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DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

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

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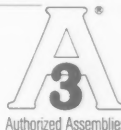
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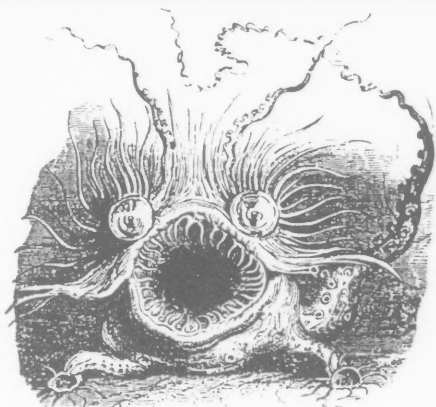
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COMMENTS

FROM YOUR PRESIDENT



By GALE PRINCE
IAMFES President

“Reflections”

The ultimate Christmas gift is a fruit cake. Rumors suggest there is only one fruit cake and it is passed around year after year. Since I got two fruit cakes this past holiday season I'm beginning to believe this is a fable, like the man in the red suit who is supposed to visit every house (if you were good) in one night. I have decided to put one of the fruit cakes in the cupboard and hold it until next Christmas. I will be checking my gift list to see who will be receiving the fabled fruit cake next year. This reminded me of my father telling about receiving a fruit cake as a young man. He put it under the seat of the car and forgot about it for several months. He spoke about how delicious it was once he cut into it, proving it got better with age. While neither the fruit cake recipes nor their stories may have changed much in the past decade, your organization has changed.

January may be an odd time for reflection, but I feel it is an appropriate time for IAMFES. By looking back at the path we have traveled, you can see the progress the organization has made in the past decade. In reading through the January issues of *Dairy, Food and Environmental Sanitation* in the past several years, I am proud to report that we have accomplished most of the goals discussed by Past IAMFES Presidents and staff.

IAMFES offers a value to the membership in the information presented in the publications and in the information exchanged at the Annual Meeting. The booklets produced by IAMFES are a special value. We have managed to keep

the costs low, while continuing to improve the quality. We have been able to fulfill the fiscal needs of the organization as we move forward.

In 1993, then President Dr. Michael Doyle, discussed the need for the distribution of factual information to the consumer. He pointed out the need for professional societies and food safety professionals to take responsibility for providing this information. While we have some things going on, this is one goal we will always be striving for, and one that should remain constant in our minds.

Over many years, we have pushed to be an industry leader. The ultimate goal, of course, is to be the leading organization in food safety. This, too, is an objective we must continue to uphold, even after we have achieved it. The limitations hindering growth we face in an association of our size are many, but our greatest resource far outweighs them. This resource is the commitment of our membership to the goals and ideals of IAMFES. From attending the Annual Meeting, to submitting manuscripts for publication in the journals, IAMFES members are active participants in reaching the goals of the organization.

Where do we go from here? We continue to place an emphasis on the value we provide our members, so you will continue to lead IAMFES to the summit of food safety. With the membership support I have witnessed, there is no doubt in my mind that we are the leader in food safety, and will stay that way for many years to come. Like the fabled fruit cake, we get better with age.

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COMMENTARY

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By DAVID W. THARP
IAMFES Executive Director

“Your opinions help to shape the future of IAMFES”

Calling all members. Calling all members. That is just what we will begin doing if you fail to renew your IAMFES membership! It has been a long time since we have had an active retention program and our results show it. Our membership numbers have declined over the past 5 years and it is time that we do something about it! At the start of the new year, we will call members whose membership dues are unpaid as a friendly reminder that your membership IS important to IAMFES and to the profession of food safety. This pro-

gram is of the utmost importance to the association.

We hope we will not have to call you, but if your membership does lapse, we will be calling to determine if you misplaced your renewal form or simply forgot to renew your membership. We will be able to quickly assist you in renewing by telephone. Second, we will be able to learn about our members who choose not to renew. What reasons led to your decision not to renew? Sometimes budget cuts affect decision making, other times it may be that the focus of your position has changed and IAMFES no longer serves your informational needs. For whatever reason, we hope to learn from the information that you hold.

We wish to learn from our loyal, long-time members. All members are welcome to voice your input by calling, writing or E-mailing to our President, Gale Prince or myself. Your opinions help to shape the future of IAMFES and are critical to our success! Our phone numbers, street, and E-mail addresses are shown on page 6, so if you have something to share, please do so.

Now is a good time to begin planning ahead for your involvement in IAMFES. First, you can plan to attend the 85th IAMFES Annual Meeting August 16-19 in Nashville, Tennessee. As always, this year's Meeting promises to be the best ever and will include a program of the latest information on food safety from around the world.

The upcoming months will be busy for many members and the IAMFES staff. The Program Advisory Committee will meet at the end of January to select papers from the many excellent topics submitted for this year's technical sessions. Our Executive Board meeting will be the first of February (and again in mid-

May). Many hours will be spent by the Tennessee Affiliate in preparing to host the 1998 Annual Meeting in Nashville. The Committee on Communicable Disease Affecting Man will be reviewing final drafts for the revision of our *Procedures to Investigate Foodborne Illness* manual. We expect the new revision to be in print by July 1998. Our Committee on Sanitary Procedures will meet in Milwaukee this spring to review proposed amendments to the 3-A Sanitary Standards. And our Professional Development Groups (PDG's) are busy either working further on this year's symposia or developing a symposium for 1999's Annual Meeting. Some of our PDG's are preparing educational brochures, developing workshops and sharing information by writing columns for *DFES*!

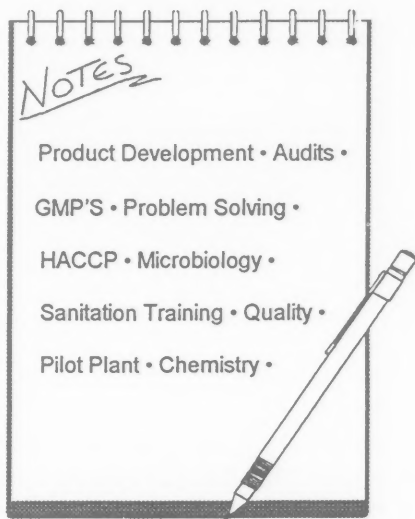
In addition, the Education Task Force is looking for IAMFES members who are willing to be included on a list of people to serve as a resource to K-12 teachers. If you are interested in this opportunity, please contact Jennifer Quinlan at 919.733.7366 for additional details.

More than enough work exists to be shared! We invite your participation. Members interested in becoming involved with these groups are encouraged to call IAMFES. This is what we are all about, sharing information with other interested people! Just contact me or any committee, PDG, or task force chairperson. The chairpersons' phone numbers and addresses are listed in the membership directory or you may call the IAMFES office at 800.369.6337 for assistance.

For those members who already serve on our committees, PDG's and task forces; please accept my sincere thanks and be assured that your time, expertise, and assistance is appreciated!



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Factors Affecting Quality and Safety of Freshly Squeezed Orange Juice (FSOJ)

Mary Eleftheriadou,^{1,2} Peter Quantick,² Maire Nolan,² and Dina Akkelidou¹

SUMMARY

Freshly squeezed orange juice (FSOJ), bottled and chilled, is an innovative product that in recent years, has appeared in the market in many countries. It offers the consumer the opportunity to enjoy a fresh, unprocessed, completely natural juice that does not come from orange concentrate, is not pasteurized or otherwise heat treated, and contains no preservatives or added color. However, the absence of any heat treatment makes FSOJ prone to microbial spoilage, and for this reason it has a very short shelf life and should be kept cool at all times.

This article touches upon the entire process of FSOJ production, from fruit to juice, and discusses all the factors affecting stability and safety of the product, such as the importance of using fresh, wholesome fruit, scrupulous sanitation throughout the process, and strict temperature control. A great deal of the information contained in this article refers to the production of FSOJ in Cyprus.

INTRODUCTION

Freshly squeezed orange juice (FSOJ) that has not been pasteurized but that is chilled and bottled is a rather new product in many parts of the world. It differs from the juices that are traditionally consumed in that it does not undergo any type of heat treatment. Rather, its stability depends on strict sanitation practices

during production and on storage at low temperatures during distribution and retailing.

In recent years, increased consumer awareness of food-related matters has led to a demand for minimally processed foods, which are perceived as having higher nutritive value and improved taste. As a consequence, freshly squeezed, chilled, bottled or

ange juice has gained considerable popularity in the market (1). Nevertheless, FSOJ is a very 'sensitive' product, having a very short shelf life and being prone to microbial growth and spoilage. Additionally, it loses cloud stability within a few days because of its enzymatic activity. Also, recent foodborne disease outbreaks involving fruit juices, including orange juice (13, 15, 20, 29, 37), have raised justifiable concerns regarding the disease risks of the consuming products of this kind. Some other drawbacks are the unavailability or scarcity of mature oranges during some periods of the year (19) and the difficulty of assuring continuous uniformity of commercial FSOJ due to the inevitable variability in composition and other quality characteristics of the cultivar(s) used. Last, but not least in importance, is the price of FSOJ, which is higher than other traditionally consumed juices. Consumers are willing to pay more for a fresh, non-processed product that they perceive as superior in quality and they should, therefore, be guaranteed that their expectations are met.

Orange juice, known as the "nectar of the gods" (5), is consumed by all, including high-risk population groups (children, elderly, pregnant women and immunocompromised individuals) and should, therefore, always be of acceptable microbiological quality. FSOJ is produced by

large bulk processors, by small processing plants, and, especially in developing countries, by street vendors and from roadside stands. Hygiene training and good manufacturing practices must be required for all production operations, regardless of size. Finally, the incorporation of HACCP into FSOJ production, the ultimate step towards achieving maximum quality and safety products, should be encouraged and enforced by public health authorities. In this article, microbiological factors that affect the quality, safety and shelf life of FSOJ are reviewed.

LEGISLATIVE ASPECTS OF FSOJ

Pure juice, a rather expensive commodity in many parts of the world, is prone to adulteration, and in that respect is in need of legislative protection. In Europe, the EEC directive 75/726 (2) and its amendments (3, 4) on fruit juices and similar products, defines fruit juice as:

"The juice obtained from fruit by mechanical processes, fermentable but unfermented, having the characteristic color, aroma and flavor typical of the fruit from which it comes." In these directives, however, there is no specific reference to fresh squeezed juices. In the U.S., there is an FDA Standard of Identity, for orange juice where in orange juice is defined as "The unfermentable juice obtained from the mature oranges of the species '*Citrus sinensis*'— sweet orange" (9, 37). In February 1996, the Florida Department of Citrus set regulations concerning "fresh squeezed" unpasteurized citrus juices (29). In Cyprus, there is at the moment a Cyprus Standard (CYS 43:1989) concerning "orange juice preserved exclusively by physical means" that does not cover freshly squeezed orange juice. To assess the suitability of this product for human consumption, the public health authorities in Cyprus follow the provisions of the Cyprus Food Law (Control-Sale), 1996.

FSOJ TYPES

FSOJ is a single-strength juice. Technologically it is the simplest type of juice to produce but the hardest to

maintain in good quality throughout its shelf life. It is important, though, to distinguish between three main types of FSOJ based on scale of production, mode of consumption and degree of risk of contamination and abuse:

- (1) the type produced on a very small scale for immediate consumption in the home, cafes, etc. This product is normally served directly, without bottling, and unless subjected to gross contamination, the time that elapses from extraction to consumption is too short for microbial proliferation to occur.
- (2) the type extracted and bottled at the point of sale, e.g., supermarkets, grocery stores, etc. Consumers can watch the squeezing and packing of the juice, which has a positive effect on sales. This product can undergo temperature abuse if not kept cool until sale.
- (3) the type produced on a commercial basis, in small or large extraction units, chilled, bottled, assigned a shelf life, and widely distributed, for example, in supermarkets, kiosks, and school canteens. Bottled FSOJ, produced commercially, is even marketed at the beach, in portable cooling units, in some tourist areas of the world. This is the largest category, and products should be produced under the most controlled conditions, because the risks associated with contamination and temperature abuse are usually greatest in commercial operations and because commercial products are assigned a more extended shelf life.

PACKAGING

FSOJ is available in polyethylene bottles of varied sizes and shapes, with plastic screw or push-on caps, and in paper cartons.

VARIETIES OF ORANGES USED FOR FSOJ

For FSOJ to be available year round, each producing area must utilize different varieties or mixtures of cultivars for juice making. Harvesting is therefore spread over many months, and different orange varieties are available at different times of the year. This, of course, is a significant obstacle to standardizing the product, because throughout a given year FSOJ of the same brand may vary in many factors, including pH, acid/sugar ratio and organoleptic characteristics. Freshness, however, is perceived as the most important sales factor, and variability is acceptable (37). Bottle labels may even carry a statement that juice composition may vary depending on cultivars used.

Oranges are classified into three categories, depending on the time of year they mature (21, 37): early season (September-December): Hamlin, Parson Brown, Washington Navel (Merlin); mid season (January-March): Pineapple oranges, Shamouti (Jaffa); and late season (March-September): Valencia. In Cyprus, the following three varieties are the main ones used for FSOJ production:

1. **Valencia.** This is the main variety that starts to mature in February and that can remain on the tree until November. The exocarp is orange but turns green if left on the tree during the summer. Juice yield is about 60% (21).
2. **Merlin or Washington navel.** Maturing in November, this is used mainly for direct consumption, rather than juice production, but it can be used for FSOJ, either blended with valencia (when availability of valencia is limited) or alone. It cannot be used for long-life juices, as the juice gets bitter upon storage.
3. **Shekeriko.** An acidless type of orange, this is usually blended with other available varieties to impart sweetness.

When there is little or none of a certain variety, other varieties are blended, to achieve optimum flavor, color, texture and/or other characteristics. Availability of some varieties can be extended either by holding late oranges on the tree or by storing harvested fruit at low temperatures.

Cold storage can extend the marketability of sweet oranges by 6 to 8 weeks (10).

BRIEF DESCRIPTION OF FSOJ PRODUCTION

A typical procedure for the production of FSOJ in Cyprus involves the following seven steps:

Delivery of oranges at the processing plant and storage

Oranges are transported to processing establishments by open trucks, directly from the grove, in plastic crate-bins. Some fruit still contains leaves and stems. Oranges are then unloaded and stored in a separate area, still in the bins, until processing, which usually takes place within 24 h.

Grading/Sorting

Oranges are hand carried and unloaded from their bins onto a conveyor belt that eventually leads to the washer, for grading. Unfit fruit is rejected, and stems, leaves, and other debris are removed.

Washing/Sanitizing

Most processors wash and/or sanitize oranges before extraction. Roller brush washers that spray water mixed with a suitable sanitizer are normally used; hot water alone, sprayed with pressurized nozzles, is also being used.

Extraction

Washed and/or sanitized oranges are fed into the extractor, mechanically cut in half and squeezed by pressure exerted on the entire halved fruit, including the exocarp. A filter retains the solids of the fruit, while the juice passes freely through. The waste is converted into animal feed.

Cooling and transferring to bulk tank

The extracted juice is immediately cooled to less than 2°C by a plate-type heat exchanger, and then transferred to a bulk tank, where it is agitated and kept at <2°C until bottling.

Bottling

Bottling is done shortly after the extraction is finished. The plastic (high density polyethylene) bottles used for bottling are washed and sanitized, then manually placed under the filler. Once filled, they are hand capped and a label placed on the bottle. This entire operation is done at room temperature. Within minutes of bottling, filled bottles of product are placed into crates and refrigerated until distribution.

Storing-Distributing

Because of the short shelf life of the product, storage at the processing unit is very brief. Storage is usually in walk-in refrigerator rooms at less than 4°C. Distribution at the point of sale is done with refrigerated trucks.

MICROBIOLOGICAL ASPECTS OF ORANGES AND ORANGE JUICE

Oranges

Fruits, like all other natural foods, possess natural defense mechanisms to combat microorganisms. These include skins (sometimes thick) or rinds; essential oils, which are well known antimicrobial agents; and high acidity due to the presence of organic acids (17). In the case of oranges, the primary physical barrier (rind or peel) is highly protective, and care should always be taken to keep it intact, especially during harvesting and transport.

Orange oil, present in both the peel and the juice sacs, has been shown in laboratory media to inhibit a variety of spoilage microorganisms, including some bacteria, yeast and molds (8,34). Orange oil has also been shown to extend the shelf life of milk (7). More application studies, using

real food situations, are needed to determine the potential of orange oils as a means of preservation.

Oranges are high in citric acid (which constitutes 95% of the total acid content), and thus are acidic products. Malic acid is also present in significant quantities (17, 37).

Orange juice

The composition of the fruit depends on the botanical variety but is also influenced markedly by the degree of ripeness. The acidity and the sugar content will be the determining factors in fruit juice taste and quality. As the orange ripens on the tree, not only does the sugar content increase and the acidity decrease (10), but the amount of juice increases (36).

The chief ingredients in orange juice are water (88.3%) and carbohydrate (10.4%) (10), the high content of both of which make orange juice theoretically a good medium for microbial growth. In reality, however, the low pH of orange juices limits growth to acid-tolerant (lactic, acetic acid) bacteria, yeast and molds. The sugar concentration of orange juice is too low to inhibit bacterial growth, and the inhibitory factor for bacteria appears to be acidity (16). The type of microorganism that will predominate in a given FSOJ depends on many factors, the most important probably being the storage temperature.

MICROBIAL SPOILAGE OF ORANGE JUICES

Microbial growth often results in the production of off-flavors that signify the end of the product's shelf life and consumer acceptance. The types of off-flavors that have been described are (24, 28):

Butter/buttermilk off-flavor

Butter or buttermilk off-flavors are mainly due to diacetyl production by bacteria such as lactobacilli and *Leuconostoc*. Species of *Lactobacillus* isolated from commercially produced unpasteurized orange juice include *Lactobacillus fermentum* and *Lactobacillus plantarum* (26).

TABLE 1. Contamination of freshly extracted juice from sound and defective fruit

Type of fruit	Test trial #1 (CFU/ml)	Test trial #2 (CFU/ml)
Sound fruit	—	500
Dropped fruit	29,000	1,500
Split fruit	2,800,000	620,000
Deteriorated fruit	9,200,000	3,100,000

Source: Parish (25)

TABLE 2. External (surface) microbial contamination of oranges

Microorganisms (CFU) per ml of sterile water rinse

Valencio oranges	Test #1		Test #2	
	PCA ¹	OSA ²	PCA	OSA
Sound, not cleaned	15,000	—	500	200 molds
Sound, cleaned and sonitized	600	<1,000	70	<100
Deteriorated	520,000	740,000	41,000	40,000

1-Plate count ogor 2-Orange serum ogor

Source: Eleftheriodou, 1997 unpublished data.

"Fermented" (sour) off-flavor

Ethanol, carbon dioxide, and traces of other fermentation products are due to yeast multiplication and the resulting alcoholic fermentation. The carbon dioxide, if in excessive amounts, will result in swelling of the container and eventually in bursting of the bottle cap. Species of yeast isolated from commercially produced unpasteurized orange juice include *Candida maltosa*, *Candida sake*, *Hanseniaspora guilliermondii*, *Hanseniaspora* sp., *Pichia membranaefaciens*, *Saccharomyces cerevisiae* and *Schwanniomyces occidentalis* (27).

Heterofermentative species of lactic acid bacteria may also produce gas (35).

"Stale" or "old" off-flavor

Growth of filamentous fungi in citrus juices has also been documented (24). Their importance in the citrus industry is that they can

be present in or on the incoming fruit (in large numbers if fruit is moldy), in fruit bins, and in other fruit handling or processing equipment that has not been kept in a sanitary condition (24). Even though fungi have not been involved in retail spoilage of citrus juices, probably because they are unable to compete successfully with bacteria and yeast, fungal spoilage is nevertheless possible, especially under conditions that favor mold growth, e.g., post-pasteurization contamination by fungal spores. Fungal growth can result in the accumulation of fungal biomass and a reduction in sugar content in the product. Fungal growth should not be a problem in FSOJ. Indeed, mold growth in unpasteurized juice is of little concern because of the short refrigerated shelf life of this product (27). However, if moldy or decomposed fruit or fruit with rots or soft spots is used, it will result in "stale" or "old" juice flavors in the finished product (24).

FACTORS AFFECTING QUALITY AND SAFETY OF ORANGE JUICES

Raw fruit considerations

Oranges used in the production of FSOJ must be mature and sound. The degree of maturity or ripeness, which is related to the fruit's acidity and sugar content, is an important factor in juice taste. The ratio of sugar to acid is of utmost importance, and, because oranges are among the fruits that cease ripening once they are picked, harvesting at the right time is critical. Some regulatory agencies require that certain minimum maturity requirements be met, such as: color break, minimum juice content, minimum acid content, minimum percentage of total soluble solids, and brix/acid ratio (5). Immature fruit will result in juice with excessive tartness and bitterness, while fruit left on the tree too long (over-ripe), will lead to juice with bland or stale flavor (10).

Soundness of fruit

Deteriorated fruit is fruit in which damage of the rind (the first line of defense) by splits or rots has occurred, allowing microbial invasion of the underlying nutrient-rich tissues. Improper harvesting techniques, e.g., plugging (removal of an area of peel around the stem), will allow microbial decay and introduction of foreign material (10). Deteriorated fruit should not be used at any time, as this will significantly increase the juice's microbial population, leading to inferior quality products with decreased shelf life and concerns about their safety. The presence of one slightly decayed fruit can jeopardize an entire batch of fresh juice (1).

The importance of using good quality fruit for the production of juice is clearly illustrated in Tables 1 and 2. Table 1 shows that unsound fruit can result in juice with higher numbers of microorganisms than sound fruit, while Table 2 shows that the external microbial counts of deteriorated fruit are much higher than those of sound fruit, even when sound fruit is not washed before extraction.

Contamination of fruit

Incoming fruit, even if sound, carries a variety of microorganisms on the outer surface; in unsound fruit, these are carried inside the tissues as well. The numbers and types, apart from the resident microflora, will be determined by the following factors: contamination from soil and dust, whether in the field or by contact with soiled surfaces and containers; degree of contact with soil depends also on how high above the ground the fruit is grown and on harvesting methods, e.g., whether dropped on the ground; contamination from polluted irrigation water, especially sewage-polluted water that may introduce pathogens; contamination from human hands that directly contact fruit; and contamination by human or animal feces.

With respect to fecal contamination of fruit, it has been established that either through natural means (insects, birds, animals) or agricultural practices, pathogens can be present on fresh fruit (6, 11).

Fruits that have had contact with soil (e.g., that have been dropped on the ground, especially if animal manure has been used or animals have been allowed to graze in the orchard) should be thoroughly washed and sanitized (37). When fruits are raised or processed under conditions rendering them prone to fecal contamination, the prospect of disease transmission is a matter of concern (11).

Preparation of fruit for extraction

Upon arrival at the processing plant, fruit should pass through a grading inspection for evaluating maturity and soundness. Prewashing the fruit before grading has been found to be a successful practice, since graders can more easily differentiate between sound and defective fruit (24). Prewashing can also reduce build up of soil in fruit handling equipment.

Deteriorated fruit, along with any debris, stems and leaves, should be removed. Fruit can then be stored

in fruit bins until extraction. Animals, birds, insects and rodents must not be allowed entry to fruit storage areas. Just before extraction, oranges should be washed again, even if prewashing was employed, and preferably sanitized. Water used for washing should be of acceptable bacteriological quality, preferably from a chlorinated supply, and if recycled, should be filtered to remove accumulated soil.

Washing fruits may reduce the viable counts by over 90% (15). A sanitation regime should follow. Care should be taken not to recontaminate oranges with dirty hands, uncleaned storage bins, or contaminated handling equipment, especially conveyor belts. Attaway et al. (1) suggest that oranges should be cooled before extraction to reduce the chilling requirements of the juice.

Sanitation

Strict sanitation practices, as part of a HACCP approach, are essential during the production of a sensitive product like FSOJ and ideally should begin at the time of harvesting and last until product is bottled. Processing equipment (presses, extractors, pipelines, conveyors) can be a significant source of contamination (15) and FSOJ producers should maintain a strict equipment sanitation protocol (25). Contamination can be controlled by: continuous cleaning, intermittent cleaning, especially of extractors-finishers, cleaning parts of the plant taken out of production, and general clean up at shutdown (24).

pH

The pH of orange juices vary between 3.3 and 4.3, depending on the fruit cultivar, fruit maturity and seasonal variation in organic acid content (28). At this pH range, most food poisoning and spoilage bacteria do not normally grow. Growth is limited to acid-tolerant microorganisms, mainly *Lactobacillus* and *Leuconostoc*, and to fungi. The growth of these aciduric microorganisms in orange juice was found to depend

on actual pH values. Among the lactics, lactobacilli tolerate acidity better than *Leuconostoc*. At pH 3.6, *Leuconostoc* will grow very slowly or not at all, while at higher pH values (> 3.9) they seem to grow faster than the lactobacilli (24). The rate of growth is also influenced by actual pH values. A tremendous increase in growth rate of some acid-tolerant bacteria (200%) occurs when pH shifts from 3.4 to 4.0 (28). This is very important for the microbiological quality of FSOJ because, as pointed out by Parish (25), processors should closely monitor juice pH, especially in late-season fruit, in which pH levels may approach 4.0.

Temperature storage

The lower the storage temperature (during distribution and retail sale and in consumers' homes), the more extended the shelf life of FSOJ will be. Bacterial and other microbial growth rates slow and spoilage is delayed. It should be clear to all those involved in production that chilling freshly squeezed orange juice can in no way alter the effects of bad fruit quality and/or unhygienic practices employed at all levels of production. However, the actual storage temperature will determine which types of microorganisms will prevail and cause spoilage. In single-strength juices, the lactic acid bacteria seem to outgrow the fungi, unless low storage temperatures are used (<5°C), in which case lactic growth slows or ceases and fungi take over (15).

In a study by Murdock and Hatcher (23) four incubation temperatures (1.7, 4.4, 7.2 and 10°C) were used to ascertain the amount and rates of growth in chilled juice of composite microbial suspensions made up of yeasts, lactobacilli, and leuconostocs. Yeasts were found to grow at all temperatures studied, growing faster as the temperature increased. Neither lactobacilli nor leuconostocs grew at 1.7°C, while lactobacilli grew only at 10°C (Table 3).

It has also been reported that during storage of unpasteurized orange juice at low temperatures

TABLE 3. Growth and generation times (h) of yeast, *Lactobacillus* and *Leuconostoc* in chilled orange juice

Temperature °C	Organism		
	Yeast	<i>Lactobacillus</i>	<i>Leuconastoc</i>
1.7	19.6	NG*	NG
4.4	14.9	NG	102
7.2	10.7	NG	42
10	8.6	9.6	15

* NG= No growth

Source: Murdock and Hatcher (23)

TABLE 4. Approximate shelf life of freshly squeezed, unpasteurized citrus juice in capped polyethylene bottles held at different temperatures

Cultivar	Days at different storage temperature			
	-1.7°C	1.1°C	4.4°C	7.8°C
Valencia orange 1	—	16	12	5
Valencia orange 2	—	21	15	8
Hamlin orange	33	22	14	—
Pineapple orange	31	17	16	—

Source: P. J. Fellers (9)

The shelf-life determination was based on flavor evaluation by experienced panelists.

(<7°C) a trend of decreasing, followed by increasing, microbial populations takes place. Surprisingly, perhaps, during the first few days of storage at low temperatures viable microbial counts decrease and then increase as the result of multiplication of psychrotrophic organisms favored by the storage temperature (28).

A big problem for FSOJ producers will be temperature abuse at any stage in the product's shelf life. Even short periods of thermal abuse can result in significant increases in microbial numbers (25). Juices chilled at temperatures exceeding 2.2 to 3.3°C, will have greatly reduced shelf life due to increased microbial activity and oxidation (10).

One of the authors has visited some large retail stores in the U.K. and measured the temperature of displayed

FSOJ. Temperatures were indeed very satisfactory, ranging between -1°C and +3°C, with the majority being close to 0°C. Nevertheless, a great deal of temperature abuse can take place during transportation, in retail food stores (23) and in consumers' homes, especially during warm weather. One of the authors has been a witness to FSOJ remaining at room temperature (20 to 25°C) beside the extraction equipment in a large and reputable supermarket.

Shelf life

The shelf life of fruit juices is influenced by microbial, enzymatic and chemical reactions that gradually lead to undesirable organoleptic changes. In FSOJ, the absence of heat treatment means that spoilage bacte-

ria and the action of the endogenous enzyme pectinesterase, which causes cloud loss in juices, will take effect. Spoilage in orange juice depends on initial microbial counts, types of microorganisms present, and storage temperature (23). In a shelf life study on FSOJ by Fellers (9) however, initial microbial populations had no effect on ultimate shelf life when storage temperatures of -1.7, 1.1, 4.4 and 7.8°C were used. At the three lower temperatures, staleness was the primary off-flavor limiting the shelf life, while microbial counts generally decreased markedly during storage. Staleness is thought to be due to the accumulation of products of degradation of microorganisms and of oxidative and/or enzymatic reactions. At 7.8°C (the highest temperature studied), counts generally increased during storage, with diacetyl production being the limiting factor in shelf life. Table 4 shows the approximate shelf life of FSOJ kept at different temperatures. It was found that shelf life depended primarily on storage temperature and cultivar. At 4.4°C shelf life ranged between 12 and 16 days, while at 7.8°C shelf life was 5 to 8 days.

Florida Department of Citrus regulations allow up to 17 days shelf dating, from the time of packaging, for unpasteurized orange juice (9). In the U.K., a nationwide chain of stores with supply contracts for FSOJ specifies a 9-day shelf life (31). The majority of FSOJ produced and sold in Cyprus has a 6 to 13 day shelf dating, which is not presently governed by legislation.

SAFETY CONCERNS IN CITRUS FRUIT JUICES

Traditionally, fruit juices (including citrus juices) have been considered hostile environments for the survival and growth of pathogenic microorganisms, mainly because of their low pH (<4.6) (13). They were placed in the low-risk food category with respect to microbiological hazards and possessed an exceptionally good record from the public health standpoint (37). Indeed, because orange juice is a low pH product, it has traditionally been

free of problems related to public health microorganisms (27). Recently, however, foodborne disease outbreaks involving fruit juices have been reported in the U.S.A. and elsewhere, because both bacterial and viral causative agents (13, 15, 20, 22, 29, 37). As a result, the safety aspects of fruit juices are now being reconsidered, even though outbreaks linked to juices are very rare.

Some possible explanations for the newly hazardous status of juices are as follows: in juices undergoing spoilage, the natural acids are neutralized and thus the environment becomes less inhibitory for pathogens (17); large numbers of pathogens introduced into an acid food will not die off immediately: *S. typhimurium* survived in fruit juices of pH 3.2 at 22°C for 4 to 5 days (32) and in apple juice of pH 3.6 for at least 30 days (13). In 1974, an outbreak of gastroenteritis in the U.S. occurred following consumption of apple juice contaminated with *S. typhimurium*, and samples of the incriminated juice with pH values ranging from 3.4 to 3.9 still contained viable organisms (13). In addition, an outbreak of salmonellosis from consumption of fresh orange juice was reported in Florida in 1995 (29). When microorganisms are grown outside their optimum pH range, an increased lag phase can result. In acid substrates, their metabolic activity results in the medium becoming less acidic, thus altering the external environment to a more favorable one (18).

Viral gastroenteritis has also been associated with juices and orange juice, items referred to in a scientific article as "Totems of Purity" (20, 22). Hepatitis occurring among hospital employees in the U.S. was likely spread by a worker who may have contaminated orange juice during its preparation (15). Research has shown that some juices for example, grape and apple juice destroy viruses. Orange, grapefruit, pineapple and tomato juice, on the other hand, do not (17).

Apart from salmonellae and viruses, the emerging pathogen *E. coli* O157:H7 was involved in a recent outbreak involving unpasteurized

apple juice. *E. coli* O157:H7 has proved to be an extremely aciduric bacterium that can survive for four weeks or longer in apple juice. Unpasteurized apple juice sweet cider made from unwashed apples contaminated with animal manure has been the cause of some illness in the U.S. (37). The possible growth and survival of *E. coli* O157 and of other pathogens in FSOJ need to be studied.

At this time, there are no known reports of *Listeria* in FSOJ or in other types of juices. However, attention should be given to the fact that many juices are packaged under contract in dairies, a place where *Listeria* may be present (15, 27). A study on the survival of *Listeria* (27) showed that it could survive at a very low pH under refrigeration for a period of days to weeks, and attention was drawn to the fact that low pH products would be of concern under conditions of gross contamination with this organism, followed shortly by consumption of the food product. In addition to the risks of contracting foodborne disease caused by a pathogenic agent (bacterial or viral), immunosuppressed people e.g., cancer patients receiving chemotherapy, may be at risk from opportunistic infections by non-pathogenic microorganisms such as *Klebsiella*, *Enterobacter*, *Escherichia*, *Candida*, *Tornlopsis* and related organisms normally found in small numbers in orange juice (15). This is important when one considers that many people drink orange juice when they are ill.

MICROBIOLOGICAL TESTING OF FSOJ

Indicator organisms

FSOJ, if produced under sanitary conditions using healthy, washed/sanitized fruit, should contain low levels of bacteria and should be free of hazardous microorganisms. Certain bacterial indicators have been used traditionally in food microbiology for indicating sanitary conditions and/or fecal contamination in foods, and their significance in FSOJ testing is briefly discussed.

Coliforms and Enterococci

Coliforms and *Enterococci* are so frequently isolated from orange products that their presence cannot be used to indicate unsanitary conditions or fecal contamination (15). Coliforms have been shown to be present in orange juice regardless of the level of sanitation exercised during production (23).

According to Parish (29), it is not known if the presence in small numbers of nonpathogenic *E. coli* represents a significant threat to public health, but FSOJ producers should consider its presence in their products as unacceptable.

Aerobic plate count (APC)

APC is the most suitable method for evaluating microbial quality. It may reflect the handling history of the raw materials and final product; the state of decomposition; degree of freshness; and sanitary conditions during production, storage and distribution. Excessively high numbers of microorganisms in fresh foods present cause for alarm. In fresh foods, as in the case of fresh orange juice, a part of the APC may represent pathogens (18). Good quality, nonfermented foodstuffs, if prepared and handled under strict hygienic conditions, should contain low levels of nonpathogenic or spoilage bacteria. High microbial counts often indicate poor fruit quality, unsanitary equipment, or the opportunity for growth in the juice at some stage in the process (15).

Sampling of FSOJ

Attaway et al. (1) suggest that FSOJ producers should set up a sampling routine to evaluate the microbiological and sensory quality of their products at frequent intervals. Samples should be taken after extraction chilling, from the holding tank, and from the newly bottled product.

In addition, shelf life tests (organoleptic assessment) should be carried out by storing products at temperatures comparable to customer holding conditions.

TABLE 5. Microbial counts of juice extracted in the lab

Type of orange	Washed	Sanitized	Type of extraction	O.S.A (CFU/ml)
1. Jaffa	na	na	Hand squeezed	40 (10 yeast, 30 malds)
2. Jaffa	yes	no	Hand squeezed	<10
3. Jaffa	na	na	Manual plastic juice extractor	<10
4. Jaffa	yes	no	Manual plastic juice extractor	<10
5. Jaffa	no	na	Manual juice extractor stainless steel, exacarp also	20
6. Valencia	na	na	Hand squeezed	50 malds

Source: State General Lab, Cyprus. 1995. Unpublished data.

METHODS FOR DETECTING MICROORGANISMS IN FSOJ

Cultural methods

The most widely used technique of enumerating microorganisms in citrus products is to plate appropriate dilutions of FSOJ in orange serum agar (pour plate method), and incubate at 30°C for 48 to 72 h. On this medium, lactobacilli form small, white, pinpoint colonies, and *Leuconostoc* spp. produce characteristic gummy or mucoid colonies (24, 26), while yeast colonies are large, white and variable in shape.

Microscopic method

Microscopic examination of the juice can serve as a control on the efficiency of sorting incoming unsatisfactory fruit (24) but it cannot distinguish between dead and viable cells.

Rapid methods

The time frame of cultural methods is often too long when counts of viable microorganisms are needed before the product is released to the consumer, especially with a product like FSOJ, with such a limited shelf life.

Impedance which has been used successfully with frozen concentrated orange juice (38), may be extended to FSOJ testing. Other methods applied to citrus juice testing include

radiometry, ATP assays, and the plate loop method (15). In addition to testing for microorganisms, analysis for diacetyl can be used as a means of detecting spoilage due to growth of lactic acid bacteria in orange juice (15).

Microbial counts for FSOJ juices

Since FSOJ is a "fresh" product, nonpathogenic microorganisms coming from the surface of the fruit, the equipment, and the processing environment are inevitably present under commercial production operations.

In small scale laboratory experiments on the microbial load of freshly squeezed orange juice (State General Laboratory, Cyprus, unpublished data), the results obtained are shown in Table 5. The fruit used were sound and visibly free from soil and all equipment and utensils used were cleaned and washed with boiling water. As is evident from Table 5, microbial counts are low in small scale extractions simulating those in the home. The microbial buildup expected during commercial extractions in processing lines is not present. The conclusion is that it is possible to obtain sterile juice or juice with very low microbial counts under the following conditions: use of healthy and sound, preferably clean/sanitized oranges; use of clean equipment, utensils and processing lines and

periodic cleaning during operation to avoid microbial build up; avoidance of any kind of external contamination (humans, air, etc.); and immediate cooling after extraction.

Interpretation of microbiological data

Very little information is available in the literature or in regulations concerning acceptable microbial counts in fresh juices. The newly formed Florida Department of Citrus regulations on nonpasteurized citrus juices do not specify exact levels of microorganisms that are acceptable, even though citrus juice producers are required to monitor standard plate counts and counts of coliforms and *E. coli* (29). It is actually impossible to set exact numerical limits on populations of microorganisms below which quality will be unharmed in fresh juice (1). Murdock and Hatcher (23) found no correlation between plate counts and spoilage; the initial level of contamination and the types of microorganisms present or selected by storage conditions were much more important in affecting shelf life than the actual numbers present at the time of spoilage. In the same study (23), juice spoilage from yeast growth occurred when populations reached 10⁵ CFU/ml, whereas for *Leuconostoc* to bring about spoilage; counts varied significantly and ranged from 10⁴ to almost 10⁷ CFU/ml.

Interestingly enough, it has been suggested that lactic acid bacteria can produce greater amounts of diacetyl under less optimum conditions, which means that at low temperatures, even low levels of these organisms can bring about undesirable flavors, with some strains producing more diacetyl than others (23).

In general, high total counts in FSOJ indicate use of rotten fruit, poor sanitation, poor temperature control (1), or a combination of the above factors.

Some microbiological criteria encountered by the authors concerning counts in FSOJ either in articles or by personal communications, are as follows: <200,000/ml at time of packing (1); <100,000/ml (major airline specification); <50,000/ml at time of packing (major U.K. food retailer); <30,000/ml at time of packing (major U.K. food retailer).

Some citrus microbiologists would agree that no more than 25% of the total population should be made up of yeast (1).

Between 1993 and 1995, 237 FSOJ samples from both the point of production and retail outlets were analyzed at the State General laboratory in Cyprus. Of these, 44% had counts of <100,000 CFU/ml, while 20% contained less than 20,000 CFU/ml (33). The authors believe that the limit of 100,000 CFU/ml, or even lower, at the time of production is easily achievable, while at the retail level, moderately higher microbial counts could be tolerated.

RECENT DEVELOPMENTS AND FUTURE TRENDS

Freezing FSOJ, which can then be thawed within 24 h at ambient temperature or within 48 h in a refrigerator, has been found to result in a longer shelf life than that of fresh juice, and, indeed, it enables more flexibility in the distribution chain (30). Frozen FSOJ may also be thawed in 20 min in a microwave with negligible loss of flavor and ascorbic acid (10). Frozen orange juice has an

indefinite shelf life, so the potential of this otherwise short-lived product entering international trade may now become a reality (30). Ultrafiltration has been used to separate serum from pulp, after which the pulp was pasteurized and remixed with the serum. Juice prepared this way showed a steady turbidity, had satisfactory sensory characteristics, and remained stable for 60 days at 2°C, in contrast to untreated juice, which showed complete pulp separation and spoilage after 5 days at 10°C and 21 days at 2°C (12). In the U.K., freshly squeezed "orange-grapefruit" and "orange-raspberry" juices are also available, giving consumers another option with which to treat their palate to freshness, another marketing opportunity.

SUMMARY

Orange juice is a very popular food in all parts of the world, and the orange juice industry is among the largest food processing operations in the world. Orange juice has a highly desirable flavor, that combines sweetness, tartness and often a tinge of bitterness. Its body is neither too thick nor too thin, its color is very appealing and, added to all this, it offers a bonus of significant nutrient content (5).

Of all forms of orange juice, FSOJ is probably the best in flavor, texture and aroma, but the most microbiologically unstable. The absence of a heat treatment required to destroy spoilage organisms and undesirable enzymes limits its shelf life to only a few days even when it is chilled. FSOJ must, therefore, rely on scrupulous sanitation during processing and storage, preferably at temperatures less than 2 to 3°C. Indeed, sanitation is critical for the quality of freshly squeezed orange juice and, if implemented as part of a HACCP approach it will ensure significant reductions in the microbial load of the resulting juice; less microbial buildup in the equipment, machinery and processing lines; and fewer safety concerns.

Parish (25) very clearly states that unpasteurized orange juice must rely upon only "low pH, low temperatures and scrupulous sanitation to inhibit microbial proliferation during handling, storage and distribution."

These defense lines are, nevertheless, not unbreakable. Acid-tolerant bacteria thrive in the low pH of orange juice, and some emerging pathogens have been found to be aciduric. Psychrophilic microorganisms can continue to grow, even under chilling, with their rate of growth being merely retarded, and sanitation can work only within realistic production practices. After all, that is the reason why this product has a limited shelf life even under optimum conditions of production, storage and distribution.

What is important is for authorities and processors to look at FSOJ as a very complex ecosystem. Like any other food commodity, many factors in it control safety and quality and these factors are interwoven to bring about positive or negative effects.

Microbiological criteria should be proposed for FSOJ, both at the point of production and at the point of retail sale. In addition, guidelines should be laid down on acceptable temperatures for storage and maximum shelf life under controlled conditions.

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REFERENCES

1. Attaway, J. A., R. D. Carter, and P. J. Fellers. 1989. Trends in citrus industry - the production and handling of fresh squeezed unpasteurized orange juice. *Flussiges Obst*. 56:613-616.
2. Anonymous. 1975. Council directive 75/726/EEC on the approximation of

- the laws of the member states concerning fruit juices and certain similar products. Council of the European communities. Brussels.
3. Anonymous. 1979. Council Directive 79/168/EEC amending directive 75/726/EEC. Council of the European communities. Brussels.
 4. Anonymous. 1981. Council Directive 81/487/EEC amending for the second time Directive 75/726/EEC. Council of the European communities. Brussels.
 5. Berry, R. E., and M. K. Veldhuis. 1977. Processing of orange, grapefruit and tangerines. Ch. 4. *In* "Citrus Science and Technology." AVI Publishing Inc., Westport, CT.
 6. Beuchat, L. R. 1995. Pathogenic microorganisms associated with fresh produce. *J. Food Prot.* 59:204-216.
 7. Dabbah, R., V. M. Edwards, and W. A. Moats. 1970. Antimicrobial action of some citrus fruit oils on selected foodborne bacteria. *Appl. Microbiol.* 19:27-31.
 8. Deans, S. G., and G. Ritchie. 1987. Antibacterial properties of plant essential oils. *Intern. J. Food Microbiol.* 5:165-180.
 9. Fellers, P. J. 1988. Shelf life and quality of freshly squeezed, unpasteurized, polyethylene bottled citrus juice. *J. Food Sci.* 53:1699-1702.
 10. Fellers, P. J. 1992. Citrus industry. *In* Encyclopedia of Food Science and Technology, vol. 1. (ed.), John Wiley & Sons, Inc. New York, NY.
 11. Geldreich, E. E., and R. H. Bordner. 1971. Fecal contamination of fruits and vegetables during cultivation and processing for market. A review. *J. Milk Food Technol.* 34:184-195.
 12. Gherardi, S., E. Vicini, A. Trifino, R. Bazzarini, and P. L. Decio. 1992. The use of ultrafiltration for the production of high quality orange juice. *Fluessiges-Obst.* 59:164-166.
 13. Goverd, K. A., F. W. Beech, R. P. Hobbs, and R. Shannon. 1979. The occurrence and survival of coliforms and salmonellas in apple juice and cider. *J. Appl. Bacteriol.* 46:521-530.
 14. Graumlich, T. R., J. E. Marcy, and J. P. Adams. 1986. Aseptically packaged orange juice and concentrate: A review of the influence of processing and packaging conditions on quality. *J. Agri. Food Chem.* 34:402-405.
 15. Hatcher, W. S., J. L. Weihe, E. C. Hill, D. F. Splittstoesser, and M. E. Parish. 1992. Ch. 51. *In* M. L. Speck (ed.), Compendium of methods for the microbiological examination of foods. A.P.H.A.
 16. Hsu, J. E. 1975. Factors affecting microflora in processed fruits, Ch. 5. *In* Commercial Fruit Processing, AVI Publishing Inc. Westport, CT.
 17. International Commission for the Microbiological Specifications in Food. 1980. Vegetables, fruits, nuts and their products. Ch 21. *In* Microbial Ecology of Foods, vol. 2. Food Commodities. Academic Press, Inc. New York, NY.
 18. Jay, J. M. 1986. Indices of food sanitary quality. Ch. 17. *In* Modern Food Microbiology. 3rd ed. Van Nostrand Reinhold, New York, NY.
 19. Kopelman, I. J., and M. Rauchwerger. 1985. Shelf life and microbial growth kinetics of fresh citrus juices. *J. Food Prot. and Preserv.* 8:241-250.
 20. Maurice, J. 1994. The rise and fall of food poisoning. *New Scientist*, 1956:28-33.
 21. Ministry of Agriculture and Natural Resources, Cyprus. 1991. Types and varieties of citrus grown in Cyprus. ed. 13th. Government of Cyprus.
 22. Mortimore S., and C. Wallace. 1995. Appendix C. *In* "HACCP. A practical approach." Chapman & Hall, Ltd., London, U.K.
 23. Murdock, D. I., and W. S. Hatcher, Jr. 1975. Growth of microorganisms in chilled orange juice. *J. Milk Food Technol.* 38:393-396.
 24. Murdock, D. I. 1977. Microbiology of Citrus Products. *In* Citrus Science and Technology, vol. 2. AVI Publishing Inc. Westport, CT.
 25. Parish, M. E. 1988. Microbiological aspects of freshly squeezed citrus juice. *Proc. of the 1988 Food Industry Short Course: Ready to serve citrus juices and beverages.*
 26. Parish, M., and D. Higgins. 1988. Isolation and identification of lactic acid bacteria from samples of citrus molasses and unpasteurized orange juice. *J. Food Sci.* 53:645-646.
 27. Parish, M. E., and D. P. Higgins. 1989. Yeast and molds isolated from spoiling citrus products and byproducts. *J. Food Prot.* 52:261-263.
 28. Parish, M. E. 1991. Microbiological concerns in citrus juice processing. *Food Technol.* 45:128-133.
 29. Parish, M. E. 1996. Microbiological quality and safety of citrus juices. *In* Proceedings of the Citrus Processing Short Course. C. A. Sims., (ed.), University of Florida.
 30. Rose, P. 1993. A fresh approach to orange juice. *Food Manufacture Intl.* 10:23.
 31. Sainsbury's Food Technology Group. 1996. Personal communication.
 32. Sprenger, R. 1995. Microbiology. Ch. 2. *In* Hygiene for Management. Highfield Publications, Doncaster, U.K.
 33. State General Laboratory. 1993-1996. Annual reports. Ministry of Health. Government of Cyprus.
 34. Subba, M. S., T. C. Soumithri, R. Suryanarayana Rao. 1967. Antimicrobial action of citrus oils. *J. Food Sci.* 32:225-227.
 35. Sutherland, J. P., A. H. Varnam, and M. G. Evans. 1986. Soft drinks. *In* A colour atlas of food quality control. Wolfe Publishing Ltd. London, U.K.
 36. Thompson, A. K. 1996. Harvest maturity and methods, Ch. 2. *In* Postharvest Technology of Fruit and Vegetables. Blackwell Scientific Publications, Ltd. Oxford.
 37. Varnam, A. H., and J. P. Sutherland. 1994. Fruit juices, Ch. 2. *In* Beverages: Technology, Chemistry, Microbiology. Chapman & Hall, Ltd. London.
 38. Weihe, J. L., S. L. Sebt, and W. S. Hatcher, Jr. 1984. Estimation of microbial populations in frozen concentrated orange juice using automated impedance measurements. *J. Food Sci.* 49:243-245.

Consumer Opinions in Argentina on Food Irradiation: Irradiated Onions

Oswaldo A. Curzio and Clara A. Croci

SUMMARY

This paper presents the results of market research carried out in Buenos Aires with irradiated onions. Results show that a large percentage (>90%) of the general public had scanty knowledge about food irradiation. However, a majority of consumers were willing to sample treated onions. The opinion after sampling was, in general, "like very much." The majority (90%) were also interested in repeat purchases of irradiated onions. The purchase of irradiated foodstuffs in general was also recorded. The results of the survey, divided into consumer age groups, are discussed.

INTRODUCTION

A great deal of research into the properties of irradiated foodstuffs has confirmed the wholesomeness of the process and the technological feasibility of food irradiation, when good radiation processing practices are observed (4).

Several Latin American countries have worked on food irradiation (5), but no great effort has been made with regard to the different factors in the transfer of irradiation technology to the foodstuffs industry. Among these, consumer acceptance is a key factor. In the case of Argentina, in spite of important developments, in the technological as well as the legal aspects (2), there is scant pub-

lic knowledge regarding irradiated foodstuffs (7). This situation is due mainly to the lack of a continuous consumer education program, which is considered to be essential for the adoption of new technology in food treatments (6).

Public education, by means of market research with irradiated foods, provides information that helps consumers make informed judgments about the value of irradiation. Moreover, marketing trials could provide an excellent opportunity to measure consumer attitudes to irradiation technology, especially in countries such as Argentina, where active opposition to this type of foodstuffs processing does not exist.

With this in mind, and as a continuation of our consumer education efforts about food irradiation technology and the introduction of fresh irradiated onion bulbs, a test was carried out in Buenos Aires (the most important city in Argentina and the third most important in Latin America). The test was carried out in October with onion bulbs – "Valenciana sintética 14" – labelled to show that they had been "treated with ionizing radiation." The trial was conducted without price incentives and with consumers classified by age groups. Thus, this study evaluates: (1) the amount of knowledge with regard to irradiation technology and interest in buying irradiated onions, and (2) the reason why irradiated onions were bought, how the product was rated after consumption, and interest in further buying of irradiated onions. An attempt was also made to establish the amount of interest in buying irradiated foodstuffs in general.

MATERIALS AND METHODS

The onions, which were of the Valencia sintética 14 variety, were harvested in March, cured in the field for about 10 days and then trimmed.

The bulbs were packed, in 25-kg lots, into nylon net bags. The National Atomic Energy Commission (CNEA) was in charge of the irradiation.

Figure 1. Occupations of the buyers of irradiated onions who responded, after consumption, to the poll.

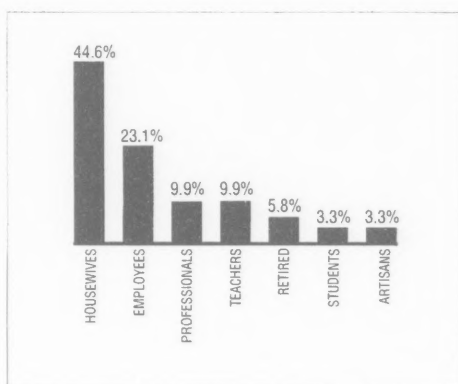


Figure 2. Reasons, by age group, for purchase of irradiated onions.



tion process. The treatment was applied 40 days after harvesting and was carried out at the Ezeiza Atomic Centre. The bulbs were treated in air at 20°C, with a dose of 50 Gy, using ⁶⁰Co gamma rays (1). The dose rate was 16.5 kGy/h, determined by a Fricke dosimeter, and the dose uniformity ratio was 1.5. After irradiation, the bulbs were stored under the commercial warehouse conditions, normally found in Argentina (6° to 32°C with 40 to 95% R.H.) for 8 months.

The tests were conducted during a period (October) when this variety is not available on the market. Four metric tons of irradiated onion

bulbs, in 1 or 2 kg lots, were packed into nylon net bags. In accordance with Argentine Food Code rules, the treatment applied to the product was described on a tag attached to each bag. The samples were delivered to a supermarket situated in the Vicente López neighborhood of Buenos Aires, whose inhabitants are professionals and businessmen earning high-middle incomes. The samples were placed in a special display area in the produce section of the supermarket, together with a poster explaining the benefits offered by the radiation process. The poster pointed out that the treatment used prevents sprouting of the bulbs, prolongs the preservation time of the

product, results in a food product that is perfectly safe for human consumption, and causes the bulb to retain its natural qualities. The poster indicated that the test had been authorized by the National Ministry of Health. The price was the same for the treated as for the non-treated product. Trained personnel were on hand to inform and to answer the public's questions.

Two parallel surveys were carried out with handouts distributed to the public. The first was a general survey intended to find out how much supermarket customers know about food preservation by means of ionizing irradiation, and how much interest the public had in buying onions treated with ionizing radiation.

The second survey was carried out with the members of the public who had bought the treated onions and whose telephone numbers had been registered. The form asked for the reason for buying irradiated onions, the consumer's rating of the product, and whether the product would be purchased again. An estimate of interest in purchasing irradiated foodstuffs in general was also requested. The information was collected in reception boxes placed in the supermarket or via telephone. The results were analyzed by age group.

RESULTS

The irradiated onion bulbs were sold during a three-day period at a rate of about one metric ton per day. The total number of buyers who filled out the poll form regarding their degree of knowledge about the preservation of foodstuffs by irradiation was 600 (72.5% female and 27.5% male). For both sexes, 52% were in the 31 to 50 years age group. Of all buyers, 94% had no prior knowledge of this technology; the remainder, who had knowledge, had obtained this information from journals with limited circulation. The public was asked about their interest in buying onions treated with ionizing radiation. In spite of their ignorance about the technology, the majority (87%) were willing to try treated onions. Those uninterested in purchasing the product (13%) declared that they did not

Figure 3. Buyer opinion, by age group, of the quality of raw irradiated onions consumed.

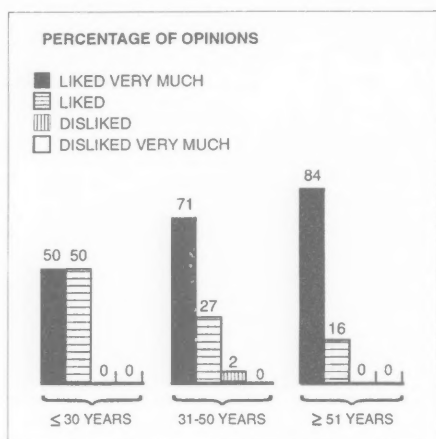
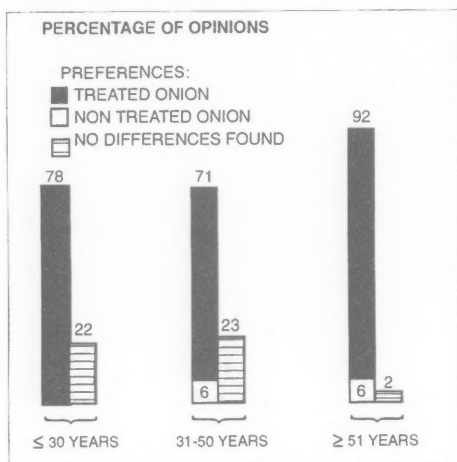


Figure 4. Buyer opinion, by age group, on preference for traditional or irradiated onions.



need onions at that time. Fewer than 1% of the latter said that they had doubts about the harmlessness of the treatment.

With regard to the buyer survey, 121 persons responded (86.7% female and 13.3% male). The highest percentage (50%) fell into the 31 to 50 years age group. With regard to their educational level, 17.4% had attended only primary school, 49.5% had completed secondary school and 33.1% had finished tertiary school. The largest number of buyers were housewives, followed by employees, professionals, teachers,

retired people, students and artisans (Fig. 1).

Fig. 2 shows the reasons the public gave for buying the treated onions. The most important reason was curiosity to try a product treated with the new technology. The older the person, the lower the percentage giving this reason. In spite of the fact that the benefits of the process seemed to be irrelevant as a reason for buying, it should be noted that the younger buyers showed the most interest (18%) in buying for this reason.

Fig. 3 shows consumers' opinions about the quality of the treated

onions consumed in the raw state. Generally, the greatest percentage of opinions fell into the category of "liked very much." It should be noted that no opinions were registered in the category "disliked very much." Similar results were obtained for the consumption of cooked irradiated onions (data not shown).

The results obtained about opinions of the difference in quality between treated and untreated onions are shown in Fig. 4. Overall, the highest percentage (80%) of individuals stated that they preferred the treated onions. Preference for untreated onions was found only among consumers in the two over-31 age groups (6%). The remainder of the buyers stated that they had found no difference between traditional and treated onions.

The majority (90%) of buyers expressed an interest in repeating the purchase of this irradiated product. When asked whether they would buy other foodstuffs preserved by ionizing radiation, most (60%) were undecided and said that they would need more information about the benefits for each particular foodstuff and about its physical characteristics after the application of this technology before making up their minds.

DISCUSSION

This survey of consumers' attitudes to irradiation technology for foodstuffs, based on a market survey using irradiated onions, was carried out using a sample population from Argentina's largest city, Buenos Aires. The objectives were to discover the extent of knowledge about the method of preservation, consumers' buying intentions, post-consumption opinions, and intentions to buy again.

The results regarding the extent of knowledge showed a high degree of ignorance (94%) about this method of foodstuff preservation. This is not surprising, as Argentina does not have continuous consumer education campaigns on this topic. There have been only two mass media campaigns, in 1985 and 1986, each lasting one month, in Bahía Blanca, a medium-

sized provincial city (3, 7). Similar levels of ignorance have been recorded in other countries, where, in spite of a negative press, there is very little familiarity with irradiation technology among consumers (5). On the other hand, although there is anti-nuclear activity in Argentina, it is not directed at food irradiation. Thus, there has been no sowing of misinformation about this technology, as is substantiated by the fact that the majority of people (87%) surveyed were prepared to buy treated onions after receiving accurate information.

With regard to the opinions of the irradiated onion buyers, all age groups gave "curiosity" as their principal reason for purchase, followed by "aspect of the product" (Fig. 2). Although "benefits of the technology" do not appear to be relevant to the decision to buy, it must be pointed out that this was more important for younger than for older buyers. This could be attributed to the greater familiarity of younger people with new technologies. This fact permits the prediction that, in the near future, appreciation of food irradiation will increase. In general, irradiated onions taste better, raw or cooked, than their untreated counterparts

(Fig. 3 and 4). This result is all the more important as the majority (90%) of the buyers expressed an interest in further purchases of irradiated onions.

The high degree of uncertainty expressed with regard to the purchase of other irradiated foodstuffs indicates the necessity of carrying out further market tests to demonstrate to the consumer the wholesomeness and economic benefits associated with this technology. These market tests would generate consumer learning by means of repetition and back-up (8), as used in numerous commercial marketing activities. This would establish the base necessary for an effective transfer of irradiation technology for foodstuffs into the field of technologies that offer minimally processed foods.

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REFERENCES

1. Curzio, O. A., and C. A. Croci. 1988. Radioinhibition process in argentinian garlic and onion bulbs. *Radiat. Phys. Chem.* 31:203-206.
2. Curzio, O. A., and C. A. Croci. 1990. A ⁶⁰Co multipurpose radiation processing facility at Bahía Blanca, Argentina. *Radiat. Phys. Chem.* 35:590-594.
3. Curzio, O. A., C. A. Croci, and A. M. Urioste. 1986. Marketing trials with irradiated onion and garlic in Argentina. *Food Irradiation Newsl.* 10:44-45.
4. Diehl, J. F., 1990. Safety of irradiated food. Marcel Dekker, Inc., N.Y.
5. IAEA. 1992. Latin American regional co-operative programme on food irradiation. IAEA-TECDOC-651. IAEA, Vienna.
6. Marcotte, M. 1991. Consumer acceptance of irradiated food. Nordion International, Inc., Ontario, Canada.
7. Urioste, A. M., C. A. Croci, and O. A. Curzio. 1990. Consumer acceptance of irradiated onions in Argentina. *Food Technol.* 44:134-136.

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ELECTRONIC MAILING LISTS: INFORMATION EXCHANGE FORUMS

Reem K. Barakat

Electronic mailing lists are discussion groups that communicate via E-mail. They provide a forum for people sharing a common interest to participate in discussions, exchange information, or receive news on topics ranging from recreational to academic. Messages are delivered to an E-mail box very much like a letter or a journal is delivered to a postal box. For individuals who cannot afford the time to look for information on a constantly changing world wide web (WWW), mailing lists are an ideal tool to receive news, digests, or request assistance on topics of interest.

The software responsible for the management and distribution of these mailing lists to thousands of subscribers are commonly called "list servers." A list server can automatically distribute an E-mail message from one member of a list to all other members on that list. Different list server software packages are available to users interested in creating and managing mailing lists. *LISTSERV*[®], *ListProc*, and *Majordomo* are among the most commonly used servers. *LISTSERV* and *ListProc* are commercial products available through L-Soft and CREN (Corporation of Research and Educational Networking), respectively. *Majordomo* is a freeware system i.e., available free-of-charge through the Internet. A mailing list is managed by a list owner(s) who is officially responsible for the list and defines its policy, charter, and rules for subscribers.

Thousands of mailing lists are available on the Internet. Table 1 lists a few that may be useful to food microbiologists or to those with an interest in the food industry. The list *FOOD-LAW*, for example, may be of use to individuals interested in food labeling issues. Questions pertaining to food-related regulations are promptly answered by other subscribers or by the list owner. WWW sites that maintain regulatory information are often posted on the list.

Some mailing lists are moderated where E-mail messages are screened by the list owner prior to distribution to other participants, or unmoderated when messages sent by one member are automatically distributed to all other subscribers. Other mailing lists only distribute digests or electronic journals (commonly known as e-journals or e-texts) which are moderated on-line excerpts or magazines usually dedicated to a specific area of research. *FSNET-L* and *AGNET-L* (Table 1) are examples of non-interactive mailing lists. *FSNET-L* relays to subscribers material related to food safety issues, including microbial hazards, nutritional issues, and new animal diseases; *AGNET-L* carries material related to plant agriculture, including food biotechnology, chemical hazards, productivity, and sustainability.

The majority of mailing lists are free-of-charge to the subscriber. Information about a mailing list and its accessibility can be reviewed prior to joining. The list *HELP-NET* (Table 1) is an ideal forum for individuals with little or no knowledge about the Internet. Several guides to the Internet or to mailing lists may be retrieved at no cost by E-mail and the *HELP-NET* group may provide answers to interested individuals. As the title implies, *NEW-LIST* (Table 1) is dedicated to announcements of newly created mailing lists and it is possible to search its

TABLE 1. Names, description, and subscription addresses of some mailing lists of interest to food scientists and the food industry

List name	List description and subscription address (<i>in italics</i>)
AGNET-L	Agriculture: biotechnology, chemical hazards, productivity and sustainability <i>Listserv@listserv.uaguelph.ca</i>
DAIRY-L	Professional educators and extension workers advising the dairy industry <i>Listserv@umdd.umd.edu</i>
FOODSAFE	Professionals interested in food safety issues <i>Majardama@nal.usda.gov</i>
FOOD-LAW	Food laws and regulations <i>Listserv@tc.umn.edu</i>
FSNET-L	Food safety information: microbial hazards, nutritional issues, and new animal diseases <i>Listserv@listserv.uaguelph.ca</i>
HELP-NET	Enquiries pertaining to the Internet <i>Listserv@vm.temple.edu</i>
HS-CANADA	Canadian occupational health and safety issues <i>Majardama@kate.ccahs.ca</i>
NEW-LIST	Announcements for new mailing lists <i>Listserv@listserv.nadac.edu</i>
PLTRYNWS	Poultry health, production, and management <i>Listserv@sdsuvm.sdstate.edu</i>
PROMED	Monitoring emerging diseases worldwide in humans, animals, and plants <i>Majardama@usa.healthnet.org</i>
RISKANAL	Risk analysis: assessment, characterization, communication, management and policy relating to risk <i>Listserv@listserv.pnl.gov</i>
SEAFOOD	Seafood research and extension information exchange <i>Listprac@ucdavis.edu</i>
USDA-POULTRY	USDA policy information, contact information for USDA material and similar information <i>Majardama@reeusda.gov</i>

TABLE 2. Mailing-lists-related web sites

Purpose	URL location
To search for mailing lists	http://www.liszt.com http://www.tile.net http://www.neasoft.com http://www.lssoft.com/internet/paml/bysubj.html http://www.catalog.com/vivian/interest-graup-search.html http://www.nova.edu/Inter-Links/cgi-bin/news-lists.pl
To look for list-user and list-owner information	http://www.webcam.com/impulse/list.html

archives for existing lists using specific keywords. Individuals with access to a web browser could visit several sites to search for mailing lists pertaining to a specific topic or to retrieve various guides on how to participate in a mailing list or what to do to set up one (Table 2).

Mailing lists have two addresses, a list server address where commands are sent (subscribe, unsubscribe, help, info), and a list address where messages intended to other list members are sent. An individual may subscribe to a list of interest by sending an E-mail message to the list server address. The message should include the 'subscribe' command, the list name, and the individual's first and last name. To subscribe to the list FSNET-L, Nancy Doe would send the following message:

TO: listserv@listserv.uoguelph.ca
FROM: ndoe@uoguelph.ca
SUBJECT: *(leave blank)*

In the body of the message,
subscribe FSNET-L Nancy Doe

Membership in some lists may be open to all who wish to join, or may be subject to approval by the list owner. Once subscription is approved, the new member usually receives a standard welcoming letter (via E-mail) describing the scope of the list with information pertaining to participation and basic server commands including how to unsubscribe. From that time on, the member will

receive all postings sent to the list by any of its subscribers or by its moderator, and may follow the discussions or join in on them. A factor to consider before signing up on several mailing lists is the amount of E-mail messages that will be received. The volume of mail generated by each list depends on its focus. The more specialized or restricted a list subject is, the lower the amount of traffic or mail per week. A subscriber to the list FOOD-LAW would receive three or four brief messages per week while HELP-NET subscribers may receive more than 20 messages per day. If an individual subscribes to a list and finds the level of activity too high to keep up with or the issues discussed on the list are not of interest, signing off a list is just as easy as joining it.

Mailing lists have become an invaluable tool to access or to distribute information for professionals and non-professionals alike. They have allowed individuals from various countries and different backgrounds, who have never met face to face but share a common interest, to come together into one forum. In an age where it is increasingly difficult to stay on top of new developments, having information reach us so easily is inestimable.

AUTHOR INFORMATION

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ATTENTION AUTHORS

The Editor is seeking articles of general interest and applied research with an emphasis on food safety for publication in **Dairy, Food and Environmental Sanitation**

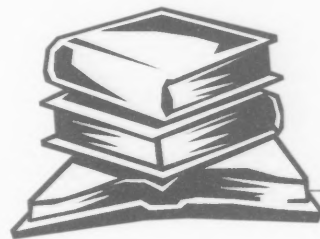
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**Managing Editor, Dairy, Food and Environmental Sanitation, c/o IAMFES, Inc.,
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2863**

Please submit three copies of manuscripts along with a fourth copy on 3 1/2" computer disk.

Book reviewed by: Purnendu C. Vasavada, University of Wisconsin, River Falls, WI

Book Review



Cheese and Fermented Milk Foods

3rd Edition 1997

Published by: F. V. Kosikowski and V. V. Mistry

I started reading this book with an apprehension of a person going to a "sequel" of a favorite movie: would it be as interesting and exciting and "improved" version of the book that introduced me to the cheese and fermented milk foods or would it be an effort that fell short of its mark? After all, it has been almost twenty years since the second edition of this book was published and much advances have been made in our understanding of all aspects of cheese and fermented dairy products manufacturing from the starter cultures and rennet coagulation to ripening and maturing of various cheeses and whey processing. I am pleased to report that the new edition of the book meets and exceeds all expectations one may have in a standard text book. Dr. Vikram Mistry and the publishing team have succeeded in providing revised and updated information while retaining the original charm and readability of the previous editions of this enormously popular text book. This expanded edition is presented in two volumes. It includes five new chapters and is richly illustrated with photographs, line drawings and sketches. Many new tables and figures regarding the production and consumption of various cheeses and fermented dairy products have also been included.

The book is divided into two volumes: Volume I: Origins and Principles covers topics including the history and origins, starter cultures, fermented milks and fundamental cheese manufacturing. It contains individual chapters on buttermilk, sour cream and ripened butter: yogurt, cottage cheese, Cheddar cheese, hard Italian cheese, bacterial surface ripened cheese, mold ripened cheese and whey cheese. A chapter on nomadic cheese and goat, sheep, buffalo and camel milk cheese is included, so are chapters on low fat and specialty cheese, process cheese, imitation cheese, whey and whey foods. Chapters on mechanization and continuous cheese making, membrane processing-ultra

filtration, microfiltration and nanofiltration, vacuum evaporation and reverse osmosis are also included in Volume I. The rest of the chapters in the volume cover topics such as control of spoilage bacteria, standards, nutrition, public health, economics and marketing. The book ends with an appendix which contains information on nutrient and composition of cheese and a list of books and resource material dealing with cheese and fermented dairy products.

Volume II of this book contains 20 chapters describing the detailed make procedures for the cheeses described in Volume I. It also contains information on various chemical and microbiological tests used for compositional and quality control analysis. The book has a definite slant on U.S. cheese industry. While the public health aspects of cheese and fermented foods are discussed, the significance of systematic, preventative and proactive approach to assuring safety and quality of cheese by practicing properly designed and implemented HACCP program currently in vogue in food industry is, unfortunately, all but ignored. A chapter on the HACCP and TQM application in cheese industry would have made the new edition all the more useful and up-to-date.

Overall, this book is an excellent text that provides a comprehensive source of information regarding cheese and fermented milk and is a much valuable resource for technical and non-technical audience. As a "sequel" this edition maintains the charm and user friendliness of the earlier editions. It appears that the authors' objective was "...to retain the basic principles of cheese making... while changing and expanding each chapter to include new developments...". They have succeeded in doing so. This book should be suitable as a text or a companion text for courses in cheese manufacturing and food fermentations. It is highly recommended for students, teachers and professionals interested in arts and science of manufacturing cheese and fermented milk foods.

For copies of *Cheese and Fermented Milk Foods*—

Mail requests to: F. V. Kosikowski, LLC, Peters Lane, Westport, CT 06880

Dairy, Food and Environmental Sanitation

IAMFES Instructions for Authors

NATURE OF THE MAGAZINE

Dairy, Food and Environmental Sanitation (DFES) is a monthly publication of the International Association of Milk, Food and Environmental Sanitarians, Inc. (IAMFES). It is targeted for persons working in industry, regulatory agencies or teaching in milk, food and environmental protection.

The major emphases include:

- practical articles in milk, food and environmental protection;
- new product information;
- news from activities and individuals in the field;
- news of IAMFES affiliate groups and their members;
- 3-A and Milk and Egg Sanitary Standards, amendments and lists of symbol holders;
- excerpts of articles and information from other publications of interest to the readership.

Anyone with questions about the suitability of material for publication should contact the editor.

SUBMITTING ARTICLES AND OTHER MATERIALS

All manuscripts including, "Letters to the Editor" should be submitted in triplicate (original and two copies), in flat form (*not folded*), and by First Class mail to Managing Editor, *DFES*, c/o IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, U.S.A.

When possible, authors are encouraged to submit a fourth copy of their manuscript on computer disk. Manuscripts submitted on disk should be saved as an ASCII file.

All news releases and events of interest to members of IAMFES should be mailed to Donna Bahun, Publications Specialist at the above address.

Correspondence regarding subscriptions or membership in IAMFES should be sent to Julie Cattanch, Membership Coordinator, (address above).

PUBLICATION OF MANUSCRIPTS

Manuscripts are accepted for publication only after they are reviewed by two members of the editorial board. Occasionally, when the subject of the paper is outside of the specialties of members of the Editorial Board, other specialists may be asked to review manuscripts. After review, a manuscript will be returned to the author by the editor for revision in accordance with reviewers' suggestions. Three clean copies of the revised paper, plus the original paper in flat form, are to be returned to

the editor as soon as possible. Authors can hasten publication of their papers by submitting well-written manuscripts conforming to the journal's style and by revising and returning manuscripts promptly. If, after review of a manuscript is completed, an author chooses to withdraw rather than revise the paper, the editor should be notified promptly. If an author does not respond in *four months* after a reviewed paper is returned, the paper will be considered as withdrawn. With authors' cooperation, articles are usually published within three to six months after they are received and may appear sooner.

When a manuscript is received, it is numbered, and the author is notified by postal card that the manuscript has been received. The manuscript number will be given on the postal card and should be used on all future correspondence and revised manuscripts to identify and help locate manuscript files. Authors will also be notified when a manuscript has been accepted for publication.

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Page proofs will be sent to authors prior to publication.

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Reprints cannot be provided free of charge. Arrangements to obtain such reprints should be made with IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, U.S.A.

TYPES OF ARTICLES

Readers of *DFES* include persons working in industry, regulatory agencies or teaching in milk, food and environmental protection. *DFES* serves this readership by publishing a variety of papers of interest and usefulness to these people. The following types of articles and information are acceptable for publication in *DFES*.

General Interest

DFES regularly publishes nontechnical articles as a service to those readers who are not involved in the technical aspects of milk, food and environmental protection. These articles include such topics as the organization and application of milk or food control programs or quality control programs, ways of solving a particular problem in the field, organization and application of an educational program, management skills, use of visual aids and similar subjects. Often talks and presentations given at meetings of affiliate groups and other gatherings can be modified sufficiently to make them appropriate for publication. Authors planning to prepare general interest/nontechnical articles are invited to correspond with the editor if they have questions about the suitability of their material.

Book Reviews

Authors and publishers of books in the fields covered by DFES are invited to submit their books to the editor. Books will then be reviewed by a specialist in the field covered by the book, and the review will be published in an issue of DFES.

PREPARATION OF ARTICLES

The editor assumes that the senior author has received proper clearance from his/her organization and from coauthors for publication of the manuscript.

All manuscripts should be typed double-spaced on 8-1/2 by 11 inch white bond paper. Onion skin or similar thin paper should not be used. *Lines on each page should be numbered to facilitate review of the manuscripts.* Use of paper with pre-numbered lines is satisfactory. *Manuscripts submitted on paper without numbered lines will be returned to authors for retyping prior to being sent out to review.* Margins on all sides should be at least one-inch wide and pages of the original manuscript should not be stapled together.

A manuscript should be read critically by someone other than the author before it is submitted. If English is not the author's first language, the manuscript should be reviewed by a colleague of the author who is fluent in written English to ensure that correct English is used throughout the paper. *The editor and editorial staff will not rewrite papers when the English is inadequate.*

Authors are encouraged to consult previously published issues of DFES to obtain a clear understanding of the style of papers published.

Brand names and manufacturers of research samples (i.e., specific products tested as in surveys, etc.) *should not* be used. It is the policy of DFES to not publish this information. Instead, refer to types of products or identify by letters or numbers.

Revised manuscripts that do not require a second review should be typed on plain white bond paper *without* numbered lines or box outlines, etc. Finished manuscripts are typeset by scanning into a computer program. A clean copy facilitates the scanning process.

In order to decrease turn-around time authors may send a copy of their manuscript on computer disk as noted earlier in these instructions.

ORGANIZATION OF ARTICLES

The title of the manuscript should appear at the top of the first page. It should be as brief as possible and contain no abbreviations.

The title should be indicative of the subject of the manuscript.

Authors should avoid expressions such as "Effects of," "Influence of," "Studies on," etc.

Names of each author (including first name and middle initial), and the name and address of the institution(s) where the work was done should appear on the title page. Footnotes can be used to give the current addresses of authors who are no longer at the institution(s) where the work was done. An *asterisk* should be placed after the name of the author to whom correspondence about the paper and proofs should be sent. The telephone and facsimile numbers of this author should be given at the bottom of the page. No text of the manuscript should appear on the title page.

The Abstract should appear on a separate piece of paper directly following the title page, and should not exceed 200 words. It should summarize the contents of the manuscript, and be meaningful without having to read remaining pages. The Abstract should *not* contain references, diagrams, tables or unusual abbreviations.

The references should be arranged in alphabetical order, by last name of first author and numbered consecutively. Only the first author's name and initial should be inverted. *Cite each reference in the text by number.* All references given in the list must be cited in the text. List references according to the style of the following examples.

Paper in journal

Aberman, G. G. and E. H. Marth. 1974. Experimental production of aflatoxin in citrus juice and peel. *J. Milk Food Technol.* 37:308-313.

Paper in book

Marth, E. H. 1974. Fermentations. pp. 771-882. *In* B. H. Webb, A. H. Johnson and J. A. Alford. (eds.). *Fundamentals of dairy chemistry*. 2nd ed. AVI Publishing Co., Westport, CT.

Book by author(s)

Minor, T. E. and E. H. Marth. 1976. *Staphylococci and their significance in foods*. Elsevier Scientific Publishing Co., Amsterdam.

Book by editor(s)

Vanderzant, C. and D. F. Splittstoesser. (eds.). 1992. *Compendium of methods for the microbiological examination of foods*. 3rd ed. American Public Health Association, Washington, D.C.

Patent

Hussong, R. V., E. H. Marth and D. G. Vakaleris. 1964. *Manufacture of cottage cheese*. U.S. Pat. 3,117,870. Jan. 14.

Publication with no identifiable author or editor

Anonymous. 1977. *Thermally processed low-acid foods in hermetically sealed containers*. Code of Federal Regulations No. 21, U.S. Government Printing Office, Washington, D.C.

References citing "personal communication" or "unpublished data" are discouraged, although it is recognized that sometimes it is unavoidable. An author may be asked to provide evidence of such references.

References consisting of papers that are "accepted for publication" or "in press" are acceptable, but the author may be asked to provide copies of such papers if needed to evaluate the manuscript in question.

References should follow the text, tables should follow references, and figures should follow tables in manuscript organization. Placement of each should be indicated in the text.

ILLUSTRATIONS, PHOTOGRAPHS, FIGURES

Submission of photographs, graphics or drawings to illustrate the article will help the article. The nature of *DFES* allows liberal use of such illustrations, and interesting photographs and drawings often increase the number of persons who are attracted to and read the article.

Photographs. Photographs which are submitted should have sharp images, with good contrast. A scale marker to indicate magnification should be on each photomicrograph. Color photographs should not be submitted for use inside of *DFES*, because they will be published in black and white, with a loss of detail. Photographs can be printed in color, but the additional cost of doing so must be borne by the author. Authors wishing to publish color photographs should contact the Managing Editor for cost estimates.

IAMFES also encourages the submission of photographs to be used on the cover of *DFES*. Photographs considered for the cover should be submitted in the form of a negative or slide, and should be four-color.

Line drawings. All line drawings (graphs, charts, diagrams, etc.) should be submitted as black and white glossy or matte finish photographs, which do not require any additional art work. *No part of a graph or drawing should be typewritten.* Use a lettering set or other suitable device for all labeling. If graphs are computer generated, printed copies of the graphs must be produced by a good quality laser printer, with sufficiently dark printing or appropriate size letters and numerals. Graphs produced by dot matrix printers or with very thick lines and lettering are not acceptable. Figures are commonly reduced to a 1-column width (85 mm) of printing. If the original figure can be repro-

duced to the size of a one-column width, further reduction will not be necessary, otherwise lettering should be of sufficient size to allow for reduction. If symbols are used, they must be identified on the Figure and not in the legend. Data that are presented in Figures should not be repeated in Tables. A well-prepared Figure should be understandable without reference to the text of the paper.

Labeling of figures. All Figures should be labeled lightly on back, using a soft pencil or a typed adhesive label. Labeling should include:

- Figure number,
- last name of author(s),
- title of manuscript,
- the manuscript number (on revised copies),
- identification of the top of the figure.

COMMON ABBREVIATIONS

Frequently used acceptable abbreviations may be used (i.e., using *wt* for the word *weight*, or *s* for the word *second*). For further details on abbreviations see the current edition of the *CBE Style Manual*. Note that a period is used with some but not all abbreviations.

For a complete listing of expressions to avoid in scientific writing, see pages 93-98 in O'Connor, M. and F. P. Woodford. 1976. *Writing Scientific Papers in English*. Elsevier, Amsterdam. Also, *How to Write a Scientific Paper*, by Day, Robert A., 3rd ed. 1988. Oryx Press, Phoenix, AZ.

Authors may also contact the Managing Editor if they are not sure about acceptable abbreviations.



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Why should I contribute to the IAMFES Foundation Fund?

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

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Awards Nominations

The International Association of Milk, Food and Environmental Sanitarians welcomes your nominations for our Association Awards. Nominate your colleagues for one of the awards listed below. Only IAMFES members are eligible* to be nominated. You do not have to be an IAMFES member to nominate a deserving professional.

To request nomination forms, contact:

IAMFES
6200 Aurora Avenue, Suite 200W
Des Moines, Iowa 50322-2863

By telephone: 800.369.6337; 515.276.3344;
Fax: 515.276.8655 or E-mail: iamfes@iamfes.org.

You may make multiple nominations. Be sure to indicate which award nomination form(s) you desire. All forms vary and cannot be universally used.

Nominations deadline is February 20, 1998. All forms must be received at the IAMFES office by February 20, 1998.

- ◆ Persons nominated for individual awards must be current IAMFES members. Black Pearl nominees must be a company employing current IAMFES members.
- ◆ Previous award winners are not eligible for the same award.
- ◆ Executive Board members and Awards Committee members are not eligible for nomination.
- ◆ Presentation of awards will be during the Awards Banquet at the IAMFES Annual Meeting in Nashville, Tennessee on August 19, 1998.

Nominations will be accepted for the following awards:

Black Pearl Award — Award with Black Pearl

Presented in recognition of a company's outstanding achievement in corporate excellence in food safety and quality. Sponsored by Wilbur Feagan and F&H Food Equipment Company.

Honorary Life Membership Award — Plaque and Lifetime Membership in IAMFES

Presented to Member(s) for their devotion to the high ideals and objectives of IAMFES and for their service to the Association.

Harry Haverland Citation Award — Plaque and \$1,000 Honorarium

Presented to an individual for years of devotion to the ideals and objectives of IAMFES. Sponsored by DiverseyLever Corporation.

Harold Barnum Industry Award — Plaque and \$1,000 Honorarium

Presented to an individual for outstanding service to the public, IAMFES and the food industry. Sponsored by NASCO International, Inc.

Educator Award — Plaque and \$1,000 Honorarium

Presented to an individual for outstanding service to the public, IAMFES and the arena of education in food safety and food protection. Sponsored by Nelson-Jameson, Inc.

Sanitarian Award — Plaque and \$1,000 Honorarium

Presented to an individual for outstanding service to the public, IAMFES and the profession of the Sanitarian. Sponsored by Ecolab, Inc., Food and Beverage Division.

NFPA Food Safety Award — Plaque and \$3,000 Honorarium

Presented to an individual, group, or organization for preeminence in and outstanding contributions to the field of food safety. Sponsored by National Food Processors Association.

*Note: You do not have to be an IAMFES member to be eligible for the NFPA Food Safety Award.

PAST AWARDEES

EDUCATOR-INDUSTRY AWARD

1973-Walter A. Krienke
1974-Richard P. March
1975-K. G. Weckel
1976-Burdet H. Heinemann
1977-Elmer H. Marth
1978-James B. Smathers
1979-Joseph Edmondson
1980-James R. Welch
1981-Francis F. Busta
In 1982, this award was split into the Educator Award and the Harold Barnum Award (for industry).

EDUCATOR AWARD

1982-Floyd Bodyfelt
1983-John Bruhn
1984-R. Burt Maxcy
1985-Lloyd B. Bullerman
1986-Robert T. Marshall
1987-David K. Bandler
1988-Edmund A. Zottola
1989-Vernal Packard
1990-Michael Stiles
1991-William E. Sandine
1992-William S. LaGrange
1993-Irving J. Pflug
1994-Kenneth R. Swartzel
1995-Robert B. Gravani
1996-Cameron R. Hackney
1997-Purnendu C. Vasavada

HAROLD BARNUM INDUSTRY AWARD

1982-Howard Ferreira
1983-C. Dee Clingman
1984-Omer Majerus
1985-William L. Arledge
1986-Hugh C. Munns
1987-J. H. Silliker
1988-Kenneth Kirby
1989-Lowell Allen
1990-Roy Ginn
1991-Thomas C. Everson
1992-Ronald Case
1993-David D. Fry
1994-R. Bruce Tompkin
1995-Damien A. Gabis
1996-Dane T. Bernard
1997-John G. Cerveny

HARRY HAVERLAND CITATION AWARD

1951-J. H. Shrader and
William B. Palmer
(posthumously)
1952-C. A. Abele
1953-Clarence Weber
1954-C. K. Johns
1955-R. G. Ross
1956-K. G. Weckel
1957-Fred C. Baselt
1958-Milton R. Fisher
1959-John D. Faulkner
1960-Luther A. Black
1961-Harold S. Adams
1962-Franklin W. Barber
1963-Merle P. Baker
1964-W. K. Moseley
1965-H. L. Thomasson
1966-J. C. Olson, Jr.
1967-William V. Hickey
1968-A. Kelley Saunders
1969-Karl K. Jones
1970-Ivan E. Parkin
1971-L. Wayne Brown
1972-Ben Luce
1973-Samuel O. Noles
1974-John C. Schilling
1975-A. R. Brazis
1976-James Meany
1977-None Given
1978-Raymond A. Belknap
1979-Harold E. Thompson, Jr.
1980-Don Raffel
1981-Henry V. Atherton
1982-None Given
1983-William B. Hasting
1984-Elmer H. Marth
1985-Ralston B. Read, Jr.
1986-Cecil E. White
1987-None Given
1988-Carl Vanderzant
1989-Clem Honer
1990-None Given
1991-Frank Bryan
1992-Ewen C. D. Todd
1993-Robert C. Tiffin
1994-Sidney E. Barnard
1995-Charles W. Felix
1996-Joseph J. Disch
1997-Earl O. Wright

SANITARIAN AWARD

1952-Paul Corash
1953-E. F. Meyers
1954-Kelley G. Vester
1955-B. G. Tennent
1956-John H. Fritz
1957-Harold J. Barnum
1958-Karl A. Mohr
1959-William Kempa
1960-James C. Barringer
1961-Martin C. Donovan
1962-Larry Gordon
1963-R. L. Cooper
1964-None Given
1965-Harold R. Irvin
1966-Paris B. Boles
1967-Roger L. Stephens
1968-Roy T. Olson
1969-W. R. McLean
1970-None Given
1971-Shelby Johnson
1972-Ambrose P. Bell
1973-None Given
1974-Clarence K. Luchterhand
1975-Samuel C. Rich
1976-M. W. Jefferson
1977-Harold Bengsch
1978-Orlowe Osten
1979-Bailus Walker, Jr.
1980-John A. Baghott
1981-Paul Pace
1982-Edwin L. Ruppert
1983-None Given
1984-Harold Wainess
1985-Harry Haverland
1986-Jay Boosinger
1987-Erwin P. Gadd
1988-Kirmon Smith
1989-Robert Gales
1990-Leon Townsend
1991-James I. Kennedy
1992-Dick B. Whitehead
1993-Lawrence Roth
1994-Charles Price
1995-Everett E. Johnson
1996-Leon H. Jensen
1997-Randall A. Dags

**HONORARY LIFE
MEMBERSHIP AWARD**

1957-J. H. Shrader
1958-H. Clifford Goslee
1959-William H. Price
1960-None Given
1961-Sarah Vance Dugan
1962-None Given
1963-C. K. Johns and Harold Macy
1964-C. B. and A. L. Shogren
1965-Fred Basselt and Ivan Parkin
1966-M. R. Fisher
1967-C. A. Abele and L. A. Black
1968-M. P. Baker and W. C. Frazier
1969-John Faulkner
1970-Harold J. Barnum
1971-William V. Hickey
1972-C. W. Dromgold and
E. Wallenfeldt
1973-Fred E. Uetz
1974-H. L. Thomasson and
K. G. Weckel
1975-A. E. Parker
1976-A. Bender Luce
1977-Harold Heiskell
1978-Karl K. Jones
1979-Joseph C. Olson, Jr.
1980-Alvin E. Tesdal and
Laurence G. Harmon
1981-Robert M. Parker
1982-None Given
1983-Orlowe Osten
1984-Paul Elliker
1985-Patrick J. Dolan,
Franklin W. Barber and
Clarence K. Luchterhand
1986-John G. Collier

1987-Elmer Marth and
James Jezeski
1988-Kenneth Whaley and
Paul J. Pace
1989-Earl Wright
Vernon Cupps
1990-Joseph E. Edmondson
1991-Leon Townsend
Dick B. Whitehead
1992-A. Richard Brazis
Harry Haverland
1993-None Given
1994-Ken Kirby
1995-Lloyd B. Bullerman
Robert T. Marshall
1996-Richard C. Swanson
1997-Frank L. Bryan

BLACK PEARL AWARD

1994-HEB Company
San Antonio, TX
1995-Albertson's, Inc., Boise, ID
1996-Silliker Laboratories Group,
Inc., Homewood, IL
1997-Papetti's of Iowa Food
Products, Inc., Lenox, IA

C. B. SHOGREN AWARD

1972-Iowa Affiliate
1973-Kentucky Affiliate
1974-Washington Affiliate
1975-Illinois Affiliate
1976-Wisconsin Affiliate
1977-Minnesota Affiliate
1978-None Given

1979-New York Affiliate
1980-Pennsylvania Affiliate
1981-Missouri Affiliate
1982-South Dakota Affiliate
1983-Washington Affiliate
1984-None Given
1985-Pennsylvania Affiliate
1986-None Given
1987-New York Affiliate
1988-Wisconsin Affiliate
1989-Georgia Affiliate
1990-Texas Affiliate
1991-Georgia Affiliate
1992-Georgia Affiliate
1993-New York Affiliate
1994-Illinois Affiliate
1995-Wisconsin Affiliate
1996-Wisconsin Affiliate
1997-Florida Affiliate

**MEMBERSHIP ACHIEVEMENT
AWARD**

1986-Iowa Affiliate
1987-Florida Affiliate
1988-Florida Affiliate
1989-California Affiliate
1990-California Affiliate
1991-Illinois Affiliate
1992-California Affiliate
Illinois Affiliate
1993-California Affiliate
1994-California Affiliate
1995-Texas Affiliate
1996-California Affiliate
1997-California Affiliate

Highlights of the Executive Board Meeting

October 26-28, 1997

Des Moines, Iowa

Following is an unofficial summary of Executive Board actions from the IAMFES Executive Board Meeting:

Approved the following:

- Minutes of July 4-10, 1997 Executive Board Meeting.
- Minutes of July 5, 1997 Executive Session.
- Votes taken by E-mail since July 1997 Meeting.
- Presenting the Membership with a name change to International Association for Food Protection.
- Posting of *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection* abstracts on FSNET (listserv).
- Name change of the Viral Foodborne Professional Development Group to Viral and Parasitic Foodborne Professional Development Group.
- Combine Meat Safety and Quality and Poultry Safety and Quality Professional Development Groups to form a Meat and Poultry Safety and Quality Professional Development Group pending Chairperson approval.
- Establish a second Membership Award for Affiliates based on percentage of Membership gained.
- Establishment of a Task Force to begin an IAMFES Fellows Program.
- Michael Brodsky to serve on the Crumbine Award selection jury for 1998.
- To support the IAMFES President-Elect's attendance at the Crumbine selection jury as an observer.
- Revised policy on Annual Meeting volunteers.
- A silent auction sponsored by the IAMFES Foundation.
- Setting Annual Meeting registration fees at the same level for students and IAMFES Retired Members.
- A rotation plan for *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection* Management Committee Members with equal representation from industry, government, and academia.
- *Dairy, Food and Environmental Sanitation* Management Committee Members to serve terms expiring as follows: Christine Bruhn, August 1998; Bob Sanders, August 1998; Linda Harris, August 2000.

- Using Foundation funds to send journals to contact person in Holland for distribution to Eastern European countries.
- Development of NFPA Food Safety Award.

Discussed the following:

- Audit report for Fiscal Year End, August 31, 1997.
- IAMFES Mission Statement.
- Vision and long range plan.
- Educator Award funding for 1998 and beyond.
- Committee, Professional Development Groups and Task Force recommendations from meetings held at the IAMFES Annual Meeting, July 1997.
- Progress by the Committee on Communicable Diseases Affecting Man on revising the Procedures to Investigate Foodborne Illness manual.
- Developing criteria for the Affiliate Awards.
- Updates to the IAMFES Policy and Procedures Manual.
- Executive Board Member presentations at Affiliate Meetings.
- IAMFES' web page.
- Installation of new Membership software.
- IAMFES' support role in fall '98 ILSI sponsored conference.
- Progress on 1998 IAMFES Annual Meeting plans.
- Revisions to Poster Session and Exhibitor schedules for Annual Meeting.
- Planning for 1999, 2000 and 2001 IAMFES Annual Meetings.
- Committee, Professional Development Groups and Task Force Membership requirements.
- Developing charges for Professional Development Groups.
- Review of employee benefits.
- International Affiliate developments.
- 3-A/IAMFES/IAFIS relationships.
- Planning progress on 1998 IAMFES workshops.
- Produce Marketing Association media release on food safety.

**Committee, Professional Development Group,
Task Force, and Support Group —
Recommendations to the Executive Board
from Meetings Held in Orlando, Florida — July 6, 1997**

Board Action Taken at the October 26 - 28, 1997

Executive Board Meeting

STANDING COMMITTEES:

**Dairy, Food and Environmental Sanitation
Management Committee**

1. To approve allowing Doug Powell to post *DFES* abstracts on his listserv. **Board action:** *Approved posting of DFES and JFP abstracts on Doug Powell's listserv.*
2. To approve establishing a News Science Editor. **Board action:** *Approved using 3 DFES committee members on a rotating basis.*
3. To approve adding a column to *DFES* on computers and food safety to be directed by Linda Harris. **Board action:** *Approved.*
4. To approve another 3-year appointment of Christine Bruhn, Robert Sanders, and Linda Harris. **Board action:** *Approved terms as follows: Christine Bruhn through August 1998, Bob Sanders through August 1998, and Linda Harris through August 2000.*

**Journal of Food Protection
Management Committee**

1. On the issue of advertising in *JFP*, the Committee recommends that:
 - A. The Table of Contents should always be the first inside page. **Board action:** *Approved.*
 - B. All advertisements accepted must be minimum of one-half page. **Board action:** *Accepted a minimum of 1/4 page advertising for JFP.*
 - C. Except for inside front cover, all ads will be placed in back of journal. **Board action:** *Approved.*
2. The Committee recommends the re-appointment of Larry Beuchat as Scientific Co-Editor for another 4-year term. **Board action:** *Approved.*

Program Advisory Committee

1. Proposed symposia topics: 4 Dairy, 2 Seafood, 6 Meat & Poultry, 3 Food Service, 1 Produce, and 4 ILSI. **Board action:** *None.*

SPECIAL COMMITTEES:

**Committee on Communicable Diseases
Affecting Man**

1. Communicate (in writing if practical, or if not, by phone) with Committee Chairs about action or inaction taken as a result of deliberation about each

recommendation that has been made in the annual report or other committee-initiated communications.

Board action: *Discussed and agreed that Vice President should write to each Committee Chair regarding action taken on recommendations.*

2. Develop a more effective means of communication with active committees about future plans and proposals, expenses, and other matters of committee concern rather than at the Committee/Program Development Group Chairs and Board Breakfast. These could be brief (10-15 minute discussion; some committees would use far less time) individual meetings at sometime during the Annual Meeting; it could even replace the Breakfast because few Committee Chairs have particular interest in what other committees are doing and it would probably not take any more time. If so, this should be part of the discussion initiated by the Executive Board during the Committee Meeting. **Board action:** *Discussed the possibility of a round-table discussion rather than the Committee Breakfast for 1998.*
3. Reconsider the pricing of the manuals that the committee developed so that they are sold to all at as low a price as feasible without a financial loss. The manuals represent a technical contribution of the association to public health and environmental agencies, universities, students and associated industries throughout the world, and not a means for generating income for the association. If the price is as low as possible, greater quantities will be sold and used throughout the world, which is the objective of the committee. **Board action:** *Discussed pricing methods and determined booklets to be priced at lowest selling cost currently. Governmental and state agencies are able to purchase at member price.*
4. The committee requests that professional development groups, which relate to the various food industries, review Table F of the HACCP manual and provide input for revision of information on hazards, critical control points, control criteria and monitoring procedures for consideration of the committee for use in revising the table and manual. These can be sent directly to the Chair of the Committee on Communicable Diseases Affecting Man or to the Executive Director, who would forward them to the Committee Chair. **Board action:** *Table F will be sent to food industry PDGs requesting input. Vice President will mail as an attachment to these recommendations.*

Executive Board Recommendations, continued

5. Combine the four-part series on surveillance of foodborne diseases that has been published recently in the *Journal of Food Protection*, add a cover and sell it at a nominal price. Promote its availability and use to improve surveillance at international, national, state/provincial, and local levels. **Board action:** *Pricing justification was discussed and accepted.*
6. Committees need a medium, which ought to be an association journal, for communication to members and other interested persons about technical aspects related to their objectives and charge. This should exceed the scope of brief administrative reports such as this one. The *Dairy, Food and Environmental Sanitation* journal could serve this purpose, but the *Journal of Food Protection* could offer this service if the association would waive page charges, which should be waived for association committee business anyway. This would stimulate committees to become more productive and a means to communicate technical information to members and the professional sanitarian. This suggestion would also improve the *Dairy, Food and Environmental Sanitation* journal if that journal is used for this purpose. **Board action:** *Approved a committee page in DFES and inviting committee and PDG Chairs and members to submit articles of interest.*
7. Promote the availability and use of the manuals in columns and articles written, during discussions with colleagues, in training courses, at professional meetings, by advertisements in journals of associations that relate to the topics of the manual, and in other appropriate ways. **Board action:** *Encouraged promoting the availability of the manuals in columns. Discussed feasibility of advertising in journals and determined cost of placing advertisements would be prohibitive.*
8. The IAMFES headquarters should sell the manuals at the Annual Meetings. This would be a good time to promote the manuals and reach an international and regional audience. A discount price could even be offered as a benefit of attending the national convention. This could be done at the registration desk, in the exhibit area, or the IAMFES hotel office, as practicable. **Board action:** *Discussed selling manuals at Annual Meetings. Sales tax issues in various states prohibit that action. The booklets and order forms are on display at the Annual Meeting and short of applying for sales tax permit, this is the best option. The Board also encouraged including the booklets on shipments to FAO Rome for distribution to developing countries.*

Committee on Sanitary Procedures (3-A Sanitary Standards)

As this committee interacts directly with the 3-A Sanitary Standards Committees and U.S. Public Health Service, it is a unique and large part of what IAMFES does as the exclusive publisher of the 3-A Sanitary Standards and

Practices. It is important that IAMFES support and publicly recognize the work and accomplishments of this committee. **Board action:** *Met with Dan Erickson, CSP Chair, and talked with Vince Mills about 3-A Sanitary Standards.*

PROFESSIONAL DEVELOPMENT GROUPS:

Applied Laboratory Methods Professional Development Group

To reschedule this committee meeting prior to the other conflicting groups including Poultry Quality & Safety, the Meat Quality & Safety, & Seafood Quality & Safety and reduce time to 1 hour after which members could attend other groups. **Board action:** *Accepted recommendation to reschedule meeting time and reduce to one hour.*

Audio-Visual Library Professional Development Group

1. IAMFES Board approves FV 1997-1998 budget of \$9,000. **Board action:** *Approved budget of \$9,000 for Lending Library.*
2. Continue to pursue the IAMFES Foundation partial funding of the AV Lending Library. **Board action:** *Agreed to pursue additional funding for the AV Library.*
3. Thanks to IAMFES staff for their excellent work. **Board action:** *Agreed.*

Dairy, Quality and Safety Professional Development Group (Farm and Plant in Joint Session)

1. That Gaylord Smith is appointed the new Chairperson and that a Vice Chairman/Sec. also be named. **Board action:** *Approved Gaylord Smith as Chairperson and Wally Jackson as Vice Chairperson.*
2. That the Sub-Committee on "Education Development" is eliminated. **Board action:** *Agreed on elimination of Education Development Sub-committee.*
3. Donald Breiner is representing the PDG on the Program Advisory Committee and we request this continue. **Board action:** *Discussed and agreed.*
4. Recommend the Executive Board ask National Milk Producers not to meet at the same time as the Dairy PDG. **Board action:** *Directed that National Milk Producers not meet on Sunday with conflicting times.*

Food Safety Network Professional Development Group

1. Establish a web home page as soon as possible. This activity should be adequately funded, as it is important for the association visibility. **Board action:** *Web page has been established.*

2. Encourage IAMFES to include Educational CD-ROMs in the Video Library. **Board action:** *Need sources and contacts for CD-ROMs.*

Food Sanitation Professional Development Group

1. The IAMFES Board send complimentary copies of "Before Disaster Strikes... A Guide to Food Safety in the Home," to key organizations who could benefit from this information. **Board action:** *Agreed to importance and request mailing lists or groups to share this information with is provided to the IAMFES office by Food Sanitation PDG.*
2. The Board accepts Peter Snyder as Chair of the Food Sanitation PDG and Alice Haverland as Vice-Chair. **Board action:** *Accepted Pete Snyder as Chair and appointed Gloria Swick as Vice Chair. (Note, Alice Haverland withdrew her name.)*

Meat Safety and Quality Professional Development Group

1. Recommend that Poultry Safety and Quality and Meat Safety and Quality PDG meetings not be held at the same time. **Board action:** *Directed that schedule is revised for PDG meetings.*
2. Recommend that there is a liaison between the two PDGs to coordinate symposia. **Board action:** *Recommended combining Meat Safety and Quality and Poultry Safety and Quality PDGs into one: Muscle Foods PDG. (Pending Chairperson's approval.)*

Microbial Risk Assessment Professional Development Group

IAMFES should consider identifying IAMFES members involved in Risk Assessment in the Food Protection Register to facilitate information exchange. **Board action:** *Ask PDG members for names to add to the Food Protection Register.*

Poultry Safety and Quality Professional Development Group

Our group recommends that in future years that the meetings of the Poultry Safety and Quality and Meat Safety and Quality Professional Development Groups not meet at the same time and that instead of separate groups, one separate muscle foods PDG be formed to create a critical mass of participants. **Board action:** *Recommended revising schedule for next year's PDG meetings and Poultry Safety and Quality and Meat Safety and Quality PDGs be combined into a Muscle Foods PDG. (Pending Chairperson's approval.)*

Seafood Safety and Quality Professional Development Group

Support irradiation as a technology that should be approved for certain seafood. **Board action:** *Request a white paper on this topic and send guidelines for writing a paper for IAMFES.*

Viral Foodborne Disease Professional Development Group

The Viral Foodborne Disease PDG recommends incorporation of parasitic agents into the PDG charge, thereby changing the name to Viral & Parasitic Foodborne Disease Professional Development Group. **Board action:** *Approved changing the name to Viral and Parasitic Foodborne Disease Professional Development Group.*

TASK FORCES:

Education Task Force

1. Establish a site under IAMFES web page to list the web sites of food safety education materials. **Board action:** *Web page is active. If links are available, please provide to IAMFES office.*
2. Develop a list of IAMFES members willing to serve as resources for teachers. **Board action:** *Encouraged development of a list and request that the Education Task Force solicit members and develop such a list.*

SUPPORT GROUPS:

Affiliate Council Support Group

Establish a second Affiliate Membership Award based on a % increase in affiliate's membership. **Board action:** *Approved the second membership award based on % increase in affiliate's IAMFES membership.*

Foundation Fund Support Group

1. In the future a list of all the supporters of the Foundation Fund, including sustaining members, be inserted in each registration packet. **Board action:** *Agreed that a list of supporters should be inserted in each registration packet at Annual Meeting.*
2. The protocol of annually identifying supporters of the Foundation Fund in the DFES journal is continued. **Board action:** *Agreed that supporters of the Foundation Fund should be identified in DFES journal on at least a quarterly basis.*
3. For the next three years the Foundation Fund's slogan will be \$100,000 in 2000. Periodically a thermometer of progress will be published. **Board action:** *Agreed on using the slogan "\$100,000 in 2000."*
4. To meet the Foundation's goal in 2000, a silent/live auction is permitted during each Annual Meeting. **Board action:** *Agreed a silent auction during the Annual Meeting would be permitted. Discouraged the use of a live auction.*
5. The Foundation Fund budget of \$18,000 for the year ending 08-31-98 is approved. This includes \$1,000 in support of the Crumline Award. **Board action:** *Approved.*
6. Express the Foundation Fund's appreciation for the work carried out by the staff. **Board action:** *Agreed.*

NewMembers

ARGENTINA

Graciela L. DeAntoni
CIDCA, LaPlata, Buenos Aires

BRAZIL

Jose G. Amoril
DFA-GO/SIF, Goiânia, GO

CANADA

Lucy Beck
Crossroads Health Region
Wetaskwin, Alberta

Yvon Fortier
Longueuil, Quebec

CHINA

Kwok Man Tsui
Shanghai Shen-Mei Conc Div.
Shanghai

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University of Ioannina, Ioannina

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Sookmyung Women's University
Seoul

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Javier O. Leon
Consumer Health & Food Safety
Tucson

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National Food Processors Assn.
Dublin

Lori Menke
Canyon Country

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Mary Margaret Harris
McDonough Co. Health Dept.
Macomb

INDIANA

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Good Humor-Breyers, Huntington

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Reser's Fine Foods, Baltimore

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Charles S. Shasteen
Novus International, Inc., St. Charles

NEBRASKA

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Crete Mills, Crete

Louis D. Skogen
ConAgra Frozen Foods, Omaha

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Maryann Lienhard
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O'Neal, Inc., Raleigh

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Oregon State Dept. of Agriculture
Salem

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FERMPRO, Kingstree

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Madison

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Chem-Seal C.A., Maracay, Aracua

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New Executive Vice President

The Dairy Practices Council announces the appointment of Terry B. Musson to succeed Donald F. George as Executive Vice President. Donald George announced last year that he would not renew his contract with DPC when it terminated the end of 1997.

Mr. Musson obtained his bachelor of arts degree in biology from Drake University, Des Moines, IA. Since then he has had many management and technical courses including law and investigational techniques, HACCP, advanced training for milk specialists, condensed and dry milk technology, and advanced workshop in milk processing.

Terry started his career as a Research Chemist for Pioneer Hybrid Corn Company, Des Moines, IA, in 1961. In 1963 he was hired by the Food and Drug Administration as an Investigator serving in three locations: Kansas City, MO, San Juan, Puerto Rico, and Hicksville, N.Y. From 1983 to the present, he has served as a Senior Regional Milk Specialist. Terry is a long-time member of The Dairy Practices Council and served a term on the DPC Executive Board. Terry is also a member of IAMFES and the IAMFES Affiliates of New York (NYSAMFES) and Metropolitan (MADFES).

Tri-Clover Announces Management Change

Giuseppe Falciola, Chairman of Kenosha, WI-based Tri-Clover Inc., has announced the resignation of its President, Ole B. Andersen. Quint Jackson, President of Alfa Laval Inc., the parent company of Tri-Clover, will serve as Acting President until a successor is appointed.

Jackson has been with Alfa Laval for 20 years, and has been a member of Tri-Clover's Board of Directors since 1992.

During recent years, Tri-Clover has implemented change in their distribution strategy, improved manufacturing processes, and aggressively developed new products. In addition, a dedicated, nationwide network of qualified distributors was established, to specialize and focus on the application needs of customers within their individual territories.

Mike Palmer Joins the ICIC Team

Mike Palmer, President of Palmer-Tech Services, has joined the International Can Industry Council (ICIC) as an Industry Consultant. The ICIC is a group of over 80 suppliers to the world's metal packaging industry. It operates as an industry council of the Food Processing Machinery & Supplies Association (FPM&SA).

Palmer-Tech is an international representative and distribution company that specializes in providing can making tooling, spare parts, and raw materials to various markets in Latin America, Asia, and the Middle East. Prior to forming Palmer-Tech, Mike Palmer worked for Adolph Coors (ACX) Technologies Company and Buhrke Tech International.

Palmer and Raul Martinez of Venezuela established the Latin American Can Makers and Fillers Association, which has brought can makers in Latin America together with suppliers in four major conferences. "We look forward to the addition of the Latin American Can Makers to the Can Industry Pavilion, which already enjoys the

endorsement of the Can Manufacturers Institute in the United States," concluded Melnykovich.

AFFI Elects New Officers, Directors

The American Frozen Food Institute (AFFI) elected new officers and board of directors members at its 57th Annual Meeting held in Las Vegas, Nevada during the National Frozen Food Convention.

H. Reid Wagstaff, Vice President of Government and Environmental Affairs, The J. M. Smucker Company, Salinas, CA, was elected AFFI Chairman of the Board. He was previously First Vice Chairman.

George A. Franklin, Vice President of Worldwide Government Affairs, Kellogg Company, Battle Creek, MI, was elected First Vice Chairman. He was previously Second Vice Chairman.

Kathleen Kelly Spear, Vice President and Deputy General Counsel, Kraft Foods, Inc., Northfield, IL, was elected Second Vice Chairman.

William S. Smittcamp, President, Wawona Frozen Foods, Clovis, CA, became AFFI Immediate Past Chairman of the board following his one-year term as Chairman.

AFFI also elected the following new members to its 24-member Board of Directors to serve three-year terms: Theodore C. Cronk, Vice President of Scientific and Regulatory Affairs, The Pillsbury Company, Minneapolis, MN; Gary Harrison, President, Mrs. Smith's Bakeries, Inc., Duluth, GA; Lyle Hubbard, President and Chief Executive Officer, Gardenburger, Inc., Portland, OR; James E. Matthews, Vice President of

Technical Services, Ore-Ida Foods, Inc., Boise, ID; Howard Miller, Government and Industry Relations Manager, Schwan's Sales Enterprises, Inc., Marshall, MN; H. Joseph Remington, President and Chief Operating Officer, Better Baked Foods, Inc., North East, PA; George Ann Stokes, Senior Vice President and General Counsel, The Minute Maid Company, Houston, TX; and James T. Smith, President and Chief Operating Officer, ConAgra Frozen Foods, Omaha, NE.

AFFI also elected Ben Frega, President and Chief Executive Officer, Curtice Burns Foods, Rochester, N.Y., to fill the vacancy on the board created by the election of Kathleen Kelly Spear as Second Vice Chairman.

Domas and Berg Join Motomco's Rodent Control Products

Douglas Domas and Joel Berg joined Motomco Ltd., a manufacturer of rodent control products, this fall as Technical Sales Representatives for the southeastern and north central states, respectively.

As part of Motomco's sales and marketing team, they work with Motomco accounts in the animal health industry, including farm stores, and animal health distributors. Domas's territory includes Kentucky, Virginia, eastern Tennessee, North and South Carolina, Alabama, and Florida. Berg works with accounts in North and South Dakota, Minnesota, Nebraska, Iowa, Illinois, Kansas, Missouri, and Wisconsin.

Domas was a Sales Representative in the southeast U.S. for Blue Mountain Industries, an established industrial thread manufacturer in Alabama, before joining Motomco. He also developed firsthand knowledge of retail sales while managing a store for Wal-Mart, Inc.,

in Lafayette, LA. A native of Louisiana, Domas received a bachelor of science degree in commerce and business administration from the University of Alabama in 1993.

Berg came to Motomco from Legend Seed, Inc. in South Dakota where he was District Sales Manager, marketing and selling hybrids/varieties and managing a dealer network in Iowa, Minnesota, Nebraska and the Dakotas. Raised on a 1500-acre farm in South Dakota, Berg earned a bachelor of science degree in agricultural business from South Dakota State University in Brookings where he was an active member in Alpha Gamma Rho Fraternity. In the summers of 1989 and 1990, he was an Intern Crop Consultant and Scout for Quaker Oats.

Domas will be based in Atlanta, GA, and Berg will be located in Des Moines, IA.

IDEXX Announces New Director of International Food Safety

IDEXX Laboratories, Inc. announced that Dr. Ranzell "Nick" Nickelson, II has joined IDEXX as Director, International Food Safety. Dr. Nickelson comes to IDEXX from Red Mesa Microbiology in Austin, TX where he served as President. His food safety experience spans a wide range of products including seafood, meats, acidified foods, and fresh fruits and vegetables. He is an Adjunct Professor at Texas A&M University, as well as a retired Colonel in the U.S. Army Reserve. His professional accreditations include involvement with the International Meat & Poultry HACCP Alliance, the International Seafood HACCP Alliance, and the National Advisory Committee on Microbiological Criteria for Foods; Coordinator of the Blue Ribbon Task Force on *E. coli* for the National Live Stock

and Meat Board; and Contributing Editor for *National Provisioner* magazine, Food Safety section and a member of IAMFES.

Dr. Nickelson will oversee IDEXX Food Safety Net™ products and services operations in Latin America, Europe, and the Far East. "We'll be heavily involved in education programs centered around both food quality and safety. Our key focus will be on becoming proficient with CODEX standards and specifications for food safety and on educating our customers as to how IDEXX products can help meet these standards," Dr. Nickelson said. His vision for the International Food Safety Division includes a "one-stop shopping" approach for the global market, which would include all of IDEXX's food and environmental products through the IDEXX Food Safety Net™. IDEXX's goal is to help customers ensure the quality and safety of foods imported to the U.S. and traded in the international marketplace.

A & B Strengthens Commitment to Western U.S.

A & B Process Systems Corp. announces the appointment of William R. Griffin as Vice President-Western Division.

Griffin comes to A & B with a strong background in processing environments. Previously employed by another international provider of process flow systems and related equipment, he has served key technical and managerial roles in turn-key projects.

Griffin will maintain A & B's Western Division office in Portland, Oregon. His primary focus will be sales and service of existing accounts, as well as new account development. Griffin holds a Bachelor of Technology degree in mechanical engineering from the Rochester Institute of Technology in Rochester, NY.

Brodsky Receives Amethyst Award

The fifth annual Amethyst Awards ceremony for outstanding achievement by Ontario public servants took place on December 3, 1997.

This award heralds the efforts of many individuals across the Ontario Public Service who have shown an exemplary commitment and significant contribution to their work and their profession.

Michael H. Brodsky, Chief, Environmental Bacteriology and Microbiological Support Services, Ontario Ministry of Health was recognized for over 25 years of professional excellence in microbiology.

Mr. Brodsky attributes many of his achievements to his involvement with national and international professional associations and the resulting networks that he established. He continues to be very active in his local IAMFES affiliate, the Ontario Food Protection Association, where he served two terms as President, 1988 and 1992. In addition, Mr. Brodsky was the Local Arrangements Chair for the IAMFES Annual Meeting in Toronto in 1992. Mr. Brodsky was President of IAMFES in 1996/97 and currently serves on the IAMFES Executive Board as Immediate Past President.

Food Safety and Inspection Service Statement on Results of *E. coli* O157:H7 Sampling Program

Based on another year of survey results in sampling for *E. coli* O157:H7, and significant steps being taken by industry and government through new technology and testing procedures, the U.S. Department of Agriculture's Food Safety and Inspection Service is pleased with our progress on making the world's safest food supply even safer.



NEWS

The third fiscal year of the FSIS sampling program for *E. coli* O157:H7 ended on September 30 with two positive results in FY 1997, bringing the total number of positive samples to nine in about 16,500 samples that have been taken by FSIS personnel in federal plants, retail stores, state inspected plants and import establishments since October 1994. There were three positives in FY 1995 and four positives in FY 1996. There have been no large outbreaks of foodborne illness associated with *E. coli* O157:H7 from hamburger since the 1993 outbreak in the western states, leading us to conclude that the beef industry has indeed responded to the USDA declaration of *E. coli* O157:H7 as an adulterant.

Reports of positive samples by the media should not detract from news of the important steps being taken by the industry to improve the safety of meat and poultry or relieve food preparers of responsibility to properly store and cook meat and poultry. Current control measures and testing, however, cannot prevent all pathogens in raw meat and poultry products. Thus, it is necessary for continuing improvement in industry practices to minimize the risk.

The recent *E. coli* O157:H7 findings also highlight the necessity that consumers use caution in the

cooking and handling of raw meat and poultry products to prevent foodborne illness. We must continue to stress the importance of cooking ground beef to 160 degrees Fahrenheit to destroy bacteria that go undetected in raw ground beef.

The industry has actively responded to the implementation of new meat and poultry inspection rules and is already making significant changes. Many companies are implementing new preventive controls, developing their Hazard Analysis and Critical Control plans and testing their products for bacteria in advance of regulatory requirements. All plants now have standard sanitation operating procedures, and slaughter plants are testing for generic *E. coli* to determine their compliance with performance standards set by FSIS.

These initiatives are building on U.S. worldwide leadership in providing the safest food supply for consumers. For further information contact: FSIS Food Safety Education and Communications Staff, Public Outreach and Communications; Phone: 202.720.9352; Fax: 202.720.9063.

Alfa Laval Moves Management of Dairy Farm Business to Kansas City

Alfa Laval Agri of Tumba, Sweden, announces that it has restructured its worldwide Hygiene Business Unit, which serves dairy producers and the food processing industry and has transferred management responsibilities for the group to the company's Kansas City offices. This management transition was effective October 1, 1997.

Bohman has appointed Bill Papineau, President of West Agro, Inc., as General Manager for the Hygiene Business Unit. Assisting Papineau in management of the Business Unit are Terry Mitchell, newly appointed Executive Vice

President of farm business, Tom Fahey, newly appointed Executive Vice President of industrial business, and Tom Hemling, Vice President of global technology.

FDA Publishes Substantial Evidence Proposed Rule

In the November 5, 1997, Federal Register, FDA published a proposed regulation to amend the definition of substantial evidence of effectiveness of new animal drugs. The purpose of this proposed regulation is to encourage the submission of new animal drug applications (NADA's) and supplemental NADA's for single ingredient and combination new animal drugs. The proposal also encourages dose range labeling. The proposed rule implements, in part, the Animal Drug Availability Act of 1996, which amended the Federal Food, Drug, and Cosmetic Act to provide for improvements in the process of approving and using animal drugs, and for other purposes.

The Federal Register notice for this proposed rule is available for review or downloading on CVM's Internet Website: <http://www.cvm.fda.gov/>. Paper copies are available from the Communications Staff, FDA/Center for Veterinary Medicine, HFV-12, 7500 Standish Place, Rockville, MD 20855; Phone: 301.594.1755.

Written comments on the proposed rule must be submitted by February 3, 1998. All comments should be sent to the Dockets Management Branch (HFA-305), Food and Drug Administration, 12420 Parklawn Drive, Room 1-23, Rockville, MD 20857. Please identify comments with the Docket Number 97N-0435.

Questions about this rule may be directed to Herman M. Schoenemann, Center for Veterinary Medicine (HFV-126), Food and

Drug Administration, 7500 Standish Place, Rockville, MD 20855; Phone: 301.594.1638.

A.D.P.I. Invites Nominations for 1998 Award of Merit

The American Dairy Products Institute invites the submission of nominees to receive its 1998 Award of Merit. Established in 1991, the purpose of the award is to recognize individuals who have made outstanding contributions to the processed dairy products industry. The first Award of Merit recipient was M. E. "Mel" Franks, M. E. Franks, Inc., who was recognized posthumously at the 1992 Annual Meeting of the American Dairy Products Institute. Subsequent recipients of the Award of Merit were: William F. Dietrich, Dietrich Milk Products and Nico van Zwanenberg, Cuba Cheese, Inc., in 1993; Harvey H. Ebert, Land O'Lakes, Inc., in 1994; Wesley E. Eckert, Darigold, Inc., 1995; William A. Diehl, Diehl Inc., in 1996; and Donald C. Storhoff, Foremost Farms USA and Robert E. Vaughn, Maryland & Virginia Milk Producers Cooperative Association, in 1997. Individual(s) selected to receive this year's Award of Merit will be honored at the 1998 Annual Meeting of the Institute, to be held at The Fairmont Hotel at Grant Park, Chicago, IL, on April 26-28, 1998.

Persons wishing to nominate individuals to be considered to receive the American Dairy Products Institute's 1998 Award of Merit may submit the candidate's name in a brief letter of nomination to either Dr. Warren S. Clark, Jr., Chief Executive Officer, American Dairy Products Institute, 300 W. Washington St., Suite 400, Chicago, IL 60606-1720, or to Ms. M. Jane Carlisle, Jr., Chairman of the Institute's Affiliate Member Committee, c/o United International

Industries, Inc., 104 Mullach Court, Suite 2000, Wentzville, MO 63385.

AFFI Priorities Enacted in FDA Modernization Bill

The Food and Drug Administration (FDA) modernization legislation signed into law by President Clinton addresses priorities of the American Frozen Food Institute (AFFI), including a reduction in the red tape involved in the health and nutrient content claim approval process and the facilitation of the use of irradiation as a food safety technology.

AFFI expressed its satisfaction with these achievements and urged continued vigilance to achieve more comprehensive reform involving federal uniformity for food regulations.

"This legislation delivers a more reasonable and less bureaucratic method for providing to consumers important health and nutrition information. It could also open the door to a technology widely regarded as an important food safety tool," said Steven C. Anderson, AFFI's President and Chief Executive Officer.

Regarding health and nutrient content claims, the *Food and Drug Administration Modernization and Accountability Act of 1997* requires FDA to adhere to a specific timeline under which the agency must act on a health claims petition. As an alternative to petitioning FDA for approval, the bill allows health and/or nutrient content claims to be made based on consistency with a public statement made by a U.S. authoritative scientific body responsible for public health protection.

The new law also establishes a new policy for disclosure statements relating to the use of irradiation on food that would prohibit any requirement that such a

disclosure be more prominent than the declaration of ingredients statement. The bill requires FDA to act, within 60 days, on a three-year-old petition to allow irradiation of beef.

G&H Products Earns ISO 9002 Certification

G&H Products Corp. was officially recommended for ISO 9002 certification by Lloyd's Register Quality Assurance.

ISO 9002 means that quality assurance standards at G&H comply with international regulations. Only 33% of companies get recommended for certification on their first try.

G&H Products Corp. is a full-line supplier of stainless steel pumps, valves, and measuring and control equipment.

Research Published in *Lancet* Says Folic Acid Reduces Risk of Spinal Cord Birth Defects — Orange Juice Most Popular Source of Folic Acid in American Diet

Recent research published in the British journal *Lancet* recommends adding folic acid to women's diets during childbearing years to reduce the risk of spinal cord birth defects. The study also shows that even a small amount of folic acid a day can have a strong effect on the number of babies born with neural tube defects. Unfortunately, a recent March of Dimes/Gallup survey found that while two out of three women (66 percent) have heard of folic acid, about half (51 percent) were unable to name even one food item that was a good source of folic acid.

Orange juice is the most popular source of folic acid in the American diet, according to the

United States Department of Agriculture. Two eight-ounce glasses provide about half of the recommended amount of 400 micrograms per day.

"The fact that women are becoming aware of folic acid is extremely positive; but it's even more important that women recognize and consume foods containing folic acid, like orange juice, that may increase their chance of having a healthy baby," said Carla R. McGill, Ph.D., R.D., M.T., Department of Family and Community Medicine, Medical College of Wisconsin. Orange juice is one of the most nutrient-dense beverages available. In addition to folic acid, it provides vitamin C, potassium and thiamin.

U.S. Bans Imports of Guatemalan Raspberries

The U.S. Food and Drug Administration has announced that imports of raspberries from Guatemala for 1998 have been blocked after outbreaks of foodborne illness were linked to the imported fruit during the past two seasons.

The story says the unusually harsh action came amid the FDA's efforts to carry out a Clinton Administration initiative to improve the safety of domestic and imported produce and fruit. Robert Lake, Director of Policy for the FDA's center for food safety, was quoted as saying, "We've taken the extraordinary step of informing the Guatemala government that raspberries will not be accepted from this country until this problem is solved."

Lake was cited as saying at a day-long FDA meeting on food-safety issues that the ban becomes effective March 15 and continues through August 15, the normal Guatemala raspberry exporting season. Roberto Rosenberg of the Guatemala Embassy in Washington

was cited as saying that the nation had voluntarily halted exports of raspberries in May following an outbreak of the *Cyclospora* disease among U.S. consumers last spring, adding, "We are still cooperating with the FDA to see how things are going to work next year."

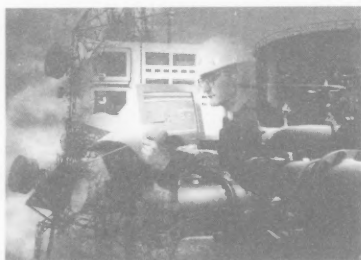
The story adds that more than 1,300 cases of *Cyclospora* infection were reported in 1997 to the Federal Centers for Disease Control and most were linked to Guatemalan raspberries.

Vegetable Plant Sanitation Training Video—Available in Spanish and English

Looking to improve the skills and safety of your sanitation crew? Tired of giving sanitation lectures? With the high turnover in today's labor force, good training videos are essential. The University of Wisconsin-Extension, in cooperation with Chaska Chemical Co., Inc. and Friday Canning Corp., has produced a 15 min. sanitation training video in English and Spanish. "Cleaning and Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!" teaches the different purposes of cleaning and sanitizing, the steps in the basic cleaning sequence, important types of cleaning and sanitizing chemicals, and personal safety procedures for sanitation personnel. Footage for the videos was shot during the sanitation shift at a Wisconsin cannery.

The English and Spanish videos may be purchased separately (\$25 each) or as a package (\$40). To order this training tool, contact Steve Ingham, University of Wisconsin-Madison, Department of Food Science, 1605 Linden Drive, Madison, WI 53706-1565; Phone: 608.265.4801; Fax: 608.262.6872; E-mail: scingham@facstaff.wisc.edu.

IndustryProducts



Solartron, Inc.

SCADA System for Widely Distributed Applications Increases Plant Productivity and Safety

Solartron, Inc., has added Plantwatch to its portfolio of third-party SCADA systems for IMPs (isolated measurement pods). Developed for round-the-clock surveillance and supervisory control of widely dispersed sites, the system is ideal for such applications as monitoring the integrity of pipelines or large-scale cold-storage facilities. Plantwatch consists of ruggedized, high-reliability remote controllers with full-feature SCADA software built-in, linked by modems to the master station for centralized analysis, reporting and site management.

Key to Plantwatch is the Windows-based Master Station which monitors and controls all remote units over local communication lines, or via the public telephone network. This communication flexibility enables automatic dial-out to a pager or fax machine

in the event of an alarm condition, providing an efficient method of keeping engineering staff in touch with events 24 hours per day. Additionally, the engineer can connect and examine activity utilizing a laptop PC slaved to the master station, allowing potentially hazardous sites to be monitored remotely in complete safety.

Graphical tools in the master station facilitate the set-up of the remote data controllers and allow results to be presented in a wide variety of formats. Data from remotes can be viewed in real time at the master station — an extensive plant mimic library simplifies the creation of process diagrams for use at both central and remote locations, while built-in trend graphs allow process variables to be tracked over time, including parameters used for a condition-based maintenance strategy.

Remote controllers interface local data acquisition and control systems via the communications links to the master station. Utilizing proven industrial PC hardware and software, Plantwatch controllers support distributed data acquisition units, for example Solartron's IMPs — PC plug-in I/O cards and PLCs, allowing powerful remote monitoring stations to be constructed easily. Built into a wall- or rack-mounted IP50 steel enclosure, Plantwatch controllers are designed to be installed and left. In the event of a system malfunction, a built-in watch-dog timer ensures that the

system fully recovers and resumes logging. Optionally the controller can be synchronized with other equipment using a radio-based time standard, ensuring consistent time/date operation across the complete potentially nationwide installation.

Solartron, Inc., Allentown, PA

Reader Service No. 345

Rapid Microbial Testing with Epifluorescent Microscopy

Epifluorescent microscopy from Osmonics allows the direct observation and counting of viable and non-viable microorganisms in less than 30 minutes. This technique compares with traditional culturing methods which may require incubation times of up to 72 hours. Traditional culturing methods also lead to large underestimates of the total number of microorganisms in a sample due to the selective nature of the media employed, lack of detection of non-viable microorganisms, and the tendency of microorganisms to form into clumps or microcolonies.

The epifluorescent microscopy technique is useful in research and for microbial quality control in ultrapure water, wine and other beverages, food and dairy products, parenterals, petroleum-based products, potable water and other liquids.

Microorganism counts obtained by using the epifluorescent micros-

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copy technique represent the total population of viable and non-viable microorganisms. This technique provides significantly improved sensitivity over traditional culturing and pour-plate procedures.

Poretics® black polycarbonate membrane filters provide the same advantages as regular polycarbonate membranes, but also are specially treated to give an exceptionally low autofluorescence. This characteristic permits high viability of microorganisms on the surface of the membrane against a non-distracting background.

Osmonics, Minnetonka, MN

Reader Service No. 346

New Cleaning System Enhances HACCP Program Application

DuBois has developed the new design concept of Localized Central Cleaning Systems. The system is the perfect tool in HACCP program application. Accuracy, consistency, ease of use and simplicity in design make it the ideal for controlling and verifying correct chemical use.

This new line of chemical dispensers eliminates set-up time and reinforces the safety standard set by the DuBois Color Code Program. Designed to be affordable, the Localized Central Cleaning Systems effectively replace tank and eductor style foamer and sanitizer units. They provide use dilution cleaning chemical simultaneously to multiple locations at the correct concentrations without employee handling of concentrates. The Sanitizer system, when used with the appropriate DuBois EPA *no rinse* sanitizer, provide an easy medium for hand, glove, utensil and area 'disinfection' during production.

DuBois, Cincinnati, OH

Reader Service No. 347

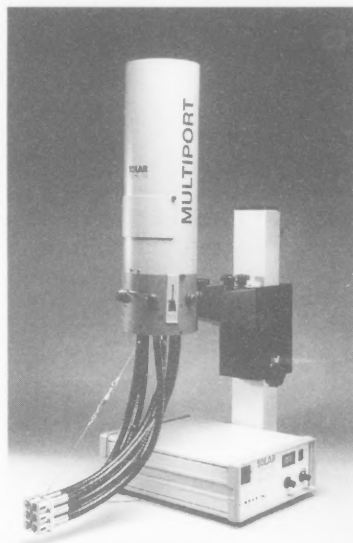
bioMérieux Vitek Offers Anaerobe Identification Test Kit

bioMérieux Vitek API 20A® manual test kit for the biochemical identification of anaerobic bacteria is now available. The API 20A test kit is a micromethod consisting of 20 dehydrated biochemical substrates for the identification of anaerobes.

The API 20A features an easy-to-use, well-defined database of 77 taxa. It offers rapid results compared to conventional methods and is cost effective. The kit contains 25 test strips, incubation trays and lids, report forms and basal medium ampules.

bioMérieux, Hazelwood, MO

Reader Service No. 348



Solar Light Company, Inc.

Multiport UV Simulator Delivers Six Doses Simultaneously

The model 601 Multiport UV Simulator from Solar Light Company combines the performance of up to six ultraviolet simulators in one compact unit.

By incorporating six independent outputs, the instrument allows simultaneous dosing and monitoring at varied and adjustable intensity levels. Typical applications would include testing materials such as plastics, paints, inks, dyes and textiles; measuring the protection factors of sunscreens, cosmetics, fabrics, and glass coatings.

Designed to replicate the ultraviolet spectrum of the sun, but at a much higher intensity, Solar Light UV simulators use a precision optical system with a xenon light source. Compared to using natural sunlight, this system enables testing of materials in only minutes instead of hours, or in days instead of years.

In addition to six continuously and individually adjustable outputs, the Model 601 Multiport UV Simulator features snap-in, flexible liquid light guides (LLGs) that produce uniform 9mm spots; an adjustable stand and lamp position control; an over temperature alarm; and an automatic ignition system that reduces electromagnetic interference. The operator may select the complete solar UV spectrum or UVA only. The Solar Light Multiport system includes a UV meter, end-plate, and power supply. Options include LLG end holders, bench mounting, and a microprocessor-controlled dose control system.

Solar Light Company, Inc., Philadelphia, PA

Reader Service No. 349

New Tween® Detergents Preserve Protein Function

Two new low-peroxide, low-carbonyl Tween® detergents that protect sensitive proteins against the undesirable actions of peroxides and carbonyl groups have been added to the comprehensive line of Sigma products. Specially purified and packaged under an inert atmosphere, Tween® 20R

(Polyoxyethylensorbitan Monolaurate) and Tween® 80R (Polyoxyethylensorbitan Monooleate) provide consistent results without altering protein function. The products are ideally suited for isolating, purifying, and preserving nonspecific binding proteins; manufacturing recombinant proteins, solubilizing specimens; maintaining reagents in solutions; and performing lysis of cells.

Tween® 20R and Tween® 80R are specially formulated to protect sensitive proteins from oxidation and denaturation. Total peroxide is certified at $\leq 0.5 \mu\text{mol/g}$; carbonyls at $\leq 1.0 \mu\text{mol/g}$ for Tween® 20R and Tween® 80R. To promote long shelf life without peroxide formation, both detergents have also been stabilized with an antioxidant.

Tween® 20R and Tween® 80R are available in undiluted 10 ml and 100 ml bottles, permitting easy dilution to desired concentrations without waste. Sigma also provides over a dozen commercial Tween® products, including Tween® 21, 40, 60, 61, 65, and 85. As with all Sigma products, Tween® detergents are backed by Sigma's comprehensive technical support and fully stocked and available for same-day shipment.

Sigma, St. Louis, MO

Reader Service No. 350

Ecolab Puts Water to Work for Dairy Processors

Hundreds of thousands of gallons of water flow in and out of a dairy plant every single day. With that water can come exorbitant water bills, lost revenue due to product washing down the drain, sewage surcharges and penalties for Biological Oxygen Demand (BOD) and inorganic compounds. Ecolab has launched a new program to help dairy processors control these water-related expenses: Water Worx™.

The program combines state-of-the-art equipment and engineering expertise to help processors optimize water use and reuse, recover useable product and control effluent. WaterWorx includes assessment and evaluation tools, controllers, CIP systems, custom engineering capabilities and design expertise.

WaterWorx is designed to help processors capitalize on four main opportunities for savings:

Use less water. With the help of Ecolab's experts, the same cleaning and sanitation results could be achieved with as little as one gallon of water; **Send less water to the drain.** Limiting water use and reusing water for pre-rinsing and washing can significantly reduce sewage costs; **Recover more milk solids.** Waste-water is most often tested for BOD, the amount of oxygen needed to degrade milk solids and other organic matter carried by the water. For every pound of discharge a plant recovers in the form of BOD, it saves one gallon of milk from going down the drain and 19 cents, on average, in sewage charges; **Control levels of inorganic compounds.** Ecolab experts can help bring pH levels and sodium and phosphorus discharges into compliance to avoid fines.

Ecolab Inc., St. Paul, MN

Reader Service No. 351

Rytec's Stainless Steel Pneumatic Doors Offer High-Tech, Low Cost Solutions

The Rytec Corporation is offering a stainless steel, high-speed door that is highly suited for the food processing and pharmaceutical industries.

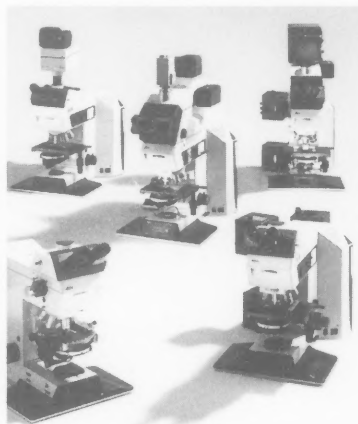
The Fast-Fold Pneumatic door consists of full-height, clear, PVC panels that offer maximum visibility, providing additional safety for

entering and exiting traffic. The panels utilize vertical seams that dramatically reduce energy costs. The Fast-Fold Pneumatic's unique design allows it to withstand the impact of a forklift while incurring little or no damage. Rytec's patented roller system, which incorporates a floating hinge that flexes, helps maintain constant contact with the roller track. This system assures uninterrupted operation and reduces wear and tear.

The door's modular design and single-point electrical connection provides for a quick and economical installation. Additionally, the door's low-profile design and minimal space requirements allow it to fit virtually anywhere.

Rytec Corporation, Jackson, WI

Reader Service No. 352



Leica Inc.

The New LEICA DM R Research Microscopes

Leica presents new innovations with the LEICA DM R research microscopes, featuring brilliant image quality and high precision.

From the very beginning, the LEICA DM R series stood for a new generation of microscopes that allowed research scientists to concentrate on the essential. The LEICA DM R microscope can be

configured for any application and integrated with electronic systems. To name a few of the possibilities, the LEICA DM R can be a microscope for observation only, or for TV applications, or used as an automatic photomicroscope.

Precise results and convenient, efficient and reliable operation — these are things you could always expect of the sophisticated optics and mechanical elements of LEICA DM R microscopes. Today, in the age of electronics, you may expect even more from your microscope.

The best of optics and electronics means that you expect even more today (and tomorrow) — more precision, more convenience, and more time for your research.

Leica Inc., Deerfield, IL

Reader Service No. 353

Fluorophos® ACP Test for Meat Adopted as AOAC Peer Verified Method

Advanced Instruments, Inc. announces that the Fluorophos® ACP Test for Meat has been adopted as an AOAC Peer Verified

Method and assigned the Peer Verified Method number PVM 3: 1997 for use in poultry. "Fluorometric Determination of Acid Phosphatase in Cooked Boneless, Non-Breaded Breast and Thigh Meat" will be published in an upcoming issue of the *Journal of AOAC International*.

When the company introduced the Fluorophos Test System and the ALP (alkaline phosphatase) Test for completeness of pasteurization, quality control for the dairy lab was revolutionized. Now the Fluorophos ACP (acid phosphatase) Test for Meat brings this same reliable, instrument-based technology to the meat processing industry.

By combining fluorescence technology and microprocessor control, the Fluorophos Test System benchtop fluorometer provides results that are accurate, reliable and extremely sensitive. Of even more importance, test results are quantitative and do not rely upon operator interpretation as colorimetric tests do. The federally-mandated standard used to assure pathogen destruction in cooked meat products is end-point tem-

perature. Because the ACP Test provides quantitative results, a direct correlation between ACP levels and endpoint temperature can be established, ensuring that tested product is fully and properly cooked.

The ACP Test is ideally-suited for quality control or HACCP programs because testing can be performed even after product has cooled allowing processors to verify end-point temperatures even after the product has exited the oven. In addition, customers can check incoming shipments to verify quality from their suppliers.

The assay is easy to perform. Simply add the sample to the substrate, press start and the instrument reports results in only three minutes. Test results are recorded by the instrument's built-in printer or can be collected for computer analysis or reporting through the instrument's standard computer interface.

Advanced Instruments, Inc., Norwood, MA

Reader Service No. 354

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3-A Sanitary Standards

A Complete Set of 3-A Dairy & Egg Standards with Five-Year Update Service Available from IAMFES

See the order form on page 62 for prices and ordering information or call IAMFES at 800.369.6337 or 515.276.3344.

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Services/Products

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2945 - 34th Avenue South
Minneapolis, MN 55405
612-724-0121

Reader Service No. 153



Michelson Laboratories, Inc.

6280 Chalet Drive, Los Angeles, CA 90040
Telephone: (562) 928-0553 / (562) 971-0673 / FAX (562) 927-6625

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- Entomological
- Nutritional Labeling
- Consulting
- Quality Assurance
- IMS-USPHS-FDA
- Japanese Ministry of Health & Welfare



IN ADDITION TO YOUR HACCP PLAN, WE WILL ASSIST YOU WITH:

- Sanitation Standard Operating Procedures
- Product Recall Procedures
- Complaint Investigation Procedures
- All of Your Prerequisite Programs

"Our Experience Is Your Protection."

Reader Service No. 163

POSITION ANNOUNCEMENTS

Visiting Scientist

National Food Processors Association

has an immediate opening for a Post-Doctoral research assignment as Visiting Scientist, Processing Technology & Microbiology (one year appointment with option for renewal for a second year). Position serves as a technical resource to NFPA and active participant in research projects. Candidates should possess a recent Ph.D. in Food Science or Food Microbiology with publications and an interest in continuing research. Good communication skills and understanding of food industry issues are required.

Education Program Manager

Food Processors Institute (FPI), the education provider for the National Food Processors Association, has an immediate opening for a Program Manager. We're growing and as a result offer this exciting opportunity to serve as instructor and technical coordinator for FPI courses and publications, and as producer for audio and video materials. Candidates should possess a Bachelor's or higher in Food Science, Microbiology or Chemistry plus a minimum two years related work experience. Must possess outstanding communication skills and service attitude. Familiarity with HACCP, food processing, instructional design, and bi- or multi-lingual skills a plus.

To apply, send curriculum vitae and cover letter stating position desired and salary requirements to:
Human Resources, National Food Processors Association
1401 New York Avenue, NW, Suite 400, Washington, DC 20005 Fax: (202) 637-8068

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Reader Service No. 215

HAVE YOU JOINED THE IAMFES FOOD PROTECTION REGISTER?

We invite you to become a part of the IAMFES Food Protection Register. Registry Members may be called upon to answer questions received through the IAMFES office and other sources. If you are willing to serve the Association in this manner, please fill out the information below and return to:

IAMFES
Attn: Rick McAtee
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2863
Fax: 515.276.8655
E-mail: iamfes@iamfes.org

Name: _____ Title: _____

Company: _____

Address: _____

City: _____ Province/State: _____ Postal Code: _____

Phone: _____ Fax: _____

E-mail: _____

I AM WILLING TO ANSWER QUESTIONS ON THE FOLLOWING TOPICS IN FOOD
PROTECTION: (please print or type)

Please attach additional paper if more space is needed.

I agree to provide information to other professionals as referred by IAMFES in areas of my interest. I also understand that if a referral is made to me and I am not comfortable in answering the question or do not feel I have the expertise, I can indicate this and decline answering. I agree to allow IAMFES to publish my name and areas of interest in *Dairy, Food and Environmental Sanitation* as a member of the Food Protection Register.

Signature: _____ Date: _____



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

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

■ Meeting Information

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

■ Registration Information

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

■ Refund/Cancellation Policy

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

■ New Membership Fees

- \$ 75.00 Dairy, Food and Environmental Sanitation
- \$ 120.00 Dairy, Food and Environmental Sanitation and Journal of Food Protection
- \$ 37.50 *Student Membership with Dairy, Food and Environmental Sanitation or Journal of Food Protection
- \$ 60.00 *Student Membership with Dairy, Food and Environmental Sanitation and Journal of Food Protection

*Full-time student verification required.

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

TICKET INFORMATION

■ Cheese and Wine Reception (August 16, 1998)

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

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

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

■ Awards Banquet — (August 19, 1998)

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

■ Other Events

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

HOTEL INFORMATION

For reservations, contact the hotel directly and identify yourself as an IAMFES attendee to receive a special rate of \$116 per night, single or double.

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

CHILD CARE

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

REGISTRATION FORM

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

First Name (please print — will appear on badge) _____ M.I. _____ Last Name _____
 Title _____ Employer _____
 Mailing Address (Please specify: Home Work) _____
 City _____ State/Province _____ Country _____ Postal/Zip Code _____
 Telephone # _____ Fax # _____ E-mail _____

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

Status (Please check applicable boxes)

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

FOR OFFICE USE
 Member # _____ First Initial _____ Last Name _____
 Registration # _____
 DFES

REGISTER BY JULY 15, 1998 TO AVOID LATE REGISTRATION FEES

REGISTRATION:

Registration (Awards Banquet included) _____
 Student _____
 Retired IAMFES Member _____
 One Day Registration: Mon. Tues. Wed. _____
 Spouse/Companion (Name): _____
 Children (15 & Over, Names): _____
 Children (14 & Under, Names): _____
 Child Care (Ages 4 to 12): Mon. Tues. Wed. _____

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NONMEMBERS

\$335 (\$385 late)
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 Not Available
 \$150 (\$170 late)
 \$ 35 (\$ 35 late)
 \$ 25 (\$ 25 late)
 FREE
 FREE

AMOUNT

OTHER EVENTS:

Grand Ole Opry (Sat., 8/15) _____
 IAMFES Golf Tournament (Sun., 8/16) _____
 Music City Sites (Sun., 8/16) _____
 Historic Nashville (Mon., 8/17) _____
 Hot Country Night (Mon. Night Social, 8/17) _____
 Children's Rate (14 & Under) _____
 Jack Daniel's Distillery (Tues., 8/18) _____
 IAMFES Awards Banquet (Wed., 8/19) _____
 Children's Banquet (Wed., 8/19) _____

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 \$ 80 (\$ 95 late)
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 \$ 41 (\$ 46 late)
 \$ 36 (\$ 41 late)
 \$ 21 (\$ 26 late)
 \$ 29 (\$ 34 late)
 \$ 40 (\$ 45 late)
 \$ 20 (\$ 25 late)

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

TOTAL AMOUNT ENCLOSED

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 Exp. Date _____
 Name on Card _____
 Signature _____
 Total Amount Enclosed \$ _____

EXHIBITORS DO NOT USE THIS FORM

Coming Events

FEBRUARY

• **3-4, Key Principles of Food Microbiology**, Brunswick, NJ. This course will introduce the principles of food microbiology and how to apply them to solve practical food microbiological problems. Participants will become familiar with environmental factors that influence the growth of bacteria in foods, genera of bacteria commonly associated with foodborne disease, HACCP tools and concepts and rapids in food microbiology. For further information, contact Keith Wilson, Phone: 732.932.9271; Fax: 732.932.1187; E-mail: ocpe@aesop.rutgers.edu.

• **16-18, 24th Annual Technical Seminar**, at the Radisson Hotel in Gainesville, FL. The technical update is designed to cover new technology, microbial intervention strategies and regulatory concerns of the food industry. For more information, contact Mary O'Neal at ABC Research, 3437 S.W. 24th Ave., Gainesville, FL 32607; Phone: 352.372.0436; Fax: 352.378.6483; Web site: www.abcr.com.

• **19-20, Concentrated & Dried Milk and Whey Products**, San Francisco Airport Hilton, San Francisco, CA. Review and update on science and technology of concentrated milk and whey products. Topics include the latest information on manufacture, performance and marketing trends including food applications and specifications of concentrated dairy ingredients such as concentrated milks, nonfat dry milk, whole milk powders and concentrates. For more information, contact Phil Tong, Phone: 805.756.6102; E-mail: ptong@calpoly.edu.

MARCH

• **3-5, Practical HACCP for Food Processors**, in San Diego, CA. For further information, contact

Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

• **3-5, Milkfat as a Food Ingredient Course**, University of Wisconsin-Madison, Madison, WI. The course is intended for people manufacturing or using milkfat ingredients. It will provide a better understanding of milkfat's chemical and physical properties, and how to select milkfat-derived ingredients for best performance in foods. For program information, contact Kerry Kaylegian, Program Coordinator-CDR at Phone: 608.265.3086; E-mail: kaylegia@cdr.wisc.edu.

• **17-18, Basic Food Microbiology Seminar**, Holiday Inn-Portland Airport, Portland, OR. This course will introduce the participant to the fundamental characteristics of microorganisms, and relate the application of microbiology to foods, food safety, and sanitation. For further information, contact Jack Brook, Dept. of Food Science Technology, Mt. Hood Community College, 26000 S.E. Stark St., Gresham, OR 97030; Phone: 503.667.7473; E-mail: brookj@mhcc.cc.or.us.

• **23-27, Laboratory Methods in Food Microbiology**, South Holland, IL. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

• **23-27, PanAmerican Congress on Mastitis Control and Milk Quality**, Co-sponsored by IAMFES. International authorities from 20 countries throughout the world will present papers. Several plenary sessions will be held along with six workshops. For more information, contact: Dr. W. Nelson Philpot, P.O. Box 120, Homer, LA 71040, U.S.A.; Phone: 318.927.2388; Fax: 318.927.3133.

APRIL

• **1-2, Introduction to Microbiological Criteria and Sampling Plans**, in Las Vegas, NM. For further

information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

• **2-4, Introduction to Statistical Methods for Sensory Evaluation of Foods**, University of California-Davis, Davis, CA. This course introduces statistical analysis to the beginning sensory scientist with little or no statistical background and demonstrates how to perform the tests and provides a solid basis of understanding for sensory analysis. To register call 800.752.0881; after November 1, 1997, call 530.757.8777. For program information, contact Michael O'Mahony, at 916.752.6389; E-mail: maomhony@ucdavis.edu.

• **6-9, Seoul Food '98**, Korea Exhibition Center, (Koex), Seoul, Korea. For additional information, contact Sue Na, International Trade Specialist, Korea Machinery Information Center, 111 E. Wacker Dr., Suite 2229, Chicago, IL 60601; U.S.A.; Phone 312.644.4323; Fax: 312.644.4879.

• **8-9, Microbiological Techniques for Dairy Quality Control**, offered by the University of Wisconsin-Madison, Dept. of Food Science. This course will teach entry-level laboratory personnel the basis of routine microbiology analyses used in the dairy industry. For further information, contact Steve Ingham at 608.265.4801.

• **15-16, The Food Industry: Pennsylvania's Opportunities for the New Millennium**, Eden Resort Inn and Conference Center, Lancaster, PA. Sponsored by Penn State Dept. of Food Science. Invited to attend are R&D food scientists and engineers, marketing and plant managers from food processing and manufacturing companies. For more information, contact Dr. Hassan Gourama, Food Science Dept., Penn State-Berks Campus, Phone: 610.396.6121; E-mail: hxg7@psu.edu.

• **20-21, Food Micro '98**, Holiday Inn Select in Old Town Alexandria, VA. The workshop will focus on

methods of controlling microbial foodborne illness, with speakers to include experts from universities, government agencies, and the food industry in general. The workshop is presented by the National Food Processors Association (NFPA) and is sponsored by the Food Processors Institute (FPI). For registration information, call Eric A. Forste, Program Coordinator, Phone: 202.393.0890; E-mail: eforste@nfpa-food.org.

• **24-29, Conference for Food Protection**, Swissotel, Boston, MA. To receive additional information, contact Leon Townsend, CFP Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601; Phone or Fax: 502.695.0253; E-mail: leontown@dcf.net.

MAY

• **18-19, PAMFES 1998 Annual Meeting**, at the Nittany Lion Inn, State College, PA. For additional information, contact Gene Frey at 717.397.0719.

• **19-21, Principles of Food Microbiology**, Philadelphia, PA. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

• **20-21, Applied Dairy Chemistry**, offered by the University of

Wisconsin-Madison, Dept. of Food Science, Madison, WI. This course will cover the chemistry of milk and milk products as they relate to specific dairy processing and control functions. For further information, contact Dr. Bill Wendorff at 608.263.2015.

JUNE

• **7-12, 4th World Congress Foodborne Infections and Intoxications**, in Berlin. The continued increase of foodborne diseases and the emergence of new or newly recognized agents of diseases all over the world underline the importance of the congress. For further information, contact Congress Office 4th World Congress, Federal Institute for Health Protection for Consumers and Veterinary Medicine, Diederdorfer Weg 1, D-12277 Berlin; Phone: +49.30.8412.2158; Fax: +49.30.8412.2957; E-mail: 4.wkoffice@bgv.de.

• **8-10, Mykotoxin Workshop**, in Detmold, Germany. The workshop is organized by the Institute for Biochemistry of Cereals and Potatoes, Federal Centre for Cereal, Potato, and Lipid Research, Schutzenberg 12, D-32756 Detmold, Germany. For information, contact Dr. Wolff at Phone:

+ 49.5231.741.121 (131); Fax: + 49.5231.741.130 (100); E-mail: betsche.bagkf@t-online.de.

JULY

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

AUGUST

• **16-19, IAMFES Annual Meeting**, in Nashville, Tennessee at the Renaissance Nashville Hotel. Registration information available in this issue of *DFES* on pages 58-59 or contact Julie Cattanaach at Phone: 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanaach@iamfes.org.



Reader Service Card

DFES January '98

Expires: April 30, 1998 (International expiration: July 31, 1998)

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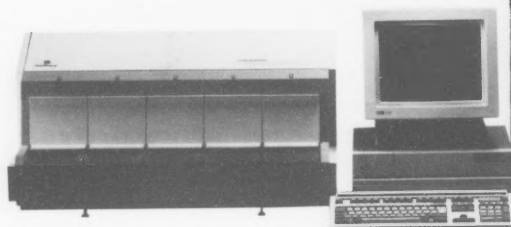
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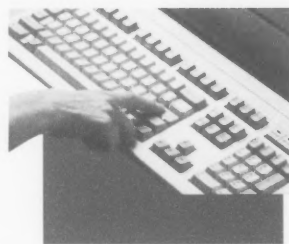


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