Laboratory, Vermont Agricultural Experiment Station, Department of Botany, University of Vermont, Burlington, Vermont 05405

*J. Food Prot.* 48:204-206

Recently an undefined off-flavor was detected in syrup produced from sap flowing from tubing systems cleaned with bleach. To identify if bleach was the source of the off-flavor, samples of maple sap, to which various concentrations of sodium hypochlorite (a common sanitizing solution) were added, were processed to syrup. Three tasters detected off-flavors in all experimental syrups, except the control, and associated them with the sodium and chloride level. An off-flavor was described as "salty" with a minimum sodium level of 2,500 ppm and a minimum chloride level of 3,930 ppm and an off-flavor called "undefined" was detected in syrups with a minimum sodium level of 139 ppm and chloride level of 380 ppm. A dramatic two-color-grade change occurred in syrup produced from sap with the highest bleach-to-sap ratio, and was associated with a pH decrease and invert sugar increase.

**Growth Response of an Osmotolerant, Sorbate-Resistant *Saccharomyces rouxii* Strain: Evaluation of Plating Media**, L. Restaino, S. Bills and L. M. Lenovich, Hershey Food Corporation, 1025 Reese Avenue, P.O. Box 805, Hershey, Pennsylvania 17033-805

*J. Food Prot.* 48:207-209

Standard Potato Dextrose Agar (PDA) was inferior to PDA/60% sucrose plating medium for enumerating osmotolerant yeasts from a high-sugar food product. The largest disparity in the number of *Saccharomyces rouxii* cells (>2.00 log number cells/g) recovery by PDA/60% sucrose and standard PDA was during the lag and early log phase. The optimum growth temperatures of *S. rouxii* propagated in double strength (2X) Potato Dextrose Broth (PDB) were 28°C at 0.995  $a_w$  level and 35°C for 0.92 and 0.90  $a_w$  levels. No significant ( $P>0.05$ ) difference was determined between shaking and stomaching for enumeration of *S. rouxii*, an osmotolerant yeast, from chocolate syrup. Therefore, use of PDA/60% sucrose incubated at 35°C for 5 d is recommended for enumeration of osmotolerant yeasts from a liquid high-sugar product.

**Simple Method of Sample Preparation for Bacterial Counts in Quality Control of Frozen Vegetables**, C. R. Rey, G. A. Halaby, T. J. Reed and E. V. Lovgren, Stokely-Van Camp, Inc., Central Laboratories, Indianapolis, Indiana 46226

*J. Food Prot.* 48:210-214

Samples of frozen broccoli, cauliflower, mixed vegetables, peas and corn were prepared for coliforms, enterococcal and aerobic plate counts by: (a) official blending technique, (b) shaking in dilution blanks by hand, and (c) by dry dispersion in plastic bags with an in-house-made press (SVC-Press) followed by addition of diluent and hand shaking. Bacterial counts with the SVC-Press were comparable to those of the standard blending method and superior to those of the shake bottle method used for quality control in many food industry operations. The press was made of aluminum and plexi-glass with simple tools at a cost of \$365.00. The SVC-Press provides bacterial recoveries statistically comparable to blending along with simplified sample handling, reduction in labor cost and instrument cost affordable to small frozen food industrial operations.

**Time Temperature Heating Effect on Biuret-Positive Water-Extractable Porcine and Bovine Muscle Proteins**, Carl E. Davis, A. J. Bracewell, J. B. Anderson and J. O. Reagan, Meat Quality Research Unit, Richard B. Russell Agricultural Research Center, Agricultural Research Service, United States Department of Agriculture, P.O. Box 5677, Athens, Georgia 30613 and Food Science Department, University of Georgia, Athens, Georgia 30602

*J. Food Prot.* 48:215-220

Ground pork longissimus or beef semimembranosus muscle was heated in stoppered glass tubes in a controlled temperature bath at 60, 65, 67.5, 70, or 75°C and held for 0, 7.5, 15 or 30 min after the sample reached the desired internal temperature, removed, and cooled (0-2°C) immediately. Heated samples were homogenized with deionized water at a ratio of 1:3.3 (w/v) muscle to water. The amount of water-extractable proteins was determined by the biuret method. Eight ml of clear extract from each treatment was reheated for 15 min at 70°C, removed, and cooled (0-2°C) immediately. Coagulum was removed by filtration (0.45 µm), and a biuret measurement made on the clear extract. These two values were used to calculate a water-extractable biuret-positive ratio (EBPR) value for a specific time/temperature treatment. The base value of 70°C was selected for the ratio because it represents a temperature slightly above that necessary for thermal inactivation of certain animal viruses required by USDA-APHIS/FSIS for certain imported canned meat products. Heat denaturation/coagulation of water-extractable, biuret-positive bovine and porcine compounds with subsequent solubility loss was a time/temperature-dependent process through 70°C. EBPR values for bovine and porcine muscles heated up to 60, 65, 67.5, 70, or 75°C with no holding time were 2.11, 1.23, 1.08, 1.07, 1.02 and 2.88, 1.65, 1.13, 1.04, and 1.02, respectively. Using 70°C as the critical denaturation/coagulation temperature, EBPR values for beef and pork were  $1.07 \pm .024$  and  $1.04 \pm .066$ , respectively. Upper 95% confidence limits were 1.30 for beef and 1.12 for pork.

**Post-Processing Spoilage of Low-Acid Canned Foods by Mesophilic Anaerobic Sporeformers**, Donald E. Lake, Richard R. Graves, Roland S. Lesniewski and Jean E. Anderson, American Can Company, 433 North Northwest Highway, Barrington, Illinois 60010

*J. Food Prot.* 48:221-226

Over a period of 4 years, 770 low-acid canned food spoilage incidents were investigated to determine the cause of spoilage. In 27 of these, the cause was attributed to the growth of bacteria of the *Clostridium* genus that had entered the cans as a result of post-processing leakage. No correlations were found that might explain the occurrence of this mesophilic anaerobic type of spoilage. It appears to be a random event, probably linked to cannery insanitation. A variety of species was found, consisting of both proteolytic and non-proteolytic types. *Clostridium botulinum* was not isolated from any of the canned foods examined, nor were any of the samples found to contain botulin toxin. Container leak test methodology and principles are discussed.

**Detection of Enterotoxin in Colonies of *Clostridium perfringens* by a Solid Phase Enzyme-Linked Immunosorbent Assay**, G. N. Stelma, Jr., C. H. Johnson and D. B. Shah, Division of Microbiology, Food and Drug Administration, Cincinnati, Ohio 45226

*J. Food Prot.* 48:227-231

A nitrocellulose colony-blot assay was developed to detect enterotoxigenic strains of *Clostridium perfringens* on an agar medium. To enhance sporulation and enterotoxin production, a number of modifications of the Duncan-Strong (D-S) medium were tested, including the substitution of raffinose for starch and the addition of theobromine, papaverine and various combinations of soil and fecal extracts. Colonies of enterotoxigenic strains were most consistently positive and produced the most intense color reactions on a modified D-S medium containing raffinose, theobromine and 50% (vol/vol) bovine fecal extract. This modified medium stimulated production of detectable enterotoxin by colonies in more than 90% of the enterotoxigenic strains tested. No false-positive reactions were observed. This enzyme-linked, immunosorbent assay (ELISA) was not as effective in the analysis of broth cultures or fecal samples. Our results indicate that the nitrocellulose colony-blot assay will be useful for screening enterotoxigenic strains in epidemiologic studies.

**Evidence That *Clostridium perfringens* Produces Only One Enterotoxin**, Gerard N. Stelma, Jr., Ronald G. Crawford, Procter L. Spaulding and Robert M. Twedt, Division of Microbiology, Food and Drug Administration, 1090 Tusculum Avenue, Cincinnati, Ohio 45226

*J. Food Prot.* 48:232-233

Thirteen *Clostridium perfringens* isolates classified as nonenterotoxigenic by radioimmunoassay (RIA) were tested for biological activity in rabbit ileal loops to determine whether these organisms produced enterotoxins serologically unrelated to the classical *C. perfringens* enterotoxin. None of these strains was active in the ileal loop assays. The large number of RIA-negative isolates obtained from food-poisoning outbreaks is more likely due to the failure to isolate causative strains rather than to the existence of novel enterotoxins.

**Antibotulinal Effectiveness of Nisin-Nitrite Combinations in Culture Medium and Chicken Frankfurter Emulsions**, Steve L. Taylor, Eileen B. Somers and Lisa A. Krueger, Food Research Institute, Department of Food Microbiology and Toxicology and Department of Food Science, University of Wisconsin, Madison, Wisconsin 53706

*J. Food Prot.* 48:234-239

Chicken frankfurter emulsions were challenged with ca. 1000 *C. botulinum* spores/g and incubated at 27°C. Botulinal toxin formation was delayed by the addition of nisin or nitrite, either singly or in combination. In the absence of nisin or nitrite, samples became toxic within 1 wk. A 4-wk extension of shelf-life was achieved by addition of 156 ppm nitrite. The addition of 500 ppm nisin allowed only a 1-wk extension of shelf-life. The addition of 100 or 250 ppm nisin together with 120 ppm nitrite was superior to addition of 156 ppm nitrite, whereas the addition of 100 or 250 ppm nisin together with 80 ppm nitrite was somewhat less effective than 156 ppm nitrite. In TPYG broth, an adjuvant effect was observed between nisin and nitrite. Levels of nisin and nitrite that were not effective in TPYG broth when used alone did prevent spore outgrowth when used in combination.

**Zearalenone and Trichothecene Production in Soybeans by Toxigenic *Fusarium***, Kurt E. Richardson, Winston M. Hagler, Jr., Carol A. Haney and P. B. Hamilton, Department of Poultry Science, North Carolina State University, Raleigh, North Carolina 27695-7608

*J. Food Prot.* 48:240-243

Several *Fusarium* isolates known to produce zearalenone or T-2 toxin were tested for their toxigenic potential on heat-sterilized whole and cracked soybeans, on soybean meal, and on rice. Moisture concentration levels and particle sizes of substrate were varied to determine effects on the amount and type of toxin produced. Only one of the three *Fusarium* isolates known to produce zearalenone, *Fusarium roseum* 'Graminearum', produced detectable amounts of this mycotoxin on soybeans. *Fusarium sporotrichioides* NRRL 3299, the T-2 toxin-producing isolate tested, produced T-2 toxin as well as T-2 tetraol, HT-2 toxin and neosolaniol on soybeans. HT-2 toxin production was greatly enhanced on soybean meal in comparison to rice cultures. These findings plus previous field observations suggest that soybean products present a mycotoxic hazard which warrants attention.

**Evaluation of a Fluorogenic MPN Procedure for Determining *Escherichia coli* in Oysters**, John A. Koburger and Mary L. Miller, Food Science and Human Nutrition, University of Florida, Gainesville, Florida 32611

*J. Food Prot.* 48:244-245

Application of a fluorogenic assay using 4-methylumbelliferone glucuronide (MUG) for detecting *Escherichia coli* in oysters was not workable due to the presence of an interfering endogenous glucuronidase in the oysters. Modification of the assay by incorporating the MUG into EC broth, rather than LST broth, eliminated the interference. When 25 oyster samples were analyzed for *E. coli*, 127 of the EC tubes were positive for gas. Of these, 103 were fluorescent and 102 yielded *E. coli* on isolation. The modification still results in saving approximately 4 d when analyzing for *E. coli* in oysters.

**Removal of Animal Fat From Food Grade Belting as Affected by Pressure and Temperature of Sprayed Water**, M. E. Anderson, H. E. Huff and R. T. Marshall, U.S. Department of Agriculture, Agricultural Research Service, 113 Eckles Hall, University of Missouri, Columbia, Missouri 65211 and Food Science and Nutrition Department, University of Missouri-Columbia, Columbia, Missouri 65211

*J. Food Prot.* 48:246-248

This study was designed to determine the extent of removal of pork, beef and chicken fat from food grade belting with water when temperature and pressure were the experimental variables. For pork fat, no significant difference was observed between water temperature of 40 and 55°C, whereas at 25°C less fat ( $P < 0.05$ ) was removed regardless of pressure. Significantly more beef fat was removed at 40°C and the intermediate pressure than at 40°C and either the higher or lower pressure. For chicken fat, pressure was the only significant variable, with no interaction between pressure and temperature. The higher the pressure, the more chicken fat was removed. Overall, temperature was a more important variable than pressure. The data imply that temperature of the washing solution should be above the melting point of the type of fat to be removed.

**A Foodborne Outbreak Traced to Niacin Overenrichment**, Paul J. Hudson and Richard L. Vogt, Vermont Department of Health, P.O. Box 70, Burlington, Vermont 05402 and Centers for Disease Control, Field Services Division, Atlanta, Georgia 30333

*J. Food Prot.* 48:249-251

In September 1983, the Vermont Department of Health identified seven employees who developed facial and skin flushing and erythema within minutes of eating lunch in a hospital cafeteria. None had vomiting or diarrhea. Because of the unusual nature of the symptoms, a case-control study was undertaken. All symptomatic individuals were interviewed regarding symptoms and food consumption. A case was defined as anyone who experienced visible erythema after lunch at the hospital on September 16. For each case, two friends who had eaten lunch in the cafeteria on the same day were selected as controls. All ill persons had consumed beef-rice soup, which was

significantly associated with illness ( $P < 0.001$ ). The median time from consumption of soup to onset of symptoms was 10 min. The nature of symptoms and the brief incubation period suggested a toxic reaction to niacin. The niacin content per serving of soup consumed was determined to be 162 mg (12 times the total daily recommended amount of 13 mg). The niacin content of the enriched rice used to make the soup was 2,636 mg per pound (160 times the amount declared by the manufacturer). The excess niacin was traced to inadequate mixing of rice with enrichment powder at the processing plant. The investigation underscores the potential for toxic effects from foods which are improperly enriched.

**Microbiological Properties of Hard-Cooked Eggs in a Citric Acid-Based Preservative Solution**, J. R. Fischer, D. L. Fletcher, N. A. Cox and J. S. Bailey, Department of Poultry Science, University of Georgia, Athens, Georgia 30602 and USDA - ARS, Richard B. Russell Agricultural Research Center, Athens, Georgia 30613

*J. Food Prot.* 48:252-256

Hard-cooked and peeled eggs were placed in .5, .75 or 1.0% citric acid solutions (with .2% sodium benzoate) and held at 4°C for 30 d (experiment 1), or in .75% acid and held at 4°C for 21 d (experiment 2) to allow equilibration. Following equilibration, the solutions were sampled for pH and total plate counts and then inoculated with either 10 or 10,000 cells each of *Salmonella typhimurium*, *Yersinia enterocolitica*, *Escherichia coli* and *Staphylococcus aureus*. The eggs were stored for an additional 10 d at 4°C (experiment 1) or for 10 and 24 d at either 1.2, 7.2 or 12.8°C (experiment 2) before sampling for pH, aerobic plate count, total *Enterobacteriaceae* and each of the individual inoculated test organisms. No growth was detected in the solutions following the 30- and 21-d equilibration periods. The .75% citric acid solution was adequate in reducing the bacterial population and retarding growth of the inoculated organisms. Storage temperature appeared to have little influence on growth of inoculated organisms. Results indicate that the microbiological quality of hard-cooked eggs stored in citric acid based solutions was more dependent on acid concentration than on temperature in resisting bacterial growth following potential recontamination.

**Effect of a Water Rinse and a Detergent Wash on Milkfat and Milk Protein Soils**, Nora E. Middlemiss, Christopher A. Nunes, John E. Sorensen and Gaetan Paquette, Diversey Wyandotte Inc., Research Centre, Mississauga, Ontario, Canada L5J 1L1 and Agriculture Canada, Food Research Institute, Ottawa, Ontario, Canada

*J. Food Prot.* 48:257-260

The effect of rinsing and washing with chlorinated alkaline detergents on the protein and fat present in milk soils was studied as a function of temperature, time and length of milk contact before cleaning. Milk containing either  $I^{131}$ -labelled pro-

tein or  $I^{131}$ -labelled fat was recirculated through a test chamber for varying times, after which the chamber was rinsed with water then washed with a detergent solution. Soil removal was monitored by measuring radiation in the test cell during the cleaning procedures. Fat and protein studies yielded similar results showing rapid soil removal at the beginning of water rinses and hot detergent washes tapering off after 1 to 2 min to very little additional soil removal. The rinse water temperature does not greatly affect soil removal, but conventional chlorinated alkaline detergents perform very poorly at 20°C and show a much more linear rate of soil removal at this temperature. Soil deposition increases with milk contact time as does the fat portion of the soil which is always at least four times greater than the protein. Results are consistent with the soil immediately adjacent to the contact surface being primarily milk protein and the outer soil being mostly milk fat.

**Development of a Method of Recovery of Rotavirus from the Surface of Vegetables**, Amin S. Badawy, Charles P. Gerba and Lee M. Kelley, Departments of Nutrition and Food Science, and Microbiology and Immunology, University of Arizona, Tucson, Arizona 85721

*J. Food Prot.* 48:261-264

Rotaviruses cause waterborne disease outbreaks of gastroenteritis from sewage contaminated water, but methods have not been available to assess the potential for transmission of rotavirus by uncooked foods. A method was developed for recovery of rotavirus from the surface of vegetables. The simian rotavirus SA-11, used as a model for the human rotavirus, was adsorbed onto lettuce and the effects of various eluents tested for its recovery. The maximum recovery of rotavirus occurred with a solution of 3% beef extract at pH 8.0 after 5 min of exposure. Longer exposure times did not enhance virus recovery. Recovery of rotavirus and poliovirus type 1 (LSC) averaged 80 and 65%, respectively. Recovery of rotavirus from non-leafy vegetables was lower, averaging 44% for celery, carrot and radish. This method should prove useful for assessing the occurrence and survival of rotavirus on uncooked foods.

**Potential for Growth of Nonproteolytic Types of *Clostridium botulinum* in Pasteurized Restructured Meat Products: A Review**, J. Simunovic, J. L. Oblinger and J. P. Adams, Food Science and Human Nutrition Department, University of Florida, I.F.A.S., Gainesville, Florida 32611

*J. Food Prot.* 48:265-276

Type E and nonproteolytic type B strains of *Clostridium botulinum* can grow and produce toxin at temperatures below 5°C. Recent publications describing the greater heat resistance of nonproteolytic type B *C. botulinum* spores than type E spores are discussed in relation to suitable process lethality required for a safe pasteurized product. The incidences of botulism in Europe caused by nonproteolytic type B spores were compared to the lack of such incidences in the U.S. and to published procedures for isolating the causative agent for botulism. The incidence of *C. botulinum* spores in meat products in the U.S. also is reviewed.

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105	125	145	165	185	205	225	245	265	285	305	325	345
106	126	146	166	186	206	226	246	266	286	306	326	346
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115	135	155	175	195	215	235	255	275	295	315	335	355
116	136	156	176	196	216	236	256	276	296	316	336	356
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March 20-22, ANNUAL MEETING OF THE MICHIGAN ENVIRONMENTAL HEALTH ASSOCIATION, to be held at Stouffers Battle Creek Hotel - Battle Creek, MI. For more information contact: J. Douglas Park, 3500 N. Logan, Lansing, MI 48909. 517-373-2936.

March 11-12, NEW YORK STATE CHEESE MANUFACTURERS' ASSOCIATION ANNUAL MEETING, to be held at the Syracuse Marriott Inn, East Syracuse, NY. For more information contact: D. K. Bandler, 11 Stocking Hall, Cornell University, Ithaca, NY 14853. 607-256-3027.

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 2-4, FREEZING TECHNOLOGY COURSE FOR THE FROZEN FOOD 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.

April 3-4, SYMPOSIUM ON "TECHNOLOGICAL DEVELOPMENTS FOR TODAY AND TOMORROW," to be held at the Giant's Stadium Club, East Rutherford, NJ. For more information contact: Ms. Connie Sibona, 201-361-0900.

April 8-11, 10TH ANNUAL AOAC SPRING TRAINING WORKSHOP, to be held at the Sheraton Dallas Hotel, Dallas, TX. For more information contact: Ginger Gipson, Food and Drug Administration, 3032 Bryan Street, Dallas, TX 75204. 214-767-0309.

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.

April 17, MICROBIAL ASPECTS OF FOOD SAFETY, to be held at the Eastern Regional Research Center, USDA, Philadelphia, PA. For more information contact: Marianne Bencivengo, 215-233-6524.

April 17-18, JOINT ANNUAL MEETING OF THE AMERICAN DRY MILK INSTITUTE AND THE WHEY PRODUCTS INSTITUTE, to be held at the Hyatt Regency O'Hare Hotel, River Road at the Kennedy Expressway, Chicago, IL. For more information contact: Dr. Warren S. Clark, Jr., Executive Director of both organizations, 130 N. Franklin St., Chicago, IL 60606.

April 17-19, MEETING OF THE FLORIDA ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, to be held at the Quality Inn - Cypress Gardens, FL. For more information contact: Dr. Franklin W. Barber, 1584 Cumberland Ct., Ft. Myers, FL 33907. 813-936-4769.

May 1, SANITATION WORKSHOP, to be held at the Hilton Inn & Towers, Anaheim, CA. For more information contact: John C.

Bruhn, Dept. of Food Science & Technology, University of California, Davis, CA 95616.

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, SD. For more information contact: Cathy Meyer, President S.D.E.H.A., PO Box 903, Mitchell, SD 57301. 605-996-6452.

May 13-15, PENNSYLVANIA DAIRY SANITARIANS' AND LABORATORY DIRECTORS' CONFERENCE, to be held at the J. O. Keller Conference Center, The Pennsylvania State University, State College, PA. For more information contact: Agricultural Conference Coordinator, 409 J. O. Keller Building, University Park, PA 16802. 814-865-9547. Or contact: Sidney E. Barnard, Program Chairman, 814-863-3915.

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 13-17, NATIONAL CONFERENCE ON INTERSTATE MILK SHIPMENTS, to be held at the Hyatt Regency, Lexington, KY. For more information contact: H. H. Vaux, Indiana State Board of Health, Indianapolis, IN 46206. 317-633-0313.

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, HFF-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 21-23, DESCRIPTIVE ANALYSIS WORKSHOP, to be held in London, England. For more information contact: Tragon Corporation, 365 Convention Way, Redwood City, CA 94063. 415-365-1833.

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 3-5, NATIONAL COUNCIL FOR INTERNATIONAL HEALTH 1985 ANNUAL INTERNATIONAL HEALTH CONFERENCE, to be held in Washington, D.C. For more information contact: Dr. Curtiss Swezy, Program Manager, National Council for International Health, 2100 Pennsylvania Avenue, N.W., Suite 740, Washington, D.C. 20037.

June 7-8, IFT BASIC SYMPOSIUM: **FOODBORNE MICROORGANISMS AND THEIR TOXINS - DEVELOPING METHODOLOGY**, to be held in conjunction with the IFT National Meeting in Atlanta, GA. For more information contact: Dr. Norman Stern, USDA-ARS, Beltsville Agricultural Research Center, Beltsville, MD 20705. 301-344-2438. Or contact: Dr. Merle Pierson, Dept. of Food Science & Technology, VPI & SU, Blacksburg, VA 24061. 703-961-6423.

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.

July 13-20, RAPID METHODS AND AUTOMATION IN MICROBIOLOGY WORKSHOP, to be held at Kansas State University, Manhattan, KS. For more information contact: Jan Hurley, Conference Coordinator, 800-255-2757 (outside Kansas) or 913-532-5575 (in Kansas or outside the U.S.).

July 14-17, SECOND INTERNATIONAL CONFERENCE ON FOULING AND CLEANING IN FOOD PROCESSING (ICFCFP), to be held in Madison, WI. For more information contact: Daryl Lund, University of Wisconsin-Madison, Department of Food Science, 1605 Linden Drive, Madison, WI 53706. 608-262-3046.

July 15-17, TECHNIQUES IN MEASUREMENT WORKSHOP, to be held in Palo Alto, CA. For more information contact: Tragon Corporation, 365 Convention Way, Redwood City, CA 94063. 415-365-1833.

August 3-9, 1985 ANNUAL MEETING OF THE SOCIETY FOR INDUSTRIAL MICROBIOLOGY, to be held at the Westin Hotel, in Copley Place, Boston, MA. For more information contact: Mrs. Ann Kulback - SIM Business Secretary, SIM Headquarters, 1401 Wilson Boulevard, Arlington, VA 22209.

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 5-9, "BIOTECHNOLOGY: MICROBIAL PRINCIPLES AND PROCESSES FOR FUELS, CHEMICALS AND BIOLOGICALS," to be held at the Massachusetts Institute of Technology, Cambridge, MA. For more information contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139.

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 17-19, NEW YORK STATE ASSOCIATION OF MILK AND FOOD SANITARIANS, to be held at the Sheraton Inn, Syracuse, NY. For more information contact: D. K. Bandler, 11 Stocking Hall, Cornell University, Ithaca, NY 14853. 607-256-3027.

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 2-4, WORKSHOP IN FOOD FLAVOR: DEVELOPMENT, MANUFACTURE AND USE, to be held at the University of Minnesota, St. Paul, MN. For more information contact: Joanne Parsons, Office of Special Programs, 405 Coffey Hall, 1420 Eckles

Avenue, University of Minnesota, St. Paul, MN 55108. 612-373-0725.

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 21-23, STABILITY AND QUALITY CONTROL WORKSHOP, to be held in Palo Alto, CA. For more information contact: Tragon Corporation, 365 Convention Way, Redwood City, CA 94063. 415-365-1833.

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.

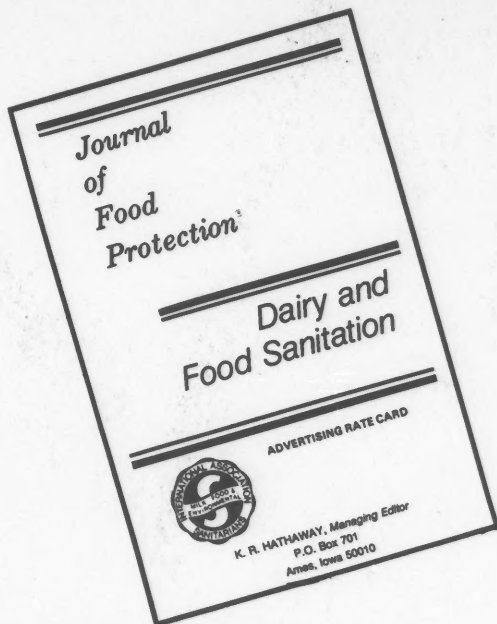
## 1986

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.



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