

ISSN: 1043-3546

June • 1989

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Vol • 9 • No. 6 • Pages 289-356

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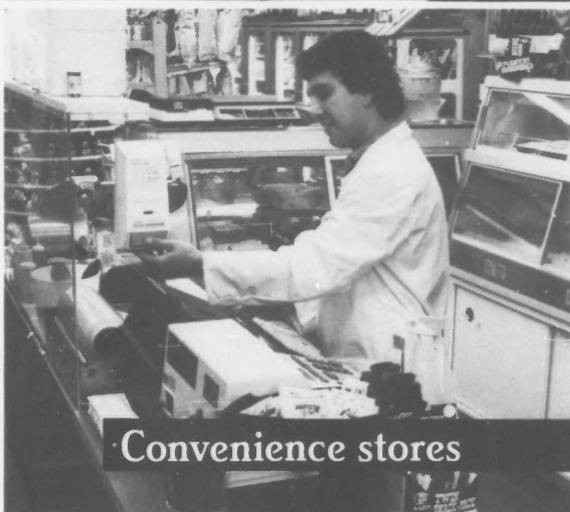
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Thoughts From the President . . .

Recently, as I was thinking about the food safety issues and consumers' concerns that made national news a few months ago, a slide from an FDA audio visual program quickly came to mind. It is a slide that I have used many times in my own presentations. It says:

The Safeness of Food Depends on People.

Those who:

- Produce and process it
- Transport and distribute it
- Prepare it

The important message that this phrase conveys is that every person who works with a food product in our complex food production chain plays a key role in assuring its quality, safety and wholesomeness.

Food industry workers are the vital link between good sanitation and safe food.

If employees don't know what is expected of them or how to do their jobs efficiently and accurately, food safety problems can and often do occur.

Effective education and training programs that are carefully designed to acquaint employees with their important role are a must. While "training programs" are frequently mentioned in the food industry, few organizations really spend the appropriate resources on employee education programs.

Continuing employee education programs should be specifically designed for adults and be conducted periodically to:

- update knowledge and skills
- provide important job information
- improve communications
- instill enthusiasm
- provide motivation

The "bottom line" for these types of programs is that the employees involved have a better understanding of not only their jobs, but how they are part of a team working together to process, distribute or prepare high quality, safe and wholesome foods.

Effective education programs are more than just an occasional slide show, video tape or get together. They are planned sessions designed to inform, educate and foster learning of important job-related information. Think about the last education program that you conducted.

- What kind of information did you share?
- How did you plan, conduct and evaluate the session?
- Did you use techniques that stimulate learning?
- How much of the information presented did the audience retain and use in their jobs?

All of these questions are very important for trainers to consider because they really affect the outcome of the educational session.

Although there are many topics and skills that can be taught — there is one topic that is very important for all people working in the food industry to understand.

By
Robert B. Gravani, Ph.D.
IAMFES President



That is, respect for the food being processed, distributed or prepared.

When working with food for a while, many employees become so familiar with it, they feel it is just an object, like bricks or lumber; they can easily forget that food is a biological system that can spoil or support the growth of pathogenic microorganisms that can cause illness and sometimes death. People who work with food need to respect what they are working with and realize their important role in assuring a safe and wholesome food supply for all consumers. Respect for food should be part of every new employee orientation training program and be periodically reviewed with experienced employees.

What the food industry needs are more creative and innovative education programs that:

- appeal to employees' sense of pride
- incorporate the principles of food safety in an understandable manner
- utilize current learning and motivation techniques
- encourage retention and use of the skill being taught.

Effective and properly conducted employee education and training programs foster good job performance.

Other Important Information

In this month's issue of the Journal, you'll find some revisions of our Association's Constitution and By-Laws. Last year, President Leon Townsend appointed a Constitution and By-Laws study and review committee and named Past President A. Richard Brazis as its chairman. The committee's task was to review these important documents and update them. The committee has met and recommended the revisions noted, and your executive board has approved the committee's recommendations. Please take a few minutes and become familiar with these revisions. We will discuss these changes at the business session of our annual meeting and then take a mail vote of the entire membership.

Also, don't forget to pre-register for our Annual Meeting in Kansas City on August 13-17, 1989. We have another excellent program that will be an enlightening and rewarding experience!

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ABOUT THE COVER . . . Everything has a purpose. Although a weed . . . the goldenrod in the forefront lends magnificent color to the lake background. The purpose of the 76th IAMFES Annual Meeting is for your continued education in this important industry. Sessions in dairy, food and environmental issues, along with table top exhibits will be the forefront of this important meeting. Social evenings, renewing of friendships and gaining of new friends will color the 4 day event and remain pleasant background memories for all of you.

Dairy, Food and Environmental Sanitation (ISSN-1043-3546) is published monthly by the International Association of Milk, Food and Environmental Sanitarians, Inc., executive offices at PO Box 701, 502 E. Lincoln Way, Ames, IA 50010. Printed by Heuss Printing, Inc., 911 N. Second St., Ames, IA 50010. Second-class Postage paid at Ames, IA. POSTMASTER: Send address changes to IAMFES, 502 E. Lincoln Way, Ames, IA 50010-0701. Manuscripts: Correspondence regarding manuscripts and other reading materials should be addressed to Margaret Marble, PO Box 701, Ames, IA 50010-0701. 515-232-8699. "Instructions to Contributors" can be obtained from the editor. Orders for Reprints: All orders should be sent to DAIRY, FOOD AND ENVIRONMENTAL SANITATION, IAMFES, Inc., PO Box 701, Ames, IA 50010-0701. Note: Single copies of reprints are not available from this address; address reprint requests to principal author. Business Matters: Correspondence re-

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Bioaugmentation in the Treatment of Dairy Processing Wastewaters

by

John H. Martin, Jr.¹ and Robert R. Zal²

Abstract

The effectiveness of bioaugmentation in treating dairy processing wastewaters with the activated sludge process was evaluated in two laboratory-scale studies. Two commercially available bioaugmentation cultures recommended for these wastewaters were tested using synthetic dairy processing wastewater formulated from nonfat dry milk, dried sweet whey, and lightly salted butter. Four liter draw and fill reactors operated at a constant hydraulic residence time of five days without solids recycle were used. In the first study, the effectiveness of the two bioaugmentation cultures with two different background populations of microorganisms was compared using a low strength synthetic wastewater formulation. There was little difference between control and bioaugmented reactors in mixed liquor and clarified effluent characteristics. Although all of the reactors produced effluents that were generally acceptable with respect to BOD₅ concentrations, removal of suspended solids by gravitational settling was marginal. In the second study, the effectiveness of the two bioaugmentation cultures in preventing the proliferation of filamentous microorganisms responsible for bulking sludge was evaluated using a higher strength wastewater formulation. Neither culture was found to be effective in preventing the proliferation of these organisms and thus, the problem of bulking sludge.

Introduction

Dairy processing wastewaters are wastewaters generated during the pasteurization and homogenization of fluid milk and the production of dairy products such as butter, ice cream, and cheese. Consequently, the principal constituents of these wastewaters are whole and processed milk, whey from cheese production, and cleaning compounds. As the five day biochemical oxygen demand (BOD₅) of whole milk

is about 100,000 mg/L, the oxygen demand of these wastewaters normally is substantially higher than that of domestic sewage. Reported values for the BOD₅ of dairy processing wastewaters from a survey of 50 plants ranged from 400 to 9440 mg/L with average values ranging from 940 to 4790 mg/L⁽⁹⁾. The three constituents of milk that are primarily responsible for the high oxygen demand of these wastewaters are lactose, proteins, and fats.

As noted by Harper *et al.*⁽⁶⁾, it is a common misconception that the biological treatment of dairy processing wastewaters is a relatively simple task, particularly when compared to the treatment of municipal wastewaters. As industry experiences have demonstrated, it is, in fact, far more difficult particularly when the activated sludge process or some modification thereof is employed. In an analysis of 20 dairy processing wastewater treatment plants, Harper *et al.* found that the efficiency of these facilities was less than 70 percent for more than 25 percent of the time.

Although relatively low influent suspended solids concentration eliminate the need for primary treatment, the highly variable nature of flows and characteristics of dairy processing wastewaters have made the realization of consistently high levels of treatment efficiency exceedingly difficult. For the activated sludge process, the occurrence of bulking is probably the most frequently cited problem in treating these wastewaters^(6,7,9).

Bulking is the term that is used to describe activated sludge that settles and compacts poorly. When bulking occurs, the ability to produce a well-clarified effluent and a concentrated return sludge is impaired. Ultimately, process failure can occur due to excessive losses of activated sludge solids via secondary clarifier effluent and high recycle ratios required due to the dilute nature of secondary clarifier underflow.

The frequent occurrence of bulking when the activated sludge process is used for the treatment of dairy processing wastewaters led Chambers⁽⁷⁾ to question the validity of what was described as the "Ubiquity Principle" as applied to the biological treatment of these wastes. Citing the abundance of filamentous bacteria and fungi that are common in bulking sludges, Chambers suggested that the microbial populations

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that develop naturally in these biological waste treatment systems are not necessarily composed of those species that will provide the most effective degree of treatment. This led to the proposal that more effective microbial populations could be established via bioaugmentation.

In support of this hypothesis, Chambers presented case histories of three industry operated, full-scale dairy processing wastewater treatment systems. For each treatment system; an extended aeration system, an aerated lagoon, and an oxidation ditch; marked improvements in system performance was reported to have occurred following the implementation of a program of bioaugmentation. Unfortunately, the data presented did not conclusively demonstrate that bioaugmentation was responsible for the improvements noted as information regarding waste characteristics and flows and operating procedures before and after bioaugmentation as well as other important details were omitted.

Objective and Scope

In view of the benefits that could be realized by the dairy industry if the practice of bioaugmentation has merit, a series of two laboratories studies were conducted to critically evaluate the validity of this concept. The objective of these studies was to assess the effectiveness of two commercially available bioaugmentation cultures, Cultures α and β , when used with the activated sludge process for dairy processing wastewater treatment. The principal difference between the two studies was the strength of the wastewaters formulated for use as influent. In the first study (Study I), the influent dairy processing wastewater formulated was relatively low in strength with a mean of BOD₅ of 584 mg/L. For the second study (Study II), influent BOD₅ was increased to 1925 mg/L which is more typical of dairy processing industry wastewaters.

Materials and Methods

In the first study, a series of eight bench-scale reactors were operated in pairs. Four of these reactors were initially seeded with mixed liquor obtained from an aerated lagoon used to treat process wastewater at the Campbell, NY plant of Pollio Dairy Products. This mixed liquor served as a common source of an active, adapted microbial population. Activated sludge from the Trumansburg, NY, municipal wastewater treatment plant was used to seed the remaining four reactors. There is no discharge of dairy processing or any other industrial wastewater to this treatment plant. This experimental design permitted comparison of the effectiveness of the two bioaugmentation cultures with and without an active microbial population adapted to dairy processing wastewaters. All eight reactors were operated under steady-state conditions organic and hydraulic loading.

In the second study, a series of four bench-scale reactors were used. In this study, only the dairy processing wastewater aerated lagoon mixed liquor was used to initially seed the reactors. Again, both bioaugmentation cultures were evaluated. Originally, this study was to have had two phases. The

objective of the first phase was again to evaluate the effectiveness of bioaugmentation with a high-strength influent under steady-state conditions of constant organic and hydraulic loading. The objective of the second phase was to evaluate the effectiveness of both bioaugmentation cultures under non-steady-state conditions with randomly varying organic loading. This was to have created conditions favorable to the proliferation of filamentous microorganisms and bulking. For reasons that will become apparent, the second phase of this study was never initiated. The details of both Study I and II are summarized in Table 1.

TABLE 1. Summary of Experimental Details for Dairy Processing Wastewater Bioaugmentation Studies I and II.

	Start-up Culture	Bioaugmentation Culture
Study I - Low Strength Influent	Dairy*	None - Control
	Dairy	Culture α
	Municipal**	None - Control
	Municipal	Culture α
	Municipal	None - Control
	Municipal	Culture β
Study II - High Strength Influent	Dairy	None - Control
	Dairy	None - Control
	Dairy	Culture α
	Dairy	Culture β

*Pollio Dairy Products, Campbell, NY, aerated lagoon mixed liquor.

**Trumansburg, NY, municipal wastewater treatment plant activated sludge.

Both low strength and high strength influent wastewaters were formulated to be representative of the dairy processing industry's wastewaters as described by Harper *et al.*⁽²⁾. Ingredients used were nonfat dry milk (Grade A, pasteurized nonfat dairy solids - Maryland and Virginia Milk Producers Association, Inc.), dried sweet whey (Extra Grade Sweet Whey - Land O'Lakes, Inc.), and lightly salted butter (Land O'Lakes, Inc.). The formulations used are outlined in Table 2. These wastewaters were prepared in eight liter batches using warm tap water and were routinely analyzed for the physical and chemical characteristics noted in Table 3. The analytical methods employed are summarized in Table 4. Each batch of wastewater was stored at 4°C until used.

The bench-scale reactors used in both studies were four liter glass aspirating bottles. For aeration, compressed air was supplied continuously via fritted glass dispersion tubes at rates necessary to maintain a measurable dissolved oxygen concentration (>2mg/L) in each reactor at all times. The mixing action of the compressed air was supplemented by magnetic stirrers with teflon-coated stirring bars to insure completely mixed conditions.

In both studies, the following standardized method of reactor operation was employed. All reactors were operated in a draw and fill mode at a constant hydraulic residence time (HRT) of five days without solids recycle. Thus, hydraulic

Con't. on p. 298

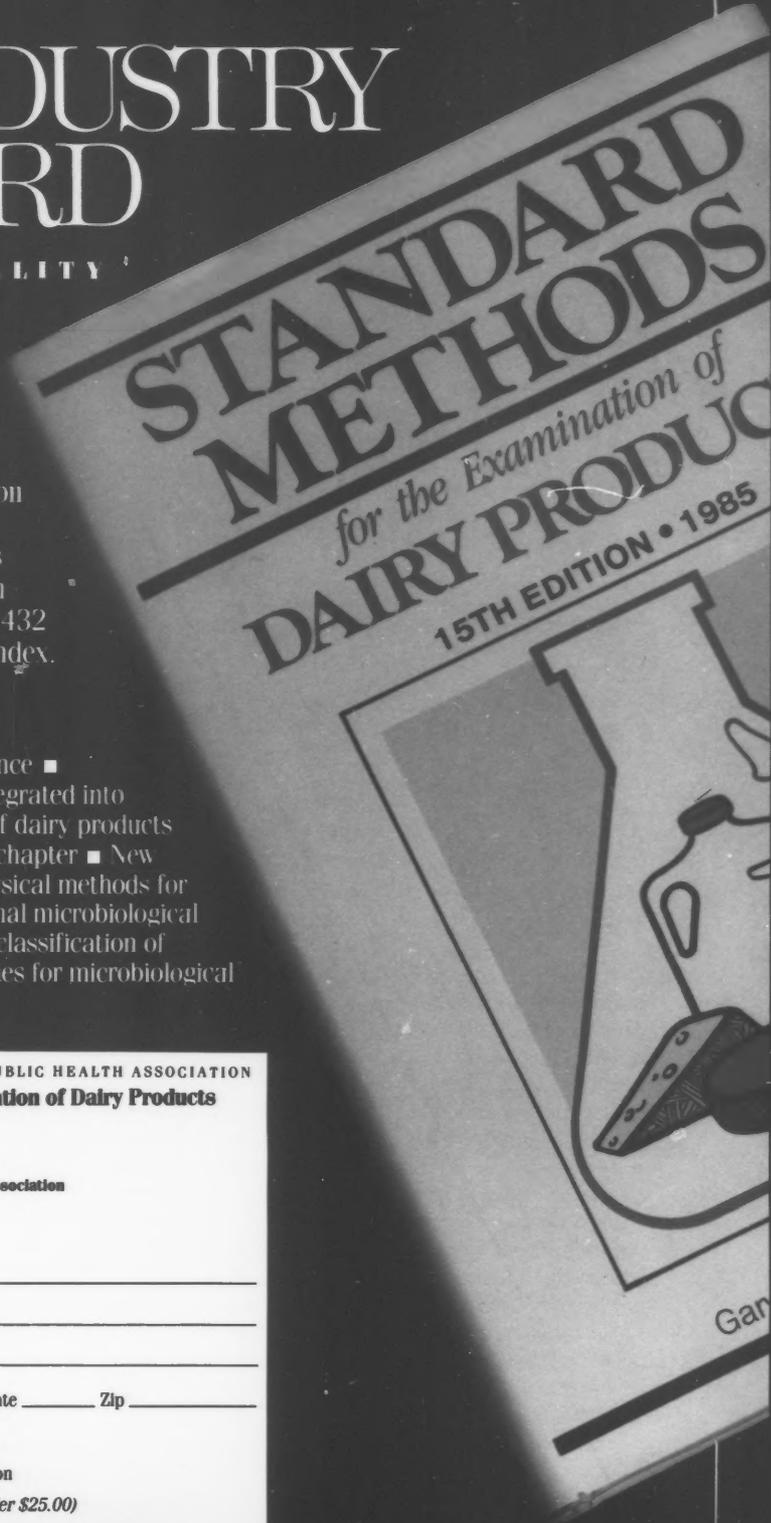
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Con't. from p. 296

TABLE 2. Formulations for the Low and High Strength Dairy Processing Wastewaters Used as Influent.

Ingredient	Concentration, mg/L	
	Low	High
Nonfat Dry Milk	962.5	2412.5
Butter	250	625
Sweet Whey	25	625

TABLE 3. Summary of routinely determined dairy processing wastewater influent, mixed liquor, and effluent physical and chemical characteristics.

Parameter	Influent	Mixed Liquor	Clarified Effluent
Total Suspended Solids	x	x	x
Volatile Suspended Solids	x	x	x
Settled Sludge Volume		x	
Biochemical Oxygen Demand, 5 day - 20°C	x		x
Chemical Oxygen Demand	x		x
Total Kjeldahl Nitrogen	x		x
pH	x	x	x
Dissolved Oxygen		x	
Temperature		x	

and solids residence times (SRT) were equal. It was decided to operate these reactors without solids recycle in order to eliminate changes in mixed liquor suspended solids concentrations due to solids losses via clarifier overflow as an additional, uncontrollable variable. Effluent withdrawals and influent additions were made daily as were the culture additions to the bioaugmented reactors noted in Table 1. The bioaugmentation culture additions were made immediately following the influent wastewater additions.

The two bioaugmentation cultures used in these studies, Culture α and β , are commercially available cultures that are marketed for use in addressing problems in the treatment of dairy processing wastewaters. Use of each culture was "as recommended" by its manufacturer. Initially, culture additions were made at "high" levels to establish desired population levels and then were reduced to lower maintenance levels. Each reactor was operated for at least 25 days, a period equal to five hydraulic residence times, to establish steady-state conditions before mixed liquor and clarified effluent samples were routinely analyzed to determine the physical and chemical characteristics noted in Table 3. Influent BOD₅ determinations were made using mixed liquor from one of the control reactors initially seeded with Pollio Dairy Products aerated lagoon mixed liquor. This control reactor mixed liquor served as the source of an active adapted population of seed microorganisms.

For steady-state mixed liquor and effluent characteristics, differences among mean values were analyzed statistically using one-way analysis of variance⁽¹³⁾. When differences among means were found to be statistically significant ($P < 0.05$), each mean value was compared with every other mean value using Duncan's new multiple range test⁽¹⁴⁾.

TABLE 4. Methods used for analysis of low and high strength dairy processing wastewaters, mixed liquors, and effluents.

Parameter	Method*
Total Suspended Solids	Total nonfilterable residue dried at 103-105°C - Sec. 209 D.
Volatile Suspended Solids	Volatile and fixed matter in nonfilterable residue - Sec. 209 G.
Settled Sludge Volume	Settled sludge volume - Sec. 213 B
Biochemical Oxygen Demand, 5 day - 20°C	Oxygen demand (biochemical) - Sec. 507.
Chemical Oxygen Demand	Dichromate reflux method - Sec. 508 A.
Total Kjeldahl Nitrogen	Semi-micro-Kjeldahl method - Sec. 420 B.
pH	Combination Ag/Ag Cl glass electrode - Sec. 423.
Dissolved Oxygen	Membrane electrode method - Sec. 421 F.

*American Public Health Association⁽⁴⁾

Results

As previously stated, this investigation consisted of two separate and independent studies. In the first study (Study I), the dairy processing wastewater formulated for use as influent was relatively low in strength having a mean BOD₅ of 584 mg/L. For the second study (Study II), influent BOD₅ was increased to 1925 mg/L which is more typical of dairy processing wastewaters. The following summarizes the results obtained from each of these studies.

Study I - Low Strength Influent

As discussed, this study was conducted to evaluate the effectiveness of each of the two bioaugmentation cultures, Cultures α and β , used in this investigation with two different background populations of microorganisms. In this study, the low strength dairy processing wastewater formulation was used as influent.

Following a 30-day period of operation to establish steady-state conditions, data collection as indicated in Table 3 commenced and continued for 15 days. Influent characteristics are summarized in Table 5 and the mixed liquor and effluent characteristics for Cultures α and β are summarized in Tables 6 and 7, respectively.

As shown in Table 5, there was significant variation in the physical and chemical characteristics of the influent wastewater formulated for this study even though each batch was carefully prepared in accordance with the formulation outlined in Table 2. Although the reason or reasons for these variations is unclear, it appears that the presence of discrete particles of butter was responsible for the difficulty in obtaining representative sub-samples for analysis. Even

TABLE 5. Characteristics of the dairy processing wastewater formulated for use as influent in Studies I and II.

Parameter	Mean \pm Standard Deviation*	
	Study I	Study II
Total Suspended Solids, mg/L	142 \pm 52	243 \pm 153
Volatile Suspended Solids, mg/L	120 \pm 31	237 \pm 148
Volatile Suspended Solids, % of Total Suspended Solids	87.3 \pm 10.9	95.3 \pm 5.5
Biochemical Oxygen Demand, mg/L	584 \pm 65	1925 \pm 486
Chemical Oxygen Demand, mg/L	1296 \pm 176	3300 \pm 493
BOD:COD Ratio	0.47 \pm 0.07	0.60 \pm 0.17
Total Kjeldahl Nitrogen, mg/L	56 \pm 2	140 \pm 5
pH	7.0 \pm 0.4	7.2 \pm 0.2

*n = 14.

TABLE 6. Comparison of Mixed Liquor and Clarified Effluent Characteristics With and Without Bioaugmentation: Culture α , Low-Strength Influent.

	Mean \pm Standard Deviation*			
	Dairy: Control	Dairy: Bioaugmented	Municipal: Control	Municipal: Bioaugmented
Mixed Liquor				
Total Suspended Solids, mg/L	458 \pm 39	417 \pm 44	474 \pm 61	449 \pm 45
Settled Sludge Volume, mL/L	15 \pm 2	11 \pm 2	15 \pm 5	17 \pm 3
Sludge Volume Index	34 \pm 3	28 \pm 4	29 \pm 7	39 \pm 8
Clarified Effluent				
Total Suspended Solids, mg/L	81 \pm 21	67 \pm 25	97 \pm 28	61 \pm 19
Volatile Suspended Solids, mg/L	74 \pm 25	61 \pm 29	89 \pm 22	52 \pm 18
Biochemical Oxygen Demand, mg/L	15 \pm 2	29 \pm 9	38 \pm 18	26 \pm 20
Chemical Oxygen Demand, mg/L	123 \pm 17	154 \pm 30	263 \pm 62	121 \pm 37
pH	8.1 \pm 0.2	8.1 \pm 0.2	8.0 \pm 0.1	8.0 \pm 0.2

*n = 7.

TABLE 7. Comparison of Mixed Liquor and Clarified Effluent Characteristics With and Without Bioaugmentation: Culture β , Low-Strength Influent.

	Mean \pm Standard Deviation*			
	Dairy: Control	Dairy: Bioaugmented	Municipal: Control	Municipal: Bioaugmented
Mixed Liquor				
Total Suspended Solids, mg/L	554 \pm 54	568 \pm 54	529 \pm 22	436 \pm 31
Settled Sludge Volume, mL/L	17 \pm 5	26 \pm 12	28 \pm 13	19 \pm 10
Sludge Volume Index	31 \pm 6	45 \pm 16	60 \pm 17	46 \pm 18
Clarified Effluent				
Total Suspended Solids, mg/L	137 \pm 27	112 \pm 32	95 \pm 21	106 \pm 21
Volatile Suspended Solids, mg/L	125 \pm 31	99 \pm 32	84 \pm 20	96 \pm 20
Biochemical Oxygen Demand, mg/L	24 \pm 5	19 \pm 6	25 \pm 3	38 \pm 7
Chemical Oxygen Demand, mg/L	135 \pm 58	129 \pm 68	198 \pm 41	293 \pm 40
pH	7.8 \pm 0.4	7.8 \pm 0.4	8.0 \pm 0.2	8.1 \pm 0.2

*n = 7.

TABLE 8. Comparison of Mixed Liquor and Clarified Effluent Characteristics With and Without Bioaugmentation: High-Strength Influent.

	Mean \pm Standard Deviation*			
	Control	Control	Bioaugmented: Culture α	Bioaugmented: Culture β
Mixed Liquor				
Total Suspended Solids, mg/L	1480 \pm 146***	1552 \pm 119 ^a	1446 \pm 159 ^a	419 \pm 171 ^a
Settled Sludge Volume, mL/L	226 \pm 139 ^a	176 \pm 54 ^a	398 \pm 132 ^a	270 \pm 120 ^a
Sludge Volume Index	155 \pm 101 ^{ab}	115 \pm 38 ^a	283 \pm 110 ^c	203 \pm 73 ^b
Clarified Effluent				
Total Suspended Solids, mg/L	172 \pm 124 ^a	212 \pm 105 ^a	249 \pm 138 ^a	263 \pm 123 ^a
Volatile Suspended Solids, mg/L	149 \pm 93 ^a	188 \pm 92 ^a	221 \pm 116 ^a	246 \pm 123 ^a
Biochemical Oxygen Demand, mg/L	38 \pm 29 ^a	56 \pm 34 ^a	46 \pm 28 ^a	58 \pm 24 ^a
Chemical Oxygen Demand, mg/L	304 \pm 197 ^a	406 \pm 186 ^{ab}	481 \pm 187 ^b	523 \pm 181 ^b
pH	8.0 \pm 0.1 ^a	8.0 \pm 0.1 ^a	8.0 \pm 0.2 ^a	8.0 \pm 0.1 ^a

*n = 12.

**means in the same row with a common superscript are not significantly different (P<0.05).

though warm water was used in the preparation of this wastewater to melt the butter added, the butter congealed during refrigerated storage. Analysis of these variations with time indicated that they were random and thus, were probably of no significance with respect to the results to the performance of each of the eight reactors.

As shown in Tables 6 and 7, there was little difference in either mixed liquor or clarified effluent characteristics between control and bioaugmented reactors. This was true for all of the combinations of bioaugmentation and reactor start-up cultures considered. Although all of the reactors produced clarified effluents that were generally acceptable with respect to BOD₅ concentrations, removal of suspended solids by gravitational settling was marginal. The reason for this difficulty is unclear as no evidence of bulking as indicated by high sludge volume index (SVI) values was noted. In fact, the SVI values measured suggest that the settling characteristics of the mixed liquors from all of the reactors should have been excellent. However, it is possible that the relatively short solids residence time (SRT) of five days employed in this study adversely affected settling characteristics. Design values for SRT in full-scale activated sludge systems are normally on the order of eight to ten days⁽¹⁰⁾.

Routine microscopic examination of the mixed liquor from each reactor revealed stable and seemingly well balanced microbial populations. Although filamentous bacteria were present in all of the reactors, their numbers were limited and apparently in balance with the populations of zoogeal organisms. In addition to bacteria, numerous protozoa including flagellates and free-swimming and stalked ciliates as well as rotifers and nematodes were present. The presence of these predaceous microorganisms is usually a reliable indicator of the satisfactory performance of the activated sludge process.

Study II - High Strength Influent

Following the completion of Study I, a second study was initiated to evaluate the effectiveness of the two bioaugmentation cultures, Cultures α and β , with an influent wastewater formulated to be more representative of the dairy processing industry wastewaters. In this study, only dairy processing wastewater aerated lagoon mixed liquor was used as a start-up culture.

Following a 25-day period of operation to establish steady-state conditions, data collection as noted in Table 3 commenced and continued for more than 60 days. The results of the influent analyses also are summarized in Table 5. Results of mixed liquor and clarified effluent analyses performed to characterize the performance of each reactor are summarized in Table 8.

As shown in Table 5, there also was significant variation in the physical and chemical characteristics of the influent wastewater formulated for this study. Again, analysis of these variations with time indicated that they were random and thus were probably of little significance with respect to the performance of each of the four reactors.

As noted in Table 8, there was little difference of statistical significance among the four reactors in either

mixed liquor or clarified effluent characteristics with the exception of sludge volume indexes (SVI) and clarified effluent chemical oxygen demand (COD) concentrations. The differences in mixed liquor settling characteristics, measured as SVI, among the four reactors were the result of varying degrees of proliferation of filamentous microorganisms which began on about the 20th day of operation under steady-state conditions (Figure 1). The filamentous microorganisms were tentatively identified microscopically as *Sphaerotilus natans* which is a commonly cited cause of bulking in activated sludge systems treating dairy processing wastewaters. It was interesting to note that the increases in the population of these filamentous microorganisms were accompanied by substantial decreases in number of protozoa, particularly stalked ciliates, rotifers, and nematodes.

As illustrated in Figure 1, the severity of bulking varied significantly among the four reactors. This result was unexpected as the only experimental variable was bioaugmentation. Other parameters, e.g., waste characteristics, organic and hydraulic loading rates, aeration rates, temperature, etc., were constant among the four reactors. Thus, the factor or factors responsible for the differences in the severity of bulking among the four reactors as well as the subsequent improvements remain unidentified. These data do show, however, that bioaugmentation with the cultures used in this study was not effective as a technique for preventing the proliferation of filamentous microorganisms in the treatment of dairy processing wastewaters via the activated sludge process.

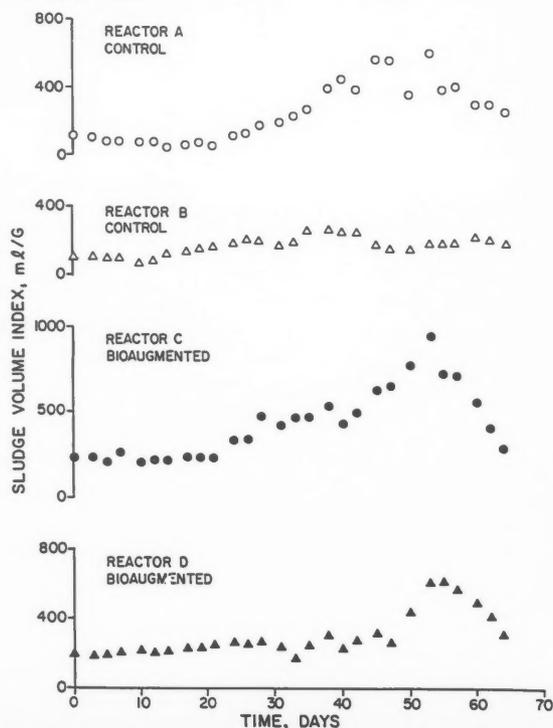


Figure 1. Comparisons of Sludge Volume Indexes Under "Steady-State" Conditions - Study II.

It should be recognized that the effluent characteristics presented in Table 8 are representative only of the clarified fraction of mixed liquor following 30 minutes of quiescent settling. Thus, they are not truly representative of the level of performance that would be realized in a full-scale treatment system as the efficiency of secondary clarification or lack thereof is not included. It also should be noted that if solids recycle had been employed in the operation of these reactors, the adverse effects of bulking on treatment efficiency would have been more pronounced due to excessive losses of mixed liquor solids.

Discussion

From the results obtained in these two studies, it is clear that neither of the two commercially available cultures, Cultures α and β , used to evaluate the merits of bioaugmentation in the treatment of dairy processing wastewaters was effective. In both studies, the differences in mixed liquor and clarified effluent characteristics between control and bioaugmented reactors were generally not significant statistically.

In retrospect, the results obtained in these two studies are not surprising if one considers the relationship between microbial composition and physical characteristics in the activated sludge process. Even though the problem of bulking activated sludge is normally the result of an overabundance of filamentous microorganisms, the presence of these organisms does not necessarily indicate that microbial populations that develop naturally are not composed of those species that will provide the most effective degree of treatment as suggested by Chambers⁽¹⁰⁾.

Although the presence of filamentous microorganisms in excessive numbers interfere with the settling and compacting of activated sludge, Sezgin *et al.*⁽¹²⁾ have observed that their presence as part of a balanced population of filamentous and zoogaleal microorganisms is essential to produce activated sludge flocs that settle and compact readily and result in a well clarified effluent. Sezgin *et al.* have suggested that it is the role of filamentous microorganisms to provide a strong rigid structure to which flocculent zoogaleal microorganisms can attach. In addition, the resulting filament network functions as an efficient device to capture any small particles such as floc fragments that do not settle readily.

The importance of filamentous microorganisms in the activated sludge process is perhaps best illustrated by the problems that occur in their absence. These problems include turbid effluent and the presence of small floc particles and fragments commonly known as "pin" floc. These "pin" floc usually will not settle without the addition of a chemical coagulant.

Further support for the validity of the "Ubiquity Principle" is provided by a comparison of the mixed liquor and clarified characteristics of the two sets of control reactors in Study I (Tables 6 and 7). Although there were differences among these four reactors in both mixed liquor and clarified effluent characteristics, these differences were random and

not correlated to the origin of the start-up cultures. This result is particularly significant as the microbial population of the municipal activated sludge had never been exposed to dairy processing wastewater prior to its use in this study. This illustrates the effectiveness of natural selection in developing a microbial population that will most effectively utilize the substrates available in biological waste treatment systems for dairy processing wastewaters and thus the lack of need for bioaugmentation.

The importance of filamentous microorganisms in the activated sludge process suggests that the problems associated with dairy processing wastewaters are probably best addressed not by focusing on the composition of the microbial population but rather on the factors necessary for balanced growth, such as maintaining adequate concentrations of residual dissolved oxygen and avoiding nitrogen and phosphorus limitations. As the problem of bulking activated sludge is common in the treatment of dairy processing wastewaters, it was the subject of a series of excellent studies by Adamse^(1,2,3) in the Netherlands. In the first of this series of studies, Adamse⁽¹⁾ found that sharp drops in both pH and dissolved oxygen concentration occurred immediately following the addition of an artificial dairy wastewater formulation to draw and fill reactors. The drop in pH was found to be caused by rapid carbohydrate degradation and the subsequent accumulation of acetic and lactic acids. In the presence of a residual concentration of dissolved oxygen, acetic acid accumulated whereas lactic acid accumulated in the absence of a residual dissolved oxygen concentration.

Adamse⁽¹⁾ also found that protein decomposition proceeded at a much slower rate than that of the carbohydrates present. Thus, a transient difference between potential and actual carbon : nitrogen (C:N) ratios occurs immediately following the introduction of these wastewaters, particularly in slugs as is common, into biological waste treatment systems. Both of these conditions, an accumulation of lactic acid and a temporarily high C:N Ratio in combination with a temporarily low dissolved oxygen concentration, were shown in a subsequent study⁽²⁾ to favor the growth of *Sphaerotilus*, a filamentous bacteria, as compared to zoogaleal bacteria such as *Arthrobacter*. Coryneform bacteria, largely *Arthrobacter*, have been identified to be the predominant group of bacteria in dairy processing wastewater activated sludges⁽³⁾.

Under the conditions noted above, *Sphaerotilus* accumulates storage compounds while arthrobacter-like bacteria show decreased activity. The accumulation of these storage compounds provides *Sphaerotilus* with a competitive advantage when a residual dissolved oxygen concentration is re-established. With repeated occurrences of these conditions, *Sphaerotilus* may finally predominate resulting in a bulking sludge as occurred in Study II.

In a more recent study Palm *et al.*⁽¹¹⁾ have shown that a low aeration basin dissolved oxygen concentrations is not a necessary prerequisite for bulking. Rather, bulking was shown to be a function of the relationship between COD removal rate, kg COD removed/kg VSS/day and aeration basin bulk dissolved oxygen concentration. This supported

the hypothesis that the proliferation of filamentous bacteria is caused by low dissolved oxygen concentrations in the interior of activated sludge flocs. This situation can occur even in the presence of a high aeration basin dissolved oxygen concentration when the rate of diffusion into the interior of sludge flocs is exceeded by the oxygen uptake rate.

Due to the draw and fill method of reactor operation employed in this study, it is highly probable that the sharp drops in mixed liquor pH and dissolved oxygen concentration that were observed by Adamse⁽¹⁾ also occurred in this study following the daily additions of the formulated dairy processing wastewaters. Unfortunately, neither pH nor dissolved oxygen was routinely measured immediately following these wastewater additions. The occasional dissolved oxygen measurements that were made indicate, however, that substantial decreases, from 6-7 mg O₂/L to less than 2 mg O₂/L, did occur.

During this period of high oxygen uptake rate immediately following wastewater additions, it also is not unlikely that the low residual dissolved oxygen concentrations present were inadequate to prevent the development of anoxic conditions in the interior of mixed liquor sludge flocs. This is particularly true for Study II where mixed total suspended solids concentrations exceeded 1400 mg/L and bulking occurred in three of the four reactors. In contrast, the mixed liquor suspended solids concentrations in Study I ranged from 400-500 mg/L and bulking did not occur. Since mixed liquor total suspended solids concentration and thus, floc size increases with loading rates, it appears reasonable to conclude that the outgrowth of filamentous microorganisms experienced in Study II was the result of the factors previously discussed. It is not unlikely that differences in mixed liquor dissolved oxygen concentrations in Study II were responsible for the differences in the severity of bulking among the four reactors.

From the experimental results obtained in this study, it is clear that bioaugmentation with the microbial cultures employed was ineffective in improving treatment efficiency and limiting the growth of filamentous microorganisms given the conditions provided favor their proliferation. Unfortunately, these results are not adequate to support any general comments on the merits or lack thereof of bioaugmentation in the treatment of dairy processing wastewaters. This statement is made in view of the obvious arguments that the wrong cultures were used or that they were used incorrectly. Given the innumerable culture formulations that are possible as well as the countless options for use, it is difficult to effectively rebut these arguments. However, when the results obtained in this study are considered in combination with the work of Sezgin, *et al.*⁽¹²⁾, Adamse^(1,2,3), and Palm *et al.*⁽¹¹⁾, it is clear that the concept of bioaugmentation in the treatment of readily biodegradable wastes such as dairy processing wastewaters may well be fundamentally flawed.

It is interesting to note that the results obtained in this study are not unique. Bressani⁽⁹⁾ reported that dairy processing wastewater effluent quality deteriorated when bench scale, continuous flow reactors were bioaugmented using

one of the cultures used in this study. In the three case histories of bioaugmentation in the treatment of dairy processing wastewaters presented by Chambers⁽⁷⁾, it was mentioned that bulking problems continued to occur occasionally in both the extended aeration and oxidation ditch treatment systems following the implementation of the bioaugmentation programs. When these bulking problems occurred, the classical approach of return sludge chlorination was employed as a corrective measure.

Conclusions

From the results obtained in this study in combination with an understanding of the factors responsible for the outgrowth of filamentous microorganisms in biological waste treatment systems, it can be concluded that:

1. The concept of bioaugmentation lacks merit in addressing the problems associated with the treatment of dairy processing wastewaters, and
2. These problems are best addressed by maintaining those conditions, particularly mixed liquor dissolved oxygen concentrations, which have been shown to be necessary to maintain a balanced population of filamentous and zoogeal microorganisms.

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Acknowledgement

This research was supported in part by a grant provided by Friendship Dairies, Inc. of Maspeth, New York. This paper was presented at the 1988 Food Processing Waste Conference, Georgia Tech Research Institute, Atlanta, Georgia.

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The Scientists Tell Me...

Trimming the Fat Off of Pork - Appearance vs. Microbial Contamination

by Marilyn Brown
TAES Science Writer

Today's consumers want leaner meats, and one offshoot of this development is the trend to more closely trim the surface or subcutaneous fat from retail cuts of meat. A potential problem with additional trimming, however, is the possibility of further contaminating the muscle with microbial organisms. The extent of microbial contamination of both fat and muscle surfaces depends largely upon the degree of sanitary effort during slaughter, dressing, and fabrication procedures, says Gary R. Acuff, animal scientist with the Texas Agricultural Experiment Station.

"In the fabrication of wholesale and retail cuts, cutting operations cause microorganisms residing on surface fat to contaminate interior meat surfaces not yet exposed to microorganisms," Acuff says. "In view of the current industry trend of marketing fresh meats with little or no surface fat, there is a need to compare microbial activities and sensory properties of cuts packaged and stored with little or no surface fat with those of comparable cuts with a normal quantity of surface fat."

A wide variety of common meat bacteria, including *Pseudomonas*, *Flavobacterium*, *Serratia*, *Enterobacter*, *Aeromonas*, *Brochothrix*, *Hafnia*, *Lactobacillus*, and *Leuconostoc* species can grow extensively on lean and fat surfaces of beef, pork, and lamb carcasses. The individual bacterial profile of carcasses can differ considerably, Acuff says.

Acuff and his colleagues conducted studies in which pork loin chops with subcutaneous fat attached, without subcutaneous fat, and with the removed fat itself (intact chops) were packaged and stored in poly vinyl chloride (PVC) film for up to 6 days or high-oxygen barrier film for up to 28 days.

The aerobic plate counts of bacteria on lean and fat of intact chops packaged and stored in either treatment did not differ in most comparisons, Acuff says. Counts for subcutaneous fat portions that were packaged and stored separately in high oxygen barrier film often were higher than those of

comparable fat samples of intact chops. There was no consistent pattern of differences in the types of bacteria found on lean and fat samples.

Differences in sensory scores for surface discoloration, off odor, and overall appearance of intact and trimmed chops usually were either not significant or inconsistent. Lean color scores of chops with or without subcutaneous fat did not differ, except that chops with the subcutaneous fat removed were rated higher than intact chops during the early periods of storage.

"Based on the results of this study, removal of most or all of the subcutaneous fat from chops had little effect on the sensory properties or shelf life of chops, except that lean color scores of trimmed chops were higher than those of intact chops," Acuff says. At 28 days of storage, intact chops packed in barrier film had less surface discoloration than trimmed chops, and at day 6 of storage in PVC film, trimmed chops rated higher in overall appearance than intact chops.

There were no significant differences in either surface discoloration or overall appearance between the two types of chops at all other packaging and storage conditions, Acuff says, suggesting that pork packers and processors should not be concerned about the impact of trimming on microbiology and case life of centrally packaged pork retail cuts.

Of more concern to the pork industry, Acuff says, is the fact that there is no systematic sorting of marbling levels in pork carcasses or cuts as there is for beef with the use of USDA quality grades.

In a companion study, pork loin chops of high, intermediate, and low marbling were trimmed free of subcutaneous fat and then packaged and stored as in the first experiment.

In general, marbling group had no effect on bacterial counts and did not result in major differences in the distribution of types of bacteria present, Acuff says. Surface discoloration and overall appearance scores of chops with low marbling stored in barrier film were usually lower than those of chops of intermediate and high marbling.

In contrast, marbling group usually had no significant effect on surface discoloration and overall appearance of chops packed in PVC film. Chops with high and intermedi-

ate marbling stored in barrier film were usually rated higher than those of chops with low marbling.

"This finding offers further documentation that marbling is related to certain display characteristics of meat and has a definite impact on how long centrally fabricated and packaged retail cuts will remain acceptable to consumers," Acuff says.

"With the data from the present study, those within the meat industry who wish to centrally fabricate and package beef or pork retail cuts should know that marbling level will have a major impact on retail case life even when all other usual case life variables, such as cutting sanitation, packaging material, storage and display temperatures, and lighting are held constant," Acuff advises.

Sorting or segmenting pork loins into different marbling groups or assuring that loins with low levels of marbling are not used for centrally fabricated and packaged pork may have to be a quality control function within the industry rather than a government service, the scientist says.

Editor's Note: Any question regarding this column should be addressed to Science Writer, Department of Agricultural Communications, Texas A&M University, College Station, TX 77843.

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Blue Diamond M.R.F. 2000 paste was applied according to label instructions in 7 apartments in Long Island, New York possessing high numbers of German roaches. Maintenance of the apartments had been neglected for some time, with a buildup of food, waste and trash. However, researchers first obtained a population estimate using three glue traps per apartment - one in each bathroom and two in each kitchen. Follow-up counts were taken with the traps one, two, four, and eight weeks after applying the paste.

Results: Within the period of the research, 96% elimination of German roaches! The M.R.F. paste worked gradually and effectively over the entire eight week period. By two weeks, the population was down by 73% and by four weeks, Blue Diamond M.R.F. 2000 had knocked out 95% of the roaches.

Dr. Frishman says, "There is no unfavorable odor associated with this product. No complaints were solicited from tenants during or after application. Two of the apartments tested contained asthmatic children and adults. No ill effects were reported by them from the presence of this material in their apartments."

Dr. Frishman's conclusion:

"Blue Diamond MRF 2000 Formula gave excellent control of German cockroaches in apartments with extremely poor sanitation."

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Fishing for Facts on Fish Safety

by

Vern Modeland

Vern Modeland is a member of FDA's public affairs staff.

Nutrition experts have encouraged Americans to turn to fish as a more healthful alternative to a steady diet of red meat. And we have. Consumption of seafood - a relatively low-fat catch for a heart-conscious public - is up 25 percent over the past five years, according to the National Marine Fisheries Service, and the demographers predict the rising trend will continue. Another study estimates Americans will be eating an average of 24 pounds of fish and shellfish a year by 2000, nearly double the slightly more than 15 pounds they ate in 1987. By comparison, each of us now consumes an average each year of about 78 pounds of poultry and about 144 pounds of red meat, according to the U.S. Department of Agriculture.

Other factors besides nutrition are boosting seafood's popularity. In fact, only about 30 percent of the increase in consumption can be attributed to nutrition awareness, according to Roy E. Martin of the National Fisheries Institute, a seafood trade group. Martin credits much of the rest of the increase to improved quality of frozen food processing and the availability of microwaveable seafood dishes.

Last year, however, seafood's good press hit a snag. The news media and consumer groups cast their attention to growing pollution in our seas and some freshwater sources and, with it, the danger that pollution poses to the wholesomeness of fish from those waters. Those reports produced a call for the federal government, including the Food and Drug Administration, to do more about inspecting and controlling the harvesting, transportation, preparation, and sale of fish and shellfish. Some even proposed that the government inspect and approve every fish before it could be sold, as is done with beef, pork and poultry.

The controversy had led FDA to take a closer look at its seafood safety effort. A special seafood task force was appointed to analyze FDA's current seafood programs and to recommend changes that would enhance consumer protection. While changes will no doubt be made, the agency believes that, overall, American seafood shoppers can be confident that their catch will be safe and wholesome. FDA's inspection and enforcement activities are designed to detect and keep off the market fish that are not fit to eat.

Depending on where they live, fin fish and shellfish may be subjected to a variety of contaminants in their watery environment. They can be exposed to toxic chemicals such as mercury, lead, cadmium, polyether compounds, polychlorinated biphenyls (PCBs), and pesticides, including DDT. Freshwater fish that feed on the bottom and are nonmigratory are the ones most likely to be contaminated with pesticides and PCBs. Generally, the larger the fish, the greater the potential concentration of these compounds, and these species are not generally sold in retail markets. The major freshwater fish sold commercially are trout and catfish raised under controlled conditions. FDA has not found problems with these fish.

Microbes that can cause food poisoning, particularly the bacteria *Listeria monocytogenes*, *Vibrio vulnificus*, and *Staphylococcus aureus*, have been found in raw seafood. Some of the viruses and bacteria being found in seafood are tough enough to survive both freezing and light cooking, but proper handling and preparation usually will ensure safe fish dishes.

In spite of concern over chemical contaminants such as pesticides, the U.S. Centers for Disease Control in Atlanta reports that the most common illnesses linked to seafood are ciguatera and scombroid poisoning. Both are toxins found in the muscles of fish.

Ciguatera affects reef-dwelling fish in subtropical and tropical climates. More than 400 species have been implicated, but only a few, such as barracuda and red snapper, are of commercial significance. Ciguatera poisoning causes cramps, vomiting, diarrhea, and progressive numbness and burning sensations that generally begin in the mouth and throat. In severe cases, the central nervous system, heart, and respiratory system are affected. As bad as this sounds, unless you live in the subtropical United States and eat recreationally caught fish, there is little risk of ciguatera poisoning.

Scombroid poisoning is found most frequently in tuna, mackerel, bonito, and mahi-mahi (dolphinfish), but only in those that have not been properly refrigerated and have been allowed to decompose. Symptoms of scombroid poisoning include chills, fever, aching joints, muscular weakness, and paralysis. Illness from other waterborne pathogens (disease-causing organisms) that accumulate in shellfish is particu-

larly risky when the shellfish are eaten raw. Eating uncleaned, raw or undercooked fish carries an added risk of parasitic infection to the gastronomical experience that can be in store for the adventuresome. However, FDA research has shown that using fish for raw fish dishes that has been properly frozen and then thawed eliminates this hazard. For more on the risks of eating raw fish, see "When It Comes to Stylish Sushi, It's Safer to Be Square," *FDA Consumer*, February 1987.

Even if a fish is free of harmful contaminants when it's brought from the water, it can spoil during the sometimes long trip from ship to table. At most of the stops between fisherman and fishmonger there's a real or implied pressure on this \$28.8 billion-a-year business to produce more, do it quicker, and sell it cheaper to meet the growing demand. With consumption of fish and shellfish increasing by almost 5 percent a year, safe handling and processing unfortunately can become questionable priorities to some when compared to the economic pressures to hurry the product to market. And after a fish is purchased, poor storage, handling or cooking at home can render it unfit to eat.

Sometimes fish can become a hazard - at least for some individuals - because of the steps taken to prevent its spoilage. Shrimp and other seafood are sometimes treated with sulfites - preservatives that are safe for most consumers but can cause allergic reactions in susceptible individuals (including many asthmatics). FDA sets limits on the residues of these chemicals in seafood and requires their presence to be declared on the label of packaged shrimp. (See "Reacting to Sulfites," *FDA Consumer*, December 1985-January 1986.)

Because of these concerns, Congress last year requested the General Accounting Office (GAO) to study how well the American public is being protected from unsafe seafood. GAO issued its report last August, saying that, while there's room for improvement, there does not appear to be a compelling case at this time for a comprehensive, mandatory federal seafood inspection program such as those for meat and poultry.

Illnesses caused by seafood represent a small percentage of all food poisoning cases in this country. Fin fish, shellfish, and foods containing fish accounted for only about 10 percent of the total number of gastrointestinal illnesses and only four deaths in 3,621 cases reported to the Centers for Disease Control between 1973 and 1982, the most recent years for which final figures are available. (CDC's next report, with data through 1985, is due out within a few months.) Further, when illness did occur, blame could not always be laid to a contaminated catch: GAO found mishandling and improper cooking to be the major causes of seafood-borne illness.

GAO listed as its principal concerns the need to:

Develop better tests to measure microbiological contamination in shellfish-growing waters and in shellfish harvests.

Develop greater public awareness of the health risks associated with eating raw or undercooked shellfish.

Intensify efforts by state and federal law enforcement officials to curtail illegal harvesting and distribution of shellfish from areas that are contaminated or closed to harvesting.

Do more testing of shellfish for heavy metals and other chemical contamination.

In fact, FDA has already been addressing those and other seafood safety concerns. The agency's role in protecting consumers of seafood is to see that the fish are wholesome, fit to eat, and processed and stored in sanitary facilities. FDA collects samples to monitor the quality of the product, and can have seafood that does not meet standards removed from interstate commerce.

However, compared to the continuous federal inspection of beef, poultry and pork by USDA, seafood has inherent differences unique to monitoring its harvest and transport. There are at least 1,000 kinds of fish, from anchovies and shrimp to tuna and swordfish, harvested from tidewater shallows to the depths of the seas. Fish have an intimate association with their environment, and water quality is not as easy to control or evaluate as the condition of the livestock feed lot.

Fish and shellfish grown or caught in U.S. territory are monitored by FDA through the compliance program that requires each of the agency's 21 districts to obtain locally at least 12 samples a year, collected as close as possible to where they were caught. And FDA inspects processing techniques and facilities and tests imported and domestic fish and seafood products. When examining fish and seafood, FDA inspectors look for filth, microbial contaminants, decomposition, pesticides, heavy metals (including mercury), PCBs, radionuclides, evidence of canning problems that could lead to botulism, unapproved food and color additives (including sulfites), and economic fraud.

FDA's field inspectors collectively expended more than 90,000 hours in 1987 on visits to the more than 4,100 U.S. processors of fish and fish products and analyzed more than 12,000 samples. Fish- and seafood-related import investigations accounted for approximately 20 percent of the total time spent by all FDA field personnel in 1987 on import inspections and analyses. By comparison, USDA has approximately 7,000 inspectors responsible for the quality of red meat and poultry at 7,100 locations.

In addition, FDA does special inspections, when warranted to uncover and resolve possible problems with, for example, pathogens or processing techniques. These more intensive inspections can be triggered by consumer complaints, media reports, problems uncovered during inspections of restaurants or other fish and seafood outlets, tips from other federal or state agencies, disease outbreaks reported by CDC or other medical sources, trade complaints, congressional interest, historical information, or data from scientific research.

FDA scientists have developed laboratory methods to identify most pathogens in seafood. Such advances as the use of recombinant DNA technology have been pressed into pioneering work to isolate the Norwalk virus (responsible for one kind of epidemic gastroenteritis) and hepatitis A virus in shellfish. Other seafood products are being examined for *Clostridium botulinum* spores, particularly Type E, which can grow and produce deadly botulism toxin in foods even at cool temperatures. A primary concern is the discovery of *C.*

botulinum spores in fish packed under vacuum or in nitrogen or carbon dioxide to retard spoilage. Time and temperature abuse of these products could lead to growth of the bacteria and toxin production.

High technology hasn't completely taken over FDA's analytical work: Specially trained agency inspectors can still be found dockside, probing fish for signs of decomposition with highly sensitive, tried-and-true instruments - their noses.

Shellfish (particularly shrimp and crab), fin fish, and surimi-based foods (see "Getting Hooked on Surimi" in the April 1985 *FDA Consumer*) are being monitored now for at least 10 pathogens, including *V. vulnificus*, *V. parahaemolyticus*, *V. cholerae*, *Salmonella*, *Listeria monocytogenes*, *Campylobacter jejuni*, *E. coli*, and *Yersinia enterocolitica*.

Last fall, after a year-long undercover investigation, state and federal agents in the South arrested black-market dealers illegally harvesting and selling shellfish from polluted waters. Millions of dollars worth of clams and oysters taken from polluted, closed breeding grounds in the Gulf of Mexico were being sold illegally in southern and eastern states by dealers in Louisiana, Florida and South Carolina, according to investigators from the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, and FDA. For violations of the Lacey Act, which makes it illegal to receive illegally harvested shellfish, those involved face possible fines of up to \$20,000 and jail sentences of up to five years.

In the Great Lakes area, FDA routinely monitors fish for contamination with cancer-causing dioxins. FDA also would collect fish for dioxin analysis in other regions if the toxin was found in dangerous amounts.

In their routine inspections of processing plants, FDA investigators also look for illegal use of food additives in fish and seafood and for unsanitary conditions or filth and spoilage. Last October, FDA food safety inspections at one Chicago area processor's warehouse led to destruction of more than 600,000 pounds of seafood valued at approximately \$1 million. FDA investigators found that scallops, lobster tails, shrimp, oysters, frog legs, cod, sole, flounder, trout, and red snapper had been kept in unsanitary conditions and had become contaminated and rodent-infested.

It is particularly difficult to evaluate decomposition in seafood because different species have their own rate of deterioration based on their unique enzymes and normal bacteria. For example, because histamine - a byproduct of decomposition in mahi-mahi, tuna, bonito and mackerel - can cause scombroid poisoning, these fish are sampled more frequently to ensure freshness.

Investigation into obviously high-risk kinds of fish and seafood products recently led to banning kapchunka, a fish preparation that originated in Russia in which uneviscerated whitefish are salted and then dried at room temperature. Three deaths traced to kapchunka led FDA to work on the problem with health officials in New York state, where the deaths occurred. FDA determined kapchunka could not be processed safely, leading state officials to ban its production and FDA to ban interstate shipment of any salt-cured, air-

dried, uneviscerated fish such as kapchunka. (See "Fish 'Delicacy' Causes Botulism Illness and Death," in Investigators' Reports in the May 1988 issue, and "The Notebook" on page 41 of the February 1989 *FDA Consumer*.)

More than 64 percent of the seafood consumed in the United States in 1987 was imported (up 4.7 percent from 1986). For imported seafood products, FDA must rely almost solely on random sampling to determine safety and compliance. If a problem is uncovered, sampling may be focused and increased. If, for instance, *Salmonella* bacteria were found frequently in an imported seafood product, such as shrimp, FDA would then require that each lot of imported shrimp coming from that importer be tested before it could be released for sale. The testing would be done at the importer's expense in private laboratories acceptable to FDA. This "automatic detention" would continue until test results showed the problem had been solved. Automatic detention has been used successfully for swordfish tainted with mercury.

While FDA lacks the authority to directly inspect foreign food processing plants, it has done inspections in other countries when invited by the government of that country. It also has presented seminars on quality control in several countries, with the goal of improving the quality of food destined for the United States.

One of FDA's most important tools in protecting consumers from unsafe seafood is research. The agency is conducting long-range studies into marine toxins and into better methods to measure pesticide residues and detect microbial pathogens in fish. It is investigating how well seafood packaging protects fish from spoilage, especially low-acid processing of canned fish products. It is even studying whether there may be harmful effects from consuming large amounts of fish oils, now popular due to their purported role in helping to prevent heart disease.

The generalized hazard posed by shellfish, particularly when eaten raw (see "Fewer Months 'R' Safe for Eating Raw Gulf Oysters" in the June 1988 *FDA Consumer*), has led FDA's Northeast Technical Services Unit at Davisville, R.I., to continuously update records it maintains on shellfish-borne disease outbreaks. FDA also is attempting to find better ways to keep contaminated shellfish from reaching the market, and to develop a plan for long-range studies of the environmental and biological problems behind shellfish contamination.

Vibrio vulnificus, found mainly in shellfish, poses a particularly serious health threat - blood poisoning - to people with liver disorders, iron imbalances, or those with weakened immune systems, such as people with acquired immune deficiency syndrome. Researchers at FDA's Davisville facility, the Fishery Research Branch at Dauphin Island, Alabama, and the seafood Products Research Center in Seattle are looking for ways to reduce those risks in the short term, while searching for a long-term solution to the *Vibrio* threat.

Cooperation with state and other federal agencies supplements FDA's limited resources in protecting consumers from seafood-borne illness. Sharing enforcement informa-

tion and research findings in seafood technology, and developing the free exchange of information with industry, trade associations, and regulating agencies is the best bait available today for hooking tainted fish. In fact, illness is caused by only a small portion of a few types of seafoods, often within limited geographic distribution. But, as with all other foods, knowing how to judge fish and seafood quality and complaining when the product doesn't measure up to expectations are the best ways to make sure the seafood you and your family eat is as safe and wholesome as the rest of your diet.

(Reprint from FDA Consumer February 1989).

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A Call to Action for Ice Cream Manufacturers: Make Sure You Have Enough "July is National Ice Cream Month" Manuals

Promotion leads to profit, and an ICE CREAM FOR AMERICA "July is National Ice Cream Month" campaign will increase ice cream manufacturers' sales this summer. Manufacturers of ice cream and ice cream products want their sales personnel to plan effective July promotions with retail customers. They should have the best tool available: the "July is National Ice Cream Month" manual.

"Retailers have been told that their suppliers—ice cream manufacturers—will supply them with the materials for a 'July is National Ice Cream Month' promotion, and now it's time to do it," said International Ice Cream Association (IICA) President Linwood Tipton. "IICA has met with retailers, and they have told us that they are excited about working with their suppliers on 'July is National Ice Cream Month' campaigns." IICA sponsors the ICE CREAM FOR AMERICA program.

The "July is National Ice Cream Month" manual will help manufacturers of ice cream and ice cream products increase their sales and profits. It provides step-by-step plans and details for developing specific ad themes, implementing in-store promotions, and cross-merchandizing with other departments.

Retailers are ready to promote ice cream, but they can't do it without their suppliers' taking the first step. When ordering manuals, ice cream manufacturers should consider that sales personnel will use the manual during presentations and then leave it with the customer. Manufacturers should make sure they have enough manuals for their sales teams and their retail customers.

"This really is a call to action for ice cream and ice cream products manufacturers," said Tipton. "Retailers are waiting for these manuals, so manufacturers shouldn't disappoint them."

The "July is National Ice Cream Month" promotion manual is available to ICE CREAM FOR AMERICA participating companies. Now available through IICA, it includes: suggested ad themes and ad formats, cross-merchandizing ideas and tie-in partner information, clip art for newspaper ads/P.O.S. displays, press releases for local food editors, demos/sampling and special event ideas, camera-ready art for P.O.S. materials, camera-ready art for recipe cards, and sample letters to communicate plans to retail merchandizing teams.

ICE CREAM FOR AMERICA is a nationwide program that increases ice cream sales. ICE CREAM FOR

AMERICA's "July is National Ice Cream Month" campaign is a specific promotion that increases ice cream promotion, merchandising, and advertising in retail stores during July, National Ice Cream Month. Sponsored by the International Ice Cream Association, the ICE CREAM FOR AMERICA program also includes special events, recipe books, contests, and other promotions.

Tailoring Dairy Packaging & Distribution - Tomorrow's Needs

An International Seminar jointly sponsored by the International Dairy Federation (IDF), and the U.S. National Committee of the International Dairy Federation (USNAC) entitled "Tailoring Dairy Packaging & Distribution - Tomorrow's Needs" will be held in conjunction with the DIFSA Expo, in Chicago, on November 13/14, 1989.

The program will be divided between speakers from the USA and Europe in order to have an exchange of innovations.

A complete program and registration form is available by contacting, Harold Wainess, Secretary, US National Committee of the IDF, 464 Central Avenue, Northfield, IL 60093, 312-446-2403.

Dickerson Receives DFISA/ASAE Food Engineering Award

Roger W. Dickerson, Jr., director, Cincinnati Research Laboratories, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration has been awarded the 1989 Food Engineering Award by Dairy and Food Industries Supply Association (DFISA) and the American Society of Agricultural Engineers (ASAE).

Dickerson received the award for his sustained superior performance and contribution to the field of food engineering. In particular, for the performance and direction of original research on thermal properties of food, pasteurization of dairy and egg products, thermal processing of food for consumer safety and the development of public health standards for design of dairy equipment.

Dickerson is a recognized authority on milk sanitation and food engineering. Throughout industry, academia and government, Dickerson is professed as the most knowledgeable individual on milk safety controls and equipment. In 1961, Dickerson initiated a program of engineering research in dairy science that resulted in the removal of radionuclides methods of pasteurization and the design

of instruments for measuring the effectiveness of pasteurization processes with heating and cooling times of less than one second. Much of the early work for the public health requirements of UHT processes was provided by Dickerson's program. Dickerson has accumulated an impressive record of publications in the scientific literature with more than 65 published papers.

DFISA is an international trade association of equipment, ingredients and supply companies serving the dairy, food and beverage processing industries. The association sponsors Food and Dairy EXPO, the largest and most diverse trade show of its kind in the world.

EXPO '89 will be held at McCormick Place, Chicago, Illinois, from November 11 to 15, 1989.

Seven Educators Win Fellowships to Continue Studies

Seven foodservice educators won awards totalling \$8,200 in the 1989 Heinz Graduate Degree Fellowship Program, according to Henry J. Cockerill, Chairman of The Educational Foundation of the National Restaurant Association.

This brings to 157 the number of foodservice educators who have received professional awards funded by the H.J. Heinz Foundation and administered by The Educational Foundation. H.J. Heinz also is a long-standing sponsor of undergraduate scholarships with awards for students of junior/community colleges and senior colleges.

The graduate degree fellowships were awarded to four men and three women in six states.

Joanne L. Dahl, Lecturer, Hotel and Restaurant Management Department, University of North Texas, Denton, Texas, was awarded a \$2,000 graduate fellowship. Dahl will attend the University of North Texas to study for a Ph.D. in higher education.

Henry A. Cittone, Coordinator, Hospitality Programs, Galveston College, Galveston, Texas, received a \$1,200 graduate fellowship to study for a master in hospitality management degree at Galveston College.

The following were each awarded \$1,000 graduate degree fellowships:

Patricia S. Bartholomew, Assistant Professor, City University of New York, New York Technical College, Brooklyn, who will study for a Ph.D. at New York University.

Robert Garlough, Director, Hospitality Education Division/Foodservice, Ferris State University, Big Rapids, Michigan, who will study for a Master of Science in Occupational Education at Ferris State University.

Thomas Jones, Assistant Professor, School of Hotel and Restaurant Management, Northern Arizona University, Flagstaff, who will study for a Doctorate in Higher Education at Arizona State University, Tempe.

Patricia Kelly Luoto, Assistant Professor, Framingham State College, Framingham, Massachusetts, who will

study for a Doctorate in Higher Education at Boston University.

Frank R. Weidmann, Coordinator, Hospitality Services Management Program, Prince George's Community College, Largo, Maryland, who will study for a Master in Business Administration at the University of Baltimore.

Winners of the annual awards are selected on a national competitive basis by The Educational Foundation's Fellowship Committee, comprised of leading educators and foodservice industry leaders.

SaniSafe & Associates Wins Syllabus Approval For Foodservice Sanitation Certification Course

SaniSafe & Associates, Inc. is pleased to announce State of Illinois Health Department approval of its syllabus for the Foodservice Sanitation Certification Course. Paulette A. Gardner, President of SaniSafe, indicated, "Our certification course will more than meet requirements for the State of Illinois. We will also offer coverage of the City of Chicago regulations for those wishing Chicago certification. In addition, our course can be easily adapted for foodservice sanitation anywhere. We will use demonstrations, case studies, and a homework assignment featuring self-inspection. We will train the trainer, so that he can return to his facility and instruct those working with him. Our intent is for the student to learn food safety, and not to just pass a test at the end of the course." Gardner indicated that courses will begin in the Chicago area in June. Interested parties should call SaniSafe & Associates, Inc. at (312) 272-0508.

Gardner is a Certified Professional Food Sanitarian and a State of Illinois-certified instructor in foodservice sanitation. SaniSafe & Associates is a consulting group to the food industry in government regulation compliance, sanitation and quality control.

Food Microbiology Short Course

A basic microbiology short course for food processors will be offered at the University of California-Davis from September 11-15, 1989. This course will consist of lectures and laboratory work. Certificates of completion will be issued. The objective of this course is to develop an understanding of basic food microbiology. This course is appropriate for people with limited training in microbiology. This course has no prerequisites.

Lecture material will begin with an introduction to microbiology, and will include basic lab procedures, various groups of microorganisms important in food processing, and conclude with a discussion of new techniques in food microbiology.

Lab topics to be covered include use of a microscope, standard plate count, most probable number, membrane filter techniques for enumerating bacteria, and others.

Enrollment will be limited to 32 students. The registration fee of \$650 includes reference and lab materials and two dinners. For registration information and further details, contact: Kathryn J. Boor, Food Science & Technology, 250 Cruess Hall, University of California, Davis, CA 95616 (916) 752-1478.

Food Cost Control Expert "Computerized"

Restaurant managers trying to lower their food costs will be able to consult a computerized "expert system" copyrighted by a Washington State University professor.

Dr. Lothar A. Kreck, the Ivar Haglund Professor of Hotel and Restaurant Administration, has extensive industry experience. He wrote the new food costs system for operators of restaurants, hotels, clubs and institutional food services. Called the "First Food Costs Expert" (TM) because it is the first in the United States, it will be marketed soon to business software companies.

An expert system is a computer program which simulates the thought processes of an expert in a given area. Kreck said that he wrote the system "because food cost control is not always clearly understood by some operators." Yet, because food costs can draw off as much as half of total sales income, even a small drop in costs can translate directly into profit.

An operator using the system would first enter three figures representing the business' ideal (or theoretical), actual and budgeted food costs as percentages of its sales income. If these are not equal there is a problem, and the system takes the operator through questions based upon Kreck's "Golden Rules" of cost control. These are grouped by functional areas, such as purchasing, preparation, or storage. Questions answered "no" represent rules the business is not following, and can be printed out as a plan of action.

Kreck has 20 years of experience in restaurants, hotels and clubs in eight countries, and is past president of the international Council on Hotel, Restaurant and Institutional Education. He has taught food cost control classes for 25 years, teaches industry seminars internationally and does consulting. He has also published two books relating to the subject.

Terry Umbreit, director of the WSU Hotel and Restaurant Administration Program, said, "One of our major functions is to assist the hotel and restaurant industry in enhancing its productivity and cost control. We are hoping this computer program created by Dr. Kreck will be a valuable tool for food service operators."

MacDonald Focuses on Technology, Quality at AFFI's Western Frozen Food Convention

"Long range planning does not deal with future decisions, but with the future of current decisions," stated C. Alan MacDonald, president and CEO of Nestle Foods Corporation, in a keynote presentation that kicked-off the American Frozen Food Institute's (AFFI) 1989 Western Frozen Food Convention in Monterey, California.

The record-breaking convention brought together over 1,600 industry representatives in February to gain new insights on current frozen food dilemmas, fresh outlook on future trends and new business contacts.

Emphasizing that today's decisions will determine the viability and growth of the frozen food industry, MacDonald told delegates that "the industry can maintain its favorable position in the market as long as you identify and take advantage of all the pluses available, while avoiding the mistakes that other industries have made."

According to MacDonald, another serious problem for the industry is out-of-control health care costs. He predicts, however, that new, time-saving computer technology will contribute to the future decline in costs.

He also advised the industry to examine what has happened to the coffee industry over the years, and avoid making the same mistakes. Soluble coffee sales were down 7 percent last year, with ground coffee down 3 percent, said MacDonald.

MacDonald concluded by challenging participants to strategically plan how their companies can get the most from today's technology, and to work to maintain high levels of quality in their frozen products.

AFFI is the national non-profit trade association that has represented the interests of frozen food processors for over 40 years.

Foundation's New Course Focuses on Foodservice Marketing

Created specifically for the foodservice professional and foodservice student, "Effective Foodservice Marketing" is the newest course from The Educational Foundation of the National Restaurant Association.

Beginning with an introduction to marketing concepts, the hospitality marketing mix, and services marketing, the course profiles management's role in marketing.

The course textbook is the newly revised *Hospitality Marketing Management, Second Edition*, by Robert D. Reid. Reid is Program Director of Hotel, Restaurant Management at James Madison University, Harrisonburg, VA.

The course is divided into six lessons which can be divided or combined to fit instructional needs. Each

lesson contains a summary of the reading assignment, a self-test, case-study questions or activity, and a multiple-choice question assignment.

Course materials include the text, a student manual, and a final examination. A certificate of completion is awarded to those who meet the course requirements.

The course is available for use in college, home study, and industry training programs. To review further information on this course - or to order - contact The Educational Foundation of the National Restaurant Association, 250 South Wacker Drive, Chicago, IL 60606 (312) 715-1010 or (800) 522-7578.

Ashland Chemical Forms New Department To Serve Food, Pharmaceutical and Cosmetics Industries

Ashland Chemical Company announced today the formation of the Fine Ingredients Department, a new distribution business unit totally dedicated to serving the raw material and service needs of the food, pharmaceutical and cosmetics industries. The announcement was made by President David J. D'Antoni.

"This move demonstrates our total commitment to serving the needs of our customers and suppliers in these industries," D'Antoni said. "We have experienced incredible growth over the past two years in these specialty areas. This new department will enable us to deliver expanded customer service while continuing that growth."

The Fine Ingredients Department will operate within the company's IC&S Division. It will feature a specialized national sales force and management focused exclusively on the needs of food, cosmetics and pharmaceutical processors and manufacturers. The group will deliver product through the IC&S Division's network of more than 70 distribution centers, enabling it to offer such services as just-in-time delivery and EDI.

Sea World of Texas Gains Food Service Certification

Sea World of Texas' Management Certification Program, a management-level training course for food service employees, has received accreditation from the Texas Department of Health's Division of Food and Drugs.

Since its official recognition by the state's Health Department, the program has graduated more than 60 food service workers at the 250-acre marine life park in San

Antonio. Course participants underwent at least 15 hours of classroom training in food protection and food-borne diseases, food service facility care, sanitary food handling habits and food service management.

By providing uniformity of training criteria within the food service industry, this educational program aims to provide more highly qualified personnel as well as a safer, disease-free environment for food service employees and consumers.

Sea World will incorporate the Management Certification Program permanently as an integral part of the training process for food service supervisory personnel. A registered staff sanitarian is responsible for the implementation and administration of the state-sanctioned course.

Under Texas Department of Health guidelines, food service workers must successfully complete the sanitation course every three years to remain accredited.

"Food service is a vital aspect of all our parks and we are very proud of Sea World of Texas' commitment to providing the highest quality service in this area to our guests," said George J. Becker, Jr., chairman of Sea World of Texas.

"In complying with the Texas Department of Health's high standards, Sea World will continue to provide a healthful and enjoyable environment for guests in all food service areas throughout the park."

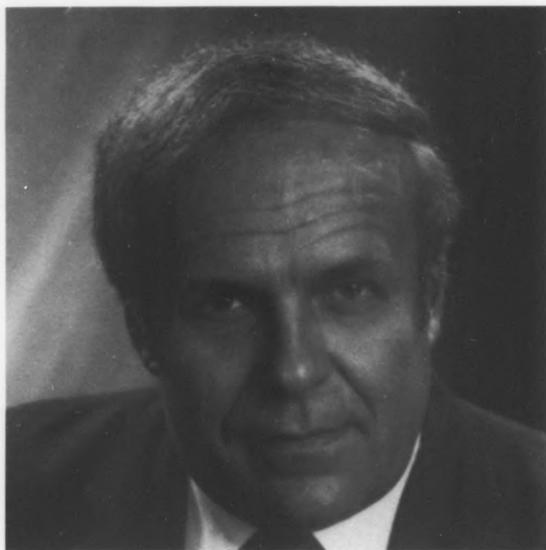
In addition to staffing four major dining facilities and numerous park-wide food kiosks, Sea World of Texas' food services division caters in-park special events for groups and also staffs an employee cafeteria.

Offering more than 25 spectacular shows, educational exhibits and attractions, Sea World of Texas is the world's largest marine life showplace. A subsidiary of Harcourt Brace Jovanovich, Inc. (HBJ), Sea World of Texas is located 18 miles northwest of San Antonio at the intersection of Westover Hills Boulevard and Ellison Drive, just off State Highway 151.

SaniSafe & Associates Expands Newsletter

SaniSafe & Associates, Inc. is pleased to announce the publication of its February issue of the *SaniSafe Alert*. Newly formatted and enlarged, this issue will contain news on sulfites, the Norwalk virus and an incentive labeling program for food plants, along with other relevant articles. Paulette Gardner, president of SaniSafe and a Certified Professional Food Sanitarian, stated, "We believe that an expanded *SaniSafe Alert* can be a central information source for those in the food industry."

SaniSafe & Associates is a consulting group to the food industry in government regulation compliance, sanitation, and quality control.



Dennis Helmke

Dennis Helmke Joins Gelber Industries As Division Manager

Dennis R. Helmke has been named Division Manager of Gelber Industries, with primary responsibilities in the Sanitary Products Division.

In his new position, Helmke oversees all sales training and support distribution, marketing, new product development and systems engineering activities for the Sanitary Division pump products and accessories.

Gelber's Sanitary Division offers a wide variety of pumps and related equipment for cleanliness-critical applications in the food processing, chemical, industrial, pharmaceutical and biotechnology industries.

Gelber Industries provides custom-engineered pump products and systems, ranging from off-the-shelf pumps and components to complete fluid handling systems. In addition, Gelber provides catalog sales and nationwide distribution for a wide variety of industrial pumps, accessories, sanitary products and filters. Headquartered in Lincolnwood (Chicago), Gelber maintains four additional engineering and sales offices, each with full-line warehouse inventory, across the United States.

For more information on Gelber Industries' Sanitary Products Division, contact Gelber Industries, 3721 West Morse Ave., Lincolnwood, IL 60645 (312) 673-5800.

In Memory of Richard Harrell

Dick Harrell of Los Angeles, California, passed away March 28. He is survived by one daughter, and one son, both residing in California.

Dick was a graduate of Texas Tech. He then worked for Borden in Texas. After the war he went to work for Knudsen Creamery where he stayed for 27 years in Los Angeles. Dick retired in 1981 from the Los Angeles County Health Department after serving as the Senior Dairy Sanitarian for 12 years.

He served as Executive Secretary for the California Association of Dairy and Milk Sanitarians for 6 years. He was very active in the 1987 IAMFES Annual Meeting held in Anaheim.

Dick would have been 73 April 5. He was an active Shriner and Mason.

Memorials may be sent to: South Bay Cancer Foundation and Support Group, c/o Kate Harmon, AM-1, South Bay Hospital, 514 N. Prospect Ave., Redondo Beach, CA 90277.

In Memory of John G. Collier

John G. Collier died Tuesday, April 4, 1989 at the Waukesha Memorial Hospital at the age of 71.

John graduated from the University of Wisconsin-Madison in 1941. He then served with the U.S. Army-Air Force from January 1942 through November 1945. John then was a trainee for Swift & Company in LaCross, Wisconsin. Viroqua High School was his home for Agricultural Instructor for On Farm Training. 1952-1954 he held the same position at Berlin High School. August 1954 he went to work as a supervisor I in the Wisconsin Department of Agriculture Dairy & Foods Division. In 1966 he became the Ag Regional Supervisor with the Wisconsin Department of Agriculture, Trade & Consumer Protection. He retired in 1983 with the title of Agricultural Supervisor 4 from the Wisconsin Department of Agriculture Trade & Consumer Protection.

John was a past president of the State Food Sanitarians, has been name Sanitarian of the Year, and held an honorary lifetime membership in IAMFES. He was also a member of the Dairy Plant Field Representatives, was a lifetime member of the Agriculture Alumni Association, the University of Wisconsin-Madison Alumni Association and the National Rifle Association.

He is survived by wife, Edna, daughter, Jane Whitford, and three grandchildren.



Rose Marie Pangborn

Rose Marie Pangborn - Macy Award Recipient

The 1989 recipient of the Harold Macy Award, Rose Marie Pangborn, exemplifies the spirit of the Harold Macy Award in recognizing someone who has been outstandingly instrumental in the transfer of technology in the food industry. Rose Marie's credentials abundantly testify to her contributions to the food industry which have accrued as a result of her activities with the industry and also through the technology which she imparted to her many students who are now in the industry.

Rose Marie Pangborn started her professional career as a junior specialist in 1955 and achieved rank of professor in 1972. Rose Marie served as Associate Dean in the College of Agricultural and Environmental Sciences from 1973 to 1975. In 1973, she was Acting Chairman of the Department of Consumer Sciences.

In her professional career, Rose Marie Pangborn, has acquired a long list of honors which reflect her academic and food industry activities. Included in these honors are Outstanding Alumnus of both Iowa State University and New Mexico State University, and Distinguished Alumnus of New Mexico State University. She received the William V. Cruess Award for teaching from the Institute of Food Technologists in 1977 and became a Fellow of the Institute in 1980. In 1984 she received a Doctor of Science, honoris causa, from the University of Helsinki, and in 1987 she became an Honorary Fellow of the Finish Society of Food Science and Technology.

In addition to being a member of the Institute of Food Technologists, she is a member of the European Chemoreception Research Organization, the Association for Chemoreception Scientists, the American Institute of Nutrition, the Society of Nutrition Education, the American Society for Testing and Materials, Sigma Xi, Phi Kappa Phi, and Phi Tau Sigma.

The purpose of the Harold Macy Award is to honor him through the selection of food scientists among academic, government and private industry who have been exemplary in the transfer of technology. Rose Marie Pangborn's reputation in industry, government, and academia as a specialist in the area of sensory evaluation is unexcelled. The food industry recognizes the importance of good sensory evaluation methods in the many areas of activities involved in the production and distribution of food. Over 100 of her students are in important leadership roles in the food industry here and abroad. They are involved in setting standards of excellence in sensory evaluation in their respective companies. Several of her graduate students are involved in higher education, institutions where they are teaching techniques of sensory evaluation. Still others are involved in consulting activities in the area of sensory science.

If this were not testimony enough of her contributions to the transfer of technology, through the careers of her student whom she was obviously able to inspire and motivate to high levels of excellence in the area of sensory evaluation, she has 180 publications which are primarily in the area of sensory science. In addition, she has co-authored three textbooks: "Principles of Sensory Evaluation of Foods", Academic Press, 1965, "Food Acceptability and Nutrition", Academic Press, 1987, and "Evaluation Sensorial de los Alimentos: Metodos Analiticos", Editorial Alhambra, Mexico, D.F., 1989 (In Press). Many of these publications provide the foundation for modern day sensory science methodology. Industry, as well as educational institutions, look to this information as the basis for much of their sensory science activities.

Professor Pangborn is the catalyst, the spark that brings sensory scientists from all areas of the country together to discuss the technique of sensory science. In addition to numerous conferences which she has arranged, she continues to provide outreach by publishing a newsletter in which she maintains contact with alumni keeping them apprised of new developments in sensory science. Professor Pangborn has been a major factor in building a firm foundation for the principles for sensory science. She could not have done this without extensive interchange of ideas and knowledge with private industry. She has had a major impact on the maintenance of quality of consumer products in several industries.

The Minnesota IFT Section is delighted to honor Harold Macy by making this award to such an outstanding example as Professor Rose Marie Pangborn. The significance of her contributions to the food industry cannot be overstated.

AIB Certifies Twenty More Bakers

Nineteen bakers became Certified Bakers through the American Institute of Baking program after completing the Bakery Management seminar in Manhattan, February 13-17. Then on February 24, Cheryl Brown was the twentieth to receive this certificate in March with her completion of Specialized Cookie Production.

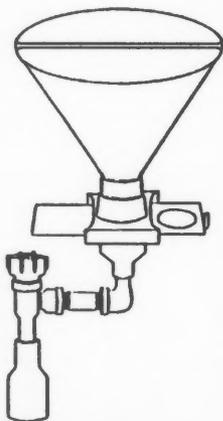
This brings the list of AIB Certified Bakers to 140 since the program began in 1983.

To become certified, bakers are required to complete the Institute's 50-lesson Science of Baking correspondence course and four designated 1-week seminars conducted in Manhattan. These seminars permit bakers to specialize in either a bread, sweet goods, or cookie option.

Those completing the bread option were James Andersen, Jr., Chas. Freihofer Baking Co.; Kathleen Byers, Best Foods Baking Group; Bountieng Bo Daoheuang, Derst Baking Co.; David Davis, Flowers Baking Company; Charles Ehrlinger, Best Foods Baking Group; Walter Gasser, Maier's Bakery, Inc.; Gregory Herzig, Best Foods Baking Group; Alan Hillyard, Fluhrer Bakeries; Joseph Lee, Schmidt Baking Company; William Muzzi, Del Campo Baking Company, Inc.; Ronald Orr, Schmidt Baking Company; William Riley, Schmidt Baking Company; Michael Stevens, U.S. "Franz" Bakery, Inc.; Kevin Sturdy, U.S. "Franz" Bakery, Inc.; and Whi-Chu Tsao, Best Foods Baking Group.

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316 DAIRY, FOOD AND ENVIRONMENTAL SANITATION/JUNE 1989



N.M.C.

NATIONAL MASTITIS COUNCIL

Water Supply May Harbor *Pseudomonas*

Pseudomonas aeruginosa is an infrequent cause of mastitis that typically causes sporadic cases in dairy herds. However, herd outbreaks in which a high proportion of cows are affected also occur.

In individual cows, the disease may vary from severe, and rarely even fatal clinical cases to those which are entirely subclinical. A common form is repeated episodes of moderately severe clinical mastitis. In the intervals between clinical episodes, the milk somatic cell count is usually elevated. When many cows are affected, bulk milk somatic cell counts may be increased.

An important feature of *Pseudomonas* mastitis is that these infections are difficult to eliminate by therapy. This is true even when antibiotics are chosen on the basis of antibiotic susceptibility testing. Cows with *Pseudomonas* mastitis are frequently culled after repeated treatment failures.

Pseudomonas is reported to be widespread in the cow's environment, and sporadic infections may result from chance exposure from the environment. Herd outbreaks, however, have been linked to a point source of the organism. One such source of contamination is the water supply used for washing cows. In milking parlors, drop hoses may be heavily colonized with *pseudomonas* and may be the source of high numbers of bacteria in the wash water. Addition of low concentrations of iodophor to the wash water does not insure that *pseudomonas* will be eliminated. Outbreaks have also been traced to pools of stagnant water to which cows have access. Other outbreaks appeared to result from use of contaminated teat cannulas or antibiotic preparations for intramammary treatment. When more than one case of *Pseudomonas* mastitis has been diagnosed in a herd, efforts should be made to identify and eliminate a point source of the organism.

This article is one in a continuing series made available by the National Mastitis Council.

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703-243-8268

Food and Environmental Hazards To Health

FDA has extended to April 1990 its requirement that the words "Treated with radiation" or "Treated by irradiation" and an internationally recognized symbol must be displayed on or with all foods that have been irradiated (FR April 18).

Nisin, an antimicrobial agent that prevents growth of *Clostridium botulinum*, can be added to certain process cheese spreads and pasteurized process cheese spreads under a rule change proposed by FDA. Cheese spreads modified to reduce sodium content are more susceptible to *C. botulinum* growth (FR April 6).

FDA plans to approve a number of colorants for use in food packaging. The new rule also will consolidate into a single regulation the list of colorants approved for use in food-contact polymers (plastics) (FR April 6).

FDA Consumer/July-August 1988

Shigella dysenteriae Type 1 in Tourists to Cancun, Mexico

From January 1 to August 1, 1988, 17 cases of diarrheal disease caused by *Shigella dysenteriae* type 1 (Shiga bacillus) were reported to CDC. Three cases were reported to CDC during the same period in 1987. Fifteen of the patients with shigellosis had visited Cancun, Mexico, and two had visited other areas in Mexico in the weeks before or during onset of their illness. The patients had no common exposures in hotels or restaurants. Thirteen (76%) of the patients required hospitalization; two patients developed hemolytic-uremic syndrome. Six isolates tested thus far at CDC were resistant to chloramphenicol and tetracycline; two isolates were also resistant to ampicillin and trimethoprim-sulfamethoxazole. An epidemiologic and laboratory investigation is under way in Mexico.

Editorial Note: The antimicrobial agents often taken prophylactically and therapeutically by travelers - trimethoprim-sulfamethoxazole and tetracycline - may be ineffective against the *S. dysenteriae* type 1 strains for which sensitivity data are available. Physicians should consider this diagnosis in persons with severe or bloody diarrheal illness who have recently returned from Mexico, obtain appropriate cultures, and report suspected cases of *S. dysenteriae* to local and state public health authorities. Laboratories are requested to send isolates of *S. dysenteriae* to appropriate public health laboratories for serotyping. Travelers to Cancun and other regions with recognized risk for travelers' diarrhea should follow CDC's recommendations for international travel.

MMWR 8/12/88

Scombroid Fish Poisoning - New Mexico, 1987

In July 1987, state and local public health officials in New Mexico investigated two cases of scombroid fish poisoning (histamine poisoning) in persons living in Albuquerque. The New Mexico Health and Environment Department was initially consulted by an Albuquerque physician regarding two patients, a husband and wife, who had become ill within 45 minutes after eating dinner. Their symptoms included nausea, vomiting, diarrhea, headache, fever, flushing, and rapid pulse rate. An investigation by the Albuquerque Environmental Health Department found that the couple had shared a meal of grilled mahi mahi, pasta, salad, water, and wine. Their dog had eaten some of the fish and had vomited; however, their daughter, who had eaten no fish, did not become ill. Both of the patients had been treated with Benadryl, activated charcoal, and ipecac in a hospital emergency room. Their symptoms resolved within 36 hours of onset of illness.

Samples of the remaining mahi mahi were sent to the Food and Drug Administration laboratory in Seattle. Histamine was detected in the samples at a ratio of 20 mg/100 g, a level sufficient to cause symptoms. Samples from a different shipment of fish were obtained from the store in Albuquerque where the mahi mahi was purchased. These samples yielded histamine levels of 3 mg/100 g of samples and were negative for ciguatera toxin.

The fish had been imported from Taiwan through California and shipped frozen to the Albuquerque distributor, where it was thawed and sold from iced refrigerator cases. The patients had frozen the fish after they bought it. Later, they thawed it for 3 hours at room temperature and then grilled the still icy fish.

Editorial Note: Of all varieties of fish, the scombroid species (tuna, bonito, and mackerel) and certain other dark-meat fish, such as mahi mahi, are the most likely to develop high levels of histamine. When fresh scombroid fish are not continuously ice or refrigerated, bacteria may convert the amino acid histidine, which occurs naturally in the muscle of the fish, to histamine. Since histamine is resistant to heat, cooking the fish generally will not prevent illness. Histamine levels may not be correlated with any obvious signs of decomposition of the fish. Thus, prompt and proper refrigeration or icing from the time the fish is caught until it is preserved, processed, or cooked is essential to prevent scombroid fish poisoning. Antihistamines may be useful for symptomatic treatment.

Because histamine is metabolized by intestinal flora, even large doses of ingested pure histamine usually do not cause symptoms. Thus, although histamine is a marker for fish that could cause scombroid fish poisoning, the actual mechanism for the poisoning must depend on an additional

cofactor. Experimental evidence indicates that other substances produced in fish by putrefactive bacteria inhibit the metabolism of histamine and permit its absorption and circulation.

MMWR 8/12/88

Organophosphate Toxicity Associated With Flea-Dip Products - California

Flea-control products, particularly flea dips for pet animals, may contain potent cholinesterase-inhibiting organophosphate pesticides. In 1986 and 1987, two cases of human illness associated with the use of flea-dip products were reported to the California Department of Health Services (CDHS) and the California Department of Industrial Relations (CDIR). One patient was a pet groomer who requested advice from the state's Hazard Evaluation System and Information Service (HESIS). The other patient was also a pet groomer. She had had a long-term illness that was discovered by HESIS through a telephone survey.

Case 1

In early September 1986, a 33-year-old female pet groomer complained of periodic headache, nausea, dizziness, tiredness, and blurred vision and of sweating and feeling "confused" and "spaced out." For over a year, these episodes had occurred more frequently, and the symptoms had become more severe each time. According to her friends, her pupils were often pinpoint-sized during these episodes. At first, she thought her symptoms were due to stress at work, and she did not seek medical care.

For the preceding 18 months, she had been treating dogs with an organophosphate pesticide. During the summer months, she had treated an average of 10 dogs per day. The flea-dip product she used is a liquid concentrate containing 11.6% phosmet (a cholinesterase-inhibiting organophosphate insecticide known to cause acute irritation of the mouth, eyes, and skin) as the active ingredient. While diluting the concentrate in water, she frequently had spilled some of the concentrate on her skin.

After consulting with HESIS, the woman's physician diagnosed her illness as organophosphate intoxication. Her red cell cholinesterase activity (0.84 pH) was well within the usual range (0.56-1.01 pH) found by the testing laboratory. The woman was treated with oral atropine, and her symptoms diminished. For 2 weeks after returning to work, she avoided contact with flea-dip solutions and remained asymptomatic; however, within an hour after she treated a dog with a product containing chlorpyrifos, a mild-to-moderate cholinesterase-inhibiting agent, her symptoms recurred. After that, she avoided contact with all organophosphate pesticides. Seven months later, her level of red cell cholinesterase, measured by the same laboratory was within 20% (0.67 pH) of the first value.

Telephone Survey

Later in September 1986, HESIS conducted a telephone survey. Twenty-four pet groomers in the San Francisco Bay area and Los Angeles were selected at random from listings in telephone directories. Through telephone interviews, 12 persons reported that they frequently used flea-dip products and usually had symptoms when they worked with the products. The symptoms most commonly reported were headache, dizziness, nausea, fatigue, and dermatitis. Two persons reported having symptoms of sweating, tearing, and confusion, all of which are consistent with cholinesterase inhibition. Flea-control products containing phosmet were most often reported as being related to the symptoms. One person complained of symptoms while working with a product containing chlorfenvinphos, an organophosphate classified by the Environmental Protection Agency (EPA) as Toxicity Class I.

Most of the pet groomers reported that they did not wear aprons or gloves and did not use the pesticides according to directions on the product labels. They often applied the undiluted concentrates with bare hands, and their skin and eyes were frequently exposed to the flea-control products.

Case 2

One of the persons interviewed was a 43-year-old female dog groomer who had been treating 8-12 dogs each day for 3 years. She sponged a concentrated solution of flea-dip product directly onto flea-infested areas on the dogs. For a year, she had periodic dizziness, fatigue, blackouts, blurred vision, chest pain, sweating, coldness, and chills. During these episodes, she had pinpoint-sized pupils. Because of the blackouts, her physician referred her to a neurologist, who observed that she had unequal pupils during one of these episodes. Diagnostic tests - including an electroencephalogram and a brain scan - did not reveal the cause of her symptoms. Pesticide poisoning was not suspected until HESIS referred her to a physician specializing in occupational medicine. Three months later, after she had completely avoided all exposure to the products, her red blood cell cholinesterase levels had gradually increased by more than 30%. The majority of her symptoms also resolved during this period. On the basis of this finding, her illness was diagnosed as organophosphate pesticide poisoning.

Further Investigations

CDHS is now conducting a statewide investigation of pet groomers and other animal handlers. The California Department of Food and Agriculture is evaluating the hazards, use, and labeling of all flea-control products containing phosmet.

Editorial Note: HESIS, which was established in 1977 and is jointly supported by CDHS and CDIR, provides an "early warning system" for identifying occupational diseases and hazards. Since 1980, HESIS has assessed occupational hazards, provided health information to the public, and maintained surveillance for occupational illness and exposure. In 1986, HESIS responded to 2,429 inquiries.

EPA has assigned phosmet to Toxicity Class II because

of acute oral toxicity ($LD_{50} = 147$ mg/kg). In a recent review of registration data on pesticides, investigators found a lack of information on acute inhalation toxicity, subchronic dermal toxicity, mutagenicity, oncogenicity, and the general metabolism of phosmet. The low-level, acute dermal toxicity ($LD_{50} = 3,160$ mg/kg) suggests a low rate of dermal absorption, but quantitative data on dermal absorption - particularly of flea-dip formulations - are lacking.

EPA requires that products used as flea dips for dogs and cats must have labels cautioning the users to wear long-sleeved shirts, long pants, elbow-length waterproof gloves, waterproof aprons, and unlined waterproof boots. Because animals that have been dipped or sprayed with pesticides have become ill or have died, EPA now requires that the product label state that a dog or cat may be poisoned if the product is not properly diluted before use.

The extent to which animal handlers in the United States are exposed to or become ill from flea-control pesticides is unknown. Animal groomers and handlers should follow label directions precisely and should wear gloves and protective clothing as recommended.

MMWR 6/3/88

Human Cutaneous Anthrax - North Carolina, 1987

On July 10, 1987, a 42-year-old male maintenance worker at a North Carolina textile mill noticed a small, red pruritic, papular lesion on his right forearm. Over the next week, the lesion became vesiculated and then developed a depressed black eschar with surrounding edema. On July 18, 24 hours after beginning treatment with an oral cephalosporin and a topical antifungal agent, he was hospitalized with worsening edema, pain, fever, and chills. Cutaneous anthrax was diagnosed. After the patient was treated with intravenous ampicillin and cephalosporins, his condition improved, and he was discharged on a regimen of oral cephalosporin. Cultures of blood and wound tissue were negative. An electrophoretic immunotransblot assay for antibody to anthrax antigens demonstrated a titer of 512 to anthrax protective antigen and lethal factor. The patient's lesion healed with a residual local scarring, and he returned to work in late August 1987.

The patient has not traveled recently outside of North Carolina, been exposed to domestic or wild animals, worked with objects made of animal materials other than those at the mill, or used bone meal fertilizer. The textile mill has been in operation for 25 years and employs about 210 workers. No known cases of anthrax have occurred among the workers before, and there has never been a vaccination program. The mill produces yarn from domestic wool and wool imported from Australia and New Zealand; cashmere goat hair from China, Afghanistan and Iran; and camel hair from China and Mongolia.

To assess the degree of *Bacillus anthracis* contamination in the mill, investigators collected samples of raw and processed materials and environmental debris from the plant. *B. anthracis* was grown from 8 (14%) of the 59 samples tested. Five samples of West Asian cashmere were positive for *B. anthracis*, as was one sample of Australian wool and two samples of surface debris from the storage area. It was not possible to determine whether the cashmere came from Iran or Afghanistan. Upon its arrival in the United States, all cashmere used in the mill is first washed in a plant in Texas and then shipped to bales in North Carolina. Although no cases of anthrax were diagnosed in Texas, eight of 12 cashmere samples (and none of four camel hair samples) obtained at the Texas plant were positive for *B. anthracis*. A vaccination program for exposed workers at both sites has been recommended.

Editorial Note: This is the first case of human anthrax to occur in the United States since 1984. Only nine cases have occurred in this country in the past decade. The practice of vaccinating workers involved in the industry processing of imported animal products and the decline in using fibers of animal origin are the primary factors in the current low incidence of human anthrax in this country. Despite the rarity of anthrax, it should be considered in the differential diagnosis of suggestive skin lesions, especially for high-risk persons, such as workers who process materials or animal origin from areas of the world where the disease is endemic and veterinarians and agricultural workers who handle infected animals.

Cutaneous anthrax was diagnosed on the basis of the characteristic skin lesion and the positive immunologic assay. The cultures were probably negative because the patient had been treated with a broad-spectrum antibiotic before sampling. The most likely source of his infection was the textile mill, since he had no other history of exposure and the mill was found to be contaminated with *B. anthracis*. Maintenance workers in textile mills are at high risk because their duties take them throughout the mill on a regular basis and the nature of their work makes them prone to minor skin injuries that can become contaminated by the bacteria.

The West Asian cashmere was probably the contaminant at the mill. Western Asia is an endemic area for anthrax, and five of the eight positive samples from the mill were from this material. In addition, all of the positive samples from the Texas plant were from cashmere, but none of the camel-hair specimens were positive. The positive sample of Australian wool may have been cross-contaminated because it was stored in the same room as the positive cashmere samples.

This case demonstrates that the potential for occupational transmission of *B. anthracis* still exists and that careful attention must be given to preventive measures. Such measures include vaccinating potentially exposed workers and educating workers about who anthrax is transmitted.

MMWR 7/8/88

Industry Products

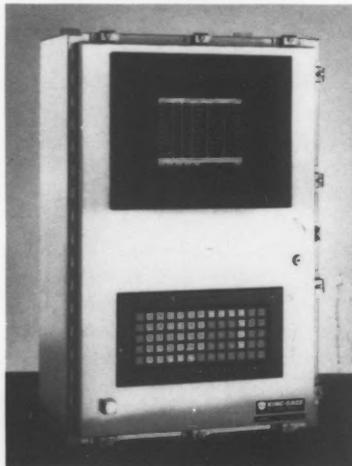


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A high efficiency, sub-micronic compressed air filter that will provide clean, dry, oil-free air required by government agencies for food processing and packaging applications. The filter will remove essentially all oil aerosols, condensed moisture, and particulates as small as 0.01 microns in size... and as an indication of efficiency, you can blow through the filter without difficulty, but the filter element will not pass tobacco smoke. The inlet and outlet ports are 1/2-14 NPT, and the filter is designed for a direct in-line installation on a rigid air line. The filter element is a roll of highly absorbent cellulose, wound on a machined polyethylene core, and can be changed in minutes without tools.

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Blue Metal-Detectable Bandage Can Save U.S. Food Processors Money

A metal- and visually- detectable bandage that can help prevent product contamination, production line downtime and product loss has been introduced to the U.S. food processing industry by Florida-based **Detectable Products**.

"Bandages can fall off the hands and fingers of workers on the processing line," says Mark Scifers, president of **Detectable Products**. "Our metal-detectable bandage offers a quick, easy way to recover them." He explains that even workers who wear gloves risk losing their bandages when removing the gloves.

The **Detectable Products Bandage** can be spotted two ways. The bandage is bright blue and can be easily seen, since virtually no food is this color. Most important, the bandage features a non-toxic metallic foil under the pad which enables it to be detected by the standard metal detection equipment installed at most food processing plants, without any adjustments or modifications.

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CRT Tank Level Gauging System Displays Liquid Level Inventories

The King-Gage CRT Gauging System is designed for the process floor environment and provides continuous indication of tank liquid inventories. Industrially hardened, it accepts proportional 4-20 mA inputs from level transmitters. Up to 80 individual channels are supported with a menu-driven user interface for a variety of display selections. Operator can choose from units of weight, volume or depth and specify individual product designations.

Customized capacity listings are used to accurately determine tank levels volumetrically, including those of non-linear tanks. This dedicated system provides precise inventory data for control and reporting. Desktop configuration is also available for control room applications. Additional remote display stations can be supported by a serial loop network.

A CRT system has a broad range of applications in food, dairy, beverage, chemical, pharmaceutical and general industrial manufacturing. Technical details are available free from **King Engineering Corp.**

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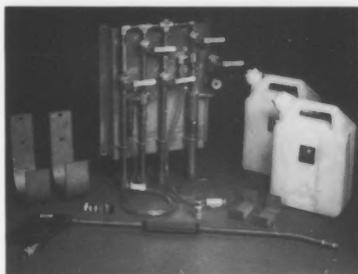
Anderson Four-Channel Sanitary Monitors Control and Retransmit

Quad-Series four-channel digital monitors from the **Anderson Instrument Company** provide continuous, independent indication of up to four process variables. The variables, which use standard electronic inputs such as voltage (0-100mV DC for pressure), resistance (100 ohm for RTDs) and current (4-20mA DC) can include pressure, temperature or any combination of the two. The status of each variable is displayed in bright, 1/2 inch high LEDs. Quad-Series monitors feature true remote operation because the four variables are displayed simultaneously without the need to manipulate channel selectors.

Modular design and construction of the Quad-Series monitors features easily accessible plug-in output cards which the user can easily change to accommodate process modifications and expansion. The cards provide a maximum of eight outputs: up to eight relays and four 4-20mA retransmission signals. The relays can be used to sound alarms and to turn equipment on or off at user-selected high or low setpoints to protect process and/or equipment. The 4-20mA retransmission signals can be interfaced with process controllers, computers and electronically-compatible recorders and indicators to expand and centralize process control.

The processor can use compatible sensors obtained elsewhere. However, when sensors are provided by **Anderson** (a wide selection of ranges and sanitary fittings are available), the combination of sensor, power supply and monitor are calibrated together by **Anderson** to ensure proper operation. Monitors are also provided with easily-accessible zero and span adjustments for calibrating the instrument for optimum accuracy. All circuitry is housed in a splashproof case which can be surface or panel mounted.

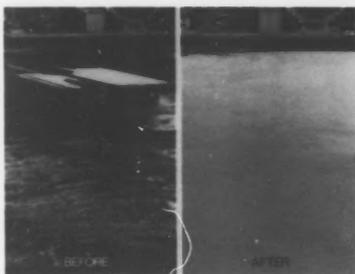
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Dual-Pressure Cleaning Station Introduced by Chemidyne

From Chemidyne Corporation comes "Commander Quad," a rinse/foam/sanitizing station that allows use of high and low water pressure from the same system. The unit feeds water for cleaning, foaming and rinsing at 600 psi, 3-4 gpm; for large-area cleaning at 250 psi, 8 gpm. It forces the use of the proper nozzle and monitors the sanitizer supply; the sanitizing drop meters the proper mix for flood sanitizing. For use with Commander I systems.

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Cono/Crete 101 Epoxy Floor Surfacers Extends Life of Concrete; Resists Abrasion, Food Fats and Slipping

The life of old and new concrete in high traffic areas of all industries can now be greatly extended by the application of a 1/4" coating of Cono/Crete 101, a heavy-duty floor surfacer manufactured by Coatings/Composites.

The 100% solids epoxy system is formulated with exceptionally hard angular aggregate instead of sand, giving it high compressive strength and exceptional resistance to abrasion, skids and slips. In addition, it resists food fats, acids and caustics.

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Shields Manufacturing Company announces their new Secondary Containment Pallets.

The Pallets have been designed to comply with current local ordinances, regulatory agency requirements and environmental regulations covering storage of hazardous materials. Two models are available: Model # 800 - 10-55 gallon drum capacity and the Mode # 300 - 4-55 gallon drum capacity

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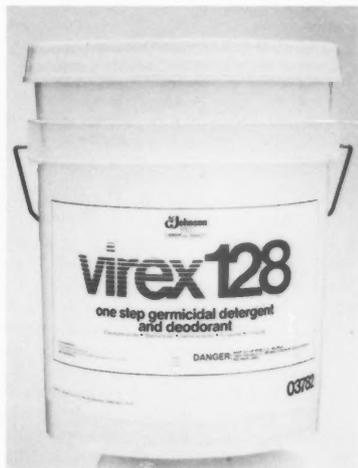
B.C. Williams Group Purchased Southland Corporation's Chemical Division and "Clean Approach" System

B.C. Williams Industries, Inc., an investment group, has acquired all of the assets, rights and technology of the Chemical Division of The Southland Corporation for an undisclosed purchase price. The investment group involves principals of the Ben C. Williams Baking Supply Company, a 54-year old Dallas-based company serving the baking industry and L.L. Brown Company, a baking service firm based in Atlanta, Georgia and the original founder of The Southland Chemical Division, Ron Goodnight.

One of the most important elements involved in this new company is the acquisition of Southland's CLEAN APPROACH, a cleaning and sanitizing system which has been field tested to guarantee successful cleaning and sanitizing for convenient, gas and specialty food stores.

The new company is engaged in the manufacturing of a wide variety of chemical specialties including sanitizers, conveyor lubricants and floor care products for food plants, dairies, bakeries and other food service operations requiring strict sanitation guidelines. With their experience in the food service industry, the company also manufactures a line of food stabilizers, flavors and a number of specialty food items.

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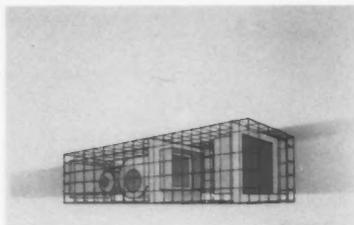
Virex 128 germicidal detergent and deodorant is an effective hospital-strength neutral cleaner that requires no rinsing from S.C. Johnson Wax.

New One-Step Neutral Germicidal Detergent Reduces Labor, Eliminates Odors

A new one-step germicidal disinfectant and deodorizer that increases labor efficiencies and reduces material costs for health care and veterinary facilities, life science laboratories, and meat and poultry plants is now available from S.C. Johnson Wax.

New Virex 128 germicidal detergent and deodorant is an effective hospital-strength neutral cleaner that requires no rinsing and prevents dulling and yellowing of floor finishes, reducing overall labor costs. Designed with advanced quaternary technology, the cleaner eliminates bacteria, fungi and viruses in 400 parts per million water hardness and 5 percent organic serum load with a 1:128 dilution ratio. Its low surface tension allows the disinfectant to penetrate deeply into cracks and crevices to ensure optimum elimination of all microbial organisms.

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The SFU from King Company is an inexpensive filtration unit which eliminates airborne contaminants such as Salmonella, Yersinia Campylobacter and Listeria.

New Unit Removes Salmonella, Yersina, and Other Airborne Contaminates

The King Company of Owatonna, Minnesota has begun shipping its new SFU air filtration units to food and pharmaceutical plants for whom an inexpensive method of eliminating airborne biological hazards from their process or storage areas will minimize the risk of product contamination and recalls.

Specifically, these SFU units filter particulates down to .3 micron through the use of HEPA or ABSOLUTE filters which have a 99.97% efficiency on airborne contaminants such as Salmonella, Yersina, Campylobacter and Listeria.

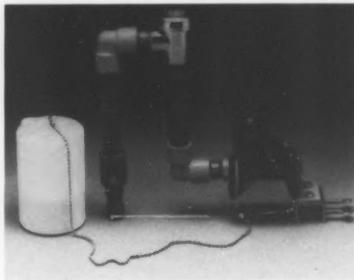
SFU equipment consists of a blower that has been precisely matched to either one or two 30% prefilters and an equal number or 95% or 99.97% HEPA final filters. By drawing tempered air from elsewhere in the building, these ceiling hung units pressurize critical space with essentially sterile air. Thus, this combination of sterile air and room pressurization assures that normal sanitization procedures used on product, equipment, room surfaces, and personnel cannot be compromised by the introduction of airborne hazards.

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Fast Chlorine Tests EPA Accepted Method

Orbeco-Hellige DPD kits and tablets assure easy and accurate tests for both Combined and Free Available Chlorine. Ideal for use with Model 605 Pocket Comparator and Color Discs or Model 943 Digital Colorimeter. The tablets are safe, pre-measured and sealed in moisture-proof foil for stability and long shelf life. Convenient for lab, plant or field use.

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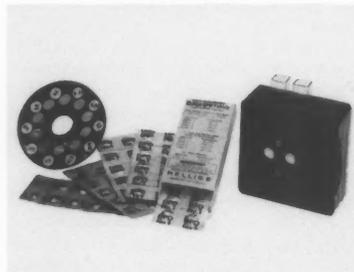
Hydro Systems Introduces 25 GPM HydroMinder

The new high volume HydroMinder from Hydro Systems Company, automatically replenishes liquid levels in premix reservoirs at 25 GPM. It eliminates manual handling, mixing and diluting of concentrates, saving time and cutting waste in the process.

When the solution level in a reservoir drops, the HydroMinder's float activates a nonelectric, magnetic valve. The flow of tap water through the valve and to the proportioner siphons liquid concentrate through a metering tip, automatically maintaining the level of prediluted solution.

HydroMinders are designed for convenience and flexibility: 1) No electrical connections or special plumbing are needed to use the high volume HydroMinder. The water inlet is standard 1" NPT. 2) Components are stainless steel, nickel plated brass, PVC, glass-filled nylon or molded polypropylene for durability and corrosion resistance. 3) Models are available with and without siphon breakers to suit specific local applications. 4) With an optional dual concentrate kit, the HydroMinder can dispense either one of two concentrates, or one concentrate at two different dilutions, via ball valve selection.

**Please circle No. 262
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Pacific Scientific Company's Compscan 7000S Near Infrared Analyzer Meets Many Requirements

The New Compscan 7000S NIR stand alone analyzer provides a fast and accurate analysis for up to 100 different products.

The Compscan 7000S has been designed to perform quantitative analysis for laboratory and process control. The operator selects the product. Product calibrations (up to six) are displayed on a large liquid crystal display (LCD). The sample is loaded into the sample transport module, the correct action initiated, and the resultant analysis displayed within seconds.

Data printout is obtained through external line printer. Data can be transmitted alternatively to IBM-PC XT or AT. NSAS-PC software is available for complete statistical spectral data analysis in real time as well as control charts supplied with SPC. Package provides storage and retrieval format for summary analysis capabilities.

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Complex Blue

Complex Blue, from CRC Chemicals, is an all new industrial strength, biodegradable cleaner and degreaser that removes grease, grime and dirt quickly, effectively and safely. Formulated from a water-based blend of high grade synthetic and natural cleaners, Complex Blue is non-flammable, non-abrasive and free of harmful bleach and ammonia. Complex Blue eliminates oil, grease and food residues from all washable surfaces and is authorized by the USDA for use in federally inspected meat and poultry plants. Containing no chlorinated solvents or petroleum distillates, Complex Blue can be used in both hot and cold water and can be diluted to provide both economical and effective cleaning performance. Complex blue performs in thousands of applications where a safer and effective cleaner/degreaser is required.

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CHARM Aflatoxin Test Available from Penicillin Assays, Inc.

A rapid aflatoxin test known as the CHARM Aflatoxin Test (CAT) for M₁ and B₁ is available from Penicillin Assays, Inc. This rapid and accurate test follows the simple procedure of the CHARM TEST II antibiotic test. The CAT can be used to test milk down to the 0.1 ppb level and feed at 2.5 ppb.

Each kit contains positive and negative standards and results are in the form of a digital readout, with a screening point that can be set at the desired detection level. No extraction procedure or preparation is needed, and no additional equipment is necessary.

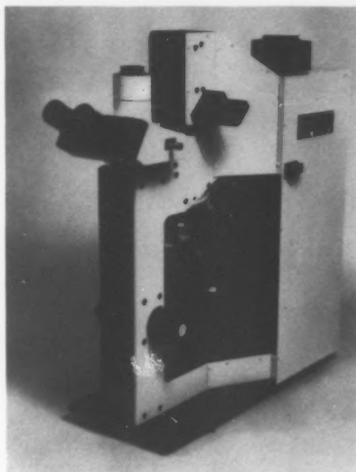
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Temperature-Compensated Electronic Level Transmitters Comply with 3-A, Can Be Cleaned in Place

Electronic level transmitters from the Anderson Instrument Company use pressure transducers and electronic circuitry to convert static head pressure generated by fluid product in vertical vessels into proportional 4-20mA output signals. These signals can be interfaced with digital indicators, microprocessors and process controllers with the objective of centralizing and enhancing process and inventory control.

The transmitters, which are available in three factory-calibrated ranges between 30" and 1200" of water column, feature all-electronic construction, and thus eliminate problems ordinarily associated with air-dependent transmitters. Transmitter circuitry is compensated for changes in ambient and process temperatures (40 to 120 degrees F) to provide less than .25% zero shift for all ranges above 80" of water column.

**Please circle No. 266
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New Spectra-Tech Microscope Aids Food & Dairy Food Chemists

Spectra-Tech has developed the IR-Plan Advanced Analytical Infrared Microscope, compact and ergonomically designed to use easily for fast acquisition of accurate data.

When it comes to various beverages, dairy foods and food products, the new microscope can be of special help in chemical analysis, research and quality control.

The microscope is built to improve precision in routine analysis of small samples, in transmission or reflectance, in sizes as microscopic as 10 microns in diameter. In addition, the microscope is priced to meet laboratory budget requirements and is optically and mechanically matched to any FT-IR.

This latest addition to Spectra-Tech's family of high-performance FT-IR microscopes lightens the user's workload with trouble-free accessible controls and optimum positioning of eye-pieces for sit-down use. It mounts at the external beam and sits on the same bench as the spectrometer. An integral 0.25 mm MCT detector aids accuracy with maximum system sensitivity.

Spectra-Tech emphasizes that all IR-Plan Microscopes give the highest sample resolution for FT-IR sampling to the diffraction limit. Exclusive resolution-enhancing techniques, Targeting and Redundant Aperturing, ensure spectra which are free of contributions caused by the surrounding sample matrix.

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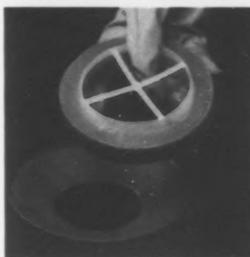


H.B. Fuller Company Division Acquires Assets of Enee Chemical Division

The Monarch Division of H.B. Fuller Company has acquired certain assets of the Clear Clean Division of Enee Chemical Sales, New Bern, N.C. Terms of the acquisition were not disclosed.

The Clear Clean Division manufactures and markets a variety of cleaners, sanitizers and conveyor lubricants for the beverage and other food processing industries in Georgia, Maryland, North Carolina, Ohio, South Carolina, Virginia and West Virginia.

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ASSUR-RING -- Assur-Ring from Klenzade, a Service of Ecolab Inc., is a uniquely designed time-released solid detergent ring formulated to control soil buildup and odors in floor drains, troughs and pits, as well as in overhead drip and collection pans. The water-activated product contains a biodegradable detergent with no phosphorus.

Klenzade Assur-Ring Provides Continuous, Time-Released Drain Sanitation

An innovative time released drain sanitation product is now available to the dairy processing industry from Klenzade, a Service of Ecolab Inc.

The Assur-Ring is a uniquely designed time-released solid detergent ring formulated to control soil buildup and odors in floor drains, troughs and pits, as well as in overhead drip and collection pans.

The product's water-activated time-released system helps maintain a cleaner plant environment 24 hours per day and helps solubilize soil deposits, reducing buildup between daily cleanings and controlling drain odors. Formed with a biodegradable detergent that contains no phosphorus, the water-activated Assur-Ring is designed to be installed around the standpipe and under the drain cover. Assur-Ring is non-corrosive to metals and masonry materials, thus minimizing expensive drain repairs.

Since it is a solid form, the Assur-Ring is easier and safer to use than liquid products. The solid product eliminates slippery spills of liquid products or dangerous splashing onto skin.

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Food Service Code Interpretations

by

Homer Emery

IAMFES Food Service Interpretations Committee

What's in a definition? During the initial review of the draft FDA Unicode several IAMFES members commented that some terms and definitions used were unclear and ambiguous. In some cases better definitions were not provided or suggested to FDA.

Some of the technical terms that we use will always be a problem. For example how do you precisely define terms such as: acceptable; pet; temporary; easily cleanable; or sound and wholesome. It's easy to find fault with a given term after someone else has written a definition. What's extremely hard if not impossible is to define a term that everyone agrees with.

While the above examples may not be considered critical issues other terms and definitions are. Two that come to mind are definitions for potentially hazardous food and hazard analysis critical control point.

A number of code interpretations dealing with the definition of potentially hazardous food have been issued by the FDA Retail Food Protection Branch (soy protein products 1984; baked potatoes 1984; cooked bacon 1984; and hard boiled eggs 1985). A detailed code interpretation was issued on the factors to be used in determining whether or not a food is potentially hazardous in 1986.

Every sanitarian conducting food related inspections should have these interpretations available. Discussions with field personnel indicate that some of us still consider commercial mayonnaise as potentially hazardous and that baked potatoes are no concern!

HACCP is a term often discussed but when it comes to definition presents a real problem. One expert has aptly described the current situation: "Everybody seems to understand the general idea of HACCP --- but there are all different types of interpretations" (Bauman 1989). If you have a HACCP definition send it in.

OFF THE CLIPBOARD: FDA recently issued a letter about the safety of garlic in oil products. When refrigeration is used as the sole barrier to microbial growth serious problems can occur. Outbreaks of botulism poisoning have been related to chopped garlic in oil products.

-It appears that the *Salmonella enteritidis*/Egg issue is a growing problem. Last fall a USDA/FDA consumer alert was issued on egg safety. In some areas nursing homes and hospitals have completely prohibited the use of shell eggs. One major food chain has limited the use of shell eggs to individual customer orders. An FDA code interpretation on this issue is being drafted.

-See you in Kansas City for the IAMFES Conference 13-17 August. A number of food sanitation related committee meetings are scheduled for Sunday afternoon. IAMFES members are invited to attend and participate in the FDA Interpretations Committee (see FEB Journal pp. 85).

-For a copy of the FDA information on garlic or egg safety send a SAS envelope to: IAMFES FDA Interpretations Committee, P.O. Box 1832, Frederick, Maryland 21701.

Homer C. Emery, R.S.

Affiliate News



Newly elected officers from left to right are Judy True, Treasurer; Debbie Pierce, Secretary; David Klee, President-Elect; Holly Wade, Vice President; E. Edsel Moore, President, and Porter Bailey, Past President. Their duties began as of February 23, 1989, and will be effective through the next Annual Conference.

KAMFES Holds Annual Meeting

This year's conference of the Kentucky Association of Milk, Food and Environmental Sanitarians was held February 21-23 at the Holiday Inn Convention Center, Louisville. This was the most expanded program that had ever been held. It consisted of a general session and three sectional sessions (milk, environmental and laboratory). The program was very successful and a plan to expand the laboratory session to a full day based upon the request from milk industry. An approximate attendance at the conference was 300 people.

Awards presented this year were: Sanitarian Award - John Draper; Achievement Award - John Delius; Service Award - Don Dixon; Special KAMFES Award - Dale Marcum; Scholarship Award - John Calvert; and Life Membership Awards - Gary Cooper, Don Dixon, Tom Forde, Warren Graham, Robert Hicks, Alpha McVicker, Orlester Owens, Leon Townsend, Joseph Schureck, and John White.

The next meeting scheduled for KAMFES is February 26-27, 1990 at the Holiday Inn Convention Center, Louisville, KY.

For more information contact Debbie Pierce, Secretary, KAMFES, P.O. Box 1464, Frankfort, KY 40602, 502-564-3340.

Upcoming IAMFES Affiliate Meetings

1989

SEPTEMBER

19-21, New York State Association of Milk and Food Sanitarians, to be held in Buffalo, New York, at the Sheraton-Buffalo Airport Hotel. For more information, contact: Paul Dersam, 27 Sullivan Rd, Alden, NY 14004, 716/937-3432.

20-21, Wisconsin Association of Milk and Food Sanitarians Annual Meeting, will be held at the Holiday Inn East, Madison, WI. Contact: Neil Vassau, PO Box 7883, Madison, WI 53707 608/267-3504.

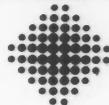
25-27, Indiana Environmental Health Association Fall Conference to be held at the Howard Johnson, Lafayette, IN. For further information call Tammy Barrett, IN State Board of Health (317) 633-0173.

1990

FEBRUARY

26-27, Kentucky Association of Milk, Food and Environmental Sanitarians' Annual Conference will be held at the Holiday Inn Convention Center, Louisville, Kentucky. For more information, contact: Debbie Pierce, Secretary, KAMFES, PO Box 1464, Frankfort, KY 40602 (502) 564-3340.

FOOD PROTECTION



and Quality Assurance Technology

September 18-22, 1989

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Synopsis of Papers for the 76th Annual Meeting

Abstracts of papers to be presented at the 76th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc. to be held in Kansas City, MO., August 13-17, 1989.

The Use of an ELISA, Listeria-Tek™, for the Rapid Detection of Listeria in Food and Environmental Samples, Rebecca J. Durham, Bryan T. Butman, and Barbara J. Robison, Organon Teknika Corporation, Bionetics Research Institute, 1330-A Piccard Dr., Rockville, MD 20850.

Detection of *Listeria* contamination in food and environmental samples remains a major concern for the food industry and regulatory agencies. Conventional microbiological methods for the detection of food borne pathogens are often laborious, time-consuming, and inconvenient. We have developed a rapid assay, enzyme-linked immunosorbent assay (ELISA), to detect *Listeria*. The test uses highly sensitive and specific monoclonal antibodies to directly assay a heat-inactivated broth sample from a 44-48 hour enrichment culture. This assay, which can test multiple samples in less than two (2) hours, has the requisite sensitivity to meet zero tolerance providing objective data for product certification.

GERMBUSTERS — A Sanitation Education Program for Elementary Schools, Homer C. Emery*, Ph.D. RS, and Florence P. Emery, U. S. Army, P.O. Box 1832, Frederick, MD 21701.

The 1988 Conference for Food Protection identified food safety education as a major issue facing food service regulatory and industry organizations. The Conference stated that "gaps in food safety education have allowed the widespread development of poor food safety habits" . . . The Conference concluded that deficiencies in food safety education extend across the entire populations.

Correcting these deficiencies will require a national food safety education effort starting in the elementary school population. Local health agencies and professional public health organizations, such as IAMFES, are in a unique position to contribute valuable expert resources to local school programs. This paper describes a program (GERMBUSTERS) that can be used to introduce food safety education to elementary school students.

Validation of EF-18 Agar with the ISO-GRID HGMF System for Rapid Detection of Salmonella in Foods, P. Entis* and P. Boleszczuk, QA Laboratories, 135 The West Mall, Toronto, Ontario, Canada, M9C 1C2.

In 1984, a rapid hydrophobic grid membrane filter (HGMF) method for detecting *Salmonella* in foods was accorded Official First Action by the AOAC. This method, which used Selective Lysine Agar (SLA), was equivalent in sensitivity to the conventional AOAC reference method; however, many non-salmonellae resembled *Salmonella* on SLA, resulting in a relatively high frequency of presumptive false positive samples. To overcome this deficiency, SLA was replaced by EF-18 Agar which incorporates an additional selective agent, novobiocin, and a second biochemical test. The revised ISO-GRID HGMF *Salmonella* method provides a negative screen result in as little as 42 hours with sensitivity equivalent to the conventional AOAC reference method. With the HGMF method, the confirmation rate of presumptive positive samples is approximately 99%, as compared to less than 90% confirmation of presumptive positive reference method results on the same samples. A collaborative study of the improved HGMF *Salmonella* method using EF-18 Agar is scheduled for 1989.

Modified Agar Medium to Isolate Starter Culture from Raw Milk, Ferreira, Célia L. F. and Aurora, P. Rueda, Universidade Federal de Viçosa - Departamento de Tecnologia de Alimentos - 36570 - Viçosa - MG - Brasil.

A modified MRS (De Man, Rogosa, Sharpe) agar, Difco, containing 0.1% sorbic acid (MRS-S) and pH adjusted to 6.4 was used as a primary medium for plating goat's milk in the process of isolation of lactic acid bacteria of importance to the dairy industry. An inhibition of 86.30 ± 2.4 percentuals (CV = 3%) towards undesirable flora was observed after comparing samples inoculated in the two media. From 156 isolates originated from the modified medium (five trials) 95.5% were cocci which exhibited positive Gram reaction following bacilli (2.60%), yeast (1.30%) and Gram negative cocci (0.60%). Behaviour of the species of interest were comparable (pH, acid and diacetyl production), to that of the type-species when cultivated to NFDM (10% reconstituted), sterilized at 121°C/15 minutes incubation at 21°C/24 h.

The Two Day

OK

Salmonella Testing

It's a step you routinely take to assure the safety of your product. And waiting for test results is costly. That's why using a 2 day test can save you time and money.

Minnesota Valley Testing Laboratory will identify routine negative Salmonella samples in just 2 days with an AOAC (Association of Official Analytical Chemists) approved testing method.

Rapid analysis means you can ship product 3 days sooner. So, there's increased shelf life, distribution flexibility and lower warehousing costs. MVTL's fast, accurate results help you respond to your customers' needs — quickly.

So why wait 5 days for the other guy to identify routine negatives when MVTL can give you an answer in just 2 days?

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Stop by our Exhibit at the IAMFES Annual Meeting Booth 40

ADVANCE REGISTRATION FORM

IAMFES

76TH ANNUAL MEETING REGISTRATION

August 13-17, 1989

Hyatt Regency Crown Center
KANSAS CITY, MISSOURI

First Initial _____ Last Name _____

ADVANCE REGISTRATION PRICES deadline Aug. 1, 1989

Please Print or Type

NAME _____

TITLE _____

ORGANIZATION _____

IS THIS: PRIVATE INDUSTRY GOVERNMENT or ACADEMIA?

STREET ADDRESS _____

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(Night) _____

Is this your first IAMFES Meeting? YES NO

Professional Area: Dairy _____ Food _____ Environmental _____ Other _____

Spouse Name _____

Children's Names _____

Please check where applicable:

IAMFES MEMBER _____ STUDENT _____

NON MEMBER _____ 30 YR. MEMBER _____ 50 YR. MEMBER _____

EXECUTIVE BOARD _____ PAST PRESIDENT _____

AFFILIATE MEMBER ONLY _____ SPEAKER _____

AFFILIATE DELEGATE _____

FOR OFFICE USE ONLY

Date Received _____
Confirmation Sent _____
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Re-bill _____ Date _____
PIF _____

REGISTRATION FEES		Student	Spouse	Amount Enclosed
Pre-registration	Member \$60	\$15		\$ _____
On-site registration	Member \$90	\$20		\$ _____
<input type="checkbox"/> I would like to become an IAMFES member and take advantage of the member discount. I am enclosing \$33.00 IAMFES membership fee along with the member registration fee. Includes 12 issues of Dairy, Food & Environmental Sanitation magazine. Foreign add \$12 for postage. US FUNDS-ONLY.				
OTHER FEES (Per Person)		# of tickets needed		
SUN., AUG. 13 8-10 p.m.	Cheese & Wine Reception	FREE		-\$0-
MON., AUG. 14 10 a.m.-noon	Hallmark Center Tour	FREE		-\$0-
MON., AUG. 14 Evening	Kansas City Gala	\$25 ⁽¹⁾ adults		
TUES., AUG. 15 10 a.m.-3 p.m.	Kansas City Sightseeing	\$12 ⁽²⁾ children (under 12)		
WED., AUG. 16 10:30 a.m.-noon	Candy/land Tour	\$22 ⁽²⁾ adults		
WED., AUG. 16 Evening	IAMFES Awards Banquet & Reception	\$12 ⁽²⁾ children (under 12)		
				TOTAL AMOUNT ENCLOSED \$ _____

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PLEASE MAIL COMPLETED APPLICATION WITH PAYMENT TO:

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Make Checks Payable to IAMFES Meeting Fund
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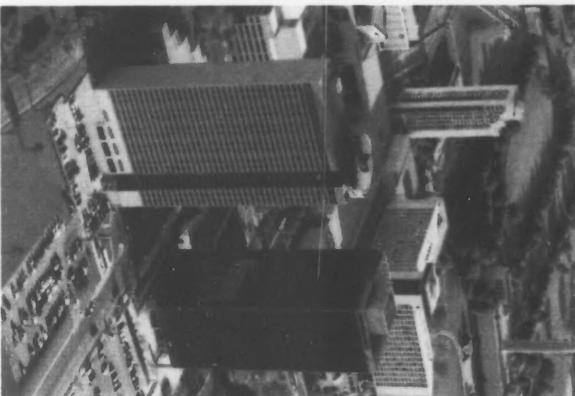
IAMFES

76th Annual Meeting
August 13-17, 1989
Hyatt Regency Crown Center
Kansas City, Missouri

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SPECIAL REQUESTS _____
Accommodations will be confirmed only with a check for the first night's deposit, or use your credit card to guarantee your reservations. You will be charged for the first night if your reservation is not cancelled prior to 6 p.m.
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2345 MCGEE STREET
KANSAS CITY, MISSOURI 64108 USA
816.421-1234 TELEX 434022

IAMFES

76th Annual Meeting Special Events Program

HALLMARK CENTER TOUR

August 14, Monday

10:00 a.m. - Noon

A guided tour of world famous Hallmark Cards production center. Seeing greeting cards being made is just the beginning of this tour. You can watch craftsmen at work, make your own ribbon bow or hear greetings in various languages. Located in the Crown Center Complex, adjacent to the Hyatt Regency, the Hallmark Visitors Center brings you the sights and sounds of Hallmark through 12 extraordinary exhibits. Hallmark produces 11 million greeting cards and 1.5 million other products each day. There is a special area of entertainment for children ages 5-12 called Kaleidoscope. You will exit onto the Crown Center Shopping Center where you may take lunch on your own at any of the many eateries, and get acquainted with the shopping complex. An all-weather skywalk will return you to your hotel. Cost: Adults *FREE*; Children *FREE*.

A DAY OF KANSAS CITY SIGHTSEEING

August 15, Tuesday

10:00 a.m. - 3:00 p.m.

A bus tour of historical westport district, the famous Plaza shopping area with its many fountains. Lunch at the Rozzelle Court Restaurant (Gourmet). A guided tour of the world famous Nelson-Atkins Museum Of Art. Time to browse the Plaza shops. Cost: Adults \$22.50; Children (12 and under) \$12.50.

CANDYLAND TOUR

August 16, Wednesday

10:30 a.m. - Noon

Your host will guide you through the plant where you can learn how chocolate is made and sample treats right off the production line. Witness the making of a batch of old-fashioned peanut brittle (and enjoy a complimentary bag of this specialty) Cost: \$5.50 Per Person.

OTHER SPECIAL EVENTS

We will have an information booth available for events you may attend on your own. Events in which you may be interested include Worlds of Fun and Oceans of Fun, K.C. Royals baseball game, American Heartland Theatre (Broadway Productions), Movie Theatre Playings at Crown Center, famous restaurants, etc. Remember, you will be in the heart of a beautiful complex with many things to see. We did not want to over schedule so you would have time to enjoy Crown Center. The Crown Center is only a 2 block walk from the Hyatt Regency.

SOCIAL EVENTS THROUGHOUT THE MEETING

Cheese & Wine Reception with Exhibits, Sunday Evening

K.C. Gala, Monday Evening A festive occasion

(You will enjoy the tastes and sounds of Kansas City)

Awards Banquet & Reception, Wednesday Evening

The Executive Board of IAMFES endorses the following Constitution and By-Law amendments as recommended by the Constitution and By-Laws revision and study committee. In accordance with the Constitution and By-Laws these will be open for discussion and vote at the 1989 Annual Business Meeting, August 15, Kansas City, Missouri. (Proposed changes are in bold print).

Constitution And By-Laws

International Association of Milk, Food and Environmental Sanitarians, Inc.

CONSTITUTION

ARTICLE I.

ASSOCIATION

There is hereby created the International Association of Milk, Food and Environmental Sanitarians, Inc., not for pecuniary purposes, which shall hereinafter be referred to as IAMFES.

ARTICLE II.

OBJECTIVES

1. Provide a forum for professionals in the areas of milk, food, and environmental safety and quality.
2. Improve the professional status of the members.
3. Assist members in their technical work and professional development.
4. Disseminate information regarding the protection of milk, food and the environment.
5. Develop, improve and promote sanitary methods and procedures for the development, production, processing, distribution, preparation and serving of milk and food.
6. Develop, improve and promote methods and procedures for supervision and inspection of the production, processing, distribution, preparation and serving of milk and food.
7. Develop and promote improved methods for the examination of milk, food and environmental samples.
8. Promote the development and adoption of uniform equipment and quality standards to improve the sanitary handling of milk and food.
9. Develop, improve and promote methods and procedures for protecting and improving the environment.
10. Cooperate with other professional groups in the improvement and promotion of milk, food and environmental sanitation.

ARTICLE III.

MEMBERSHIP

Section 1. The classes of membership in IAMFES shall be Regular, Student, Retired, Sustaining and Honorary Life Members.

Section 2. The qualification of the several classes of members, the dues of each, the manner of their election to membership, and their respective rights and privileges shall be prescribed in the By-Laws, except as otherwise provided in this Constitution.

ARTICLE IV.

OFFICERS, EXECUTIVE BOARD, AND AFFILIATE COUNCIL

Section 1. The officers of IAMFES shall be President, President-Elect, Vice President and Secretary, who shall hold these offices for one year or until their successors are elected or appointed, as provided in the By-Laws.

A. At the termination of each Annual Meeting, the President-Elect, Vice President and Secretary shall automatically succeed to the offices of President, President-Elect and Vice President, respectively.

B. The Secretary will be nominated, on a rotating basis, from educational, government and industry members.

1. The Secretary shall be elected by majority ballot of votes cast.

Section 2. The Executive Board shall consist of the Officers of IAMFES, the Immediate Past President and the Chairperson of the Affiliate Council.

Section 3. The Executive Board must include, at all times, members officially connected with education, government, and industry. There must be at least one representative from each of the three categories at all times.

A. If the status of any member of the Executive Board changes after election, or during the term of that office, or after protem appointment as provided in the By-Laws, so that the composition of members officially connected, as stated herein, is not maintained in the Executive Board, then such member shall be deemed ineligible without prejudice and such office shall be declared vacant.

B. The elective officer(s) will continue in their respective office(s) until their successor(s) are duly elected.

Section 4. An Affiliate Council shall be created which shall consist of a duly authorized representative from each Affiliate Association, and the Immediate Past President of IAMFES.

A. Each Affiliate Association shall have one vote.

B. The Council shall elect its Chairperson and Secretary, shall keep a record of its proceedings and shall submit its recommendations to the Executive Board.

C. It shall be the duty of the Council to recommend programs or activities to the IAMFES Executive Board.

ARTICLE V.

AFFILIATE ASSOCIATIONS

Section 1. IAMFES members residing in the same geographical area, and, also, functioning organizations of milk, food and/or environmental sanitarians or closely related groups whose objectives are consistent with those of IAMFES, may apply for a Charter as an Affiliate Association, under conditions stipulated in the By-Laws.

Section 2. Each Affiliate Association shall have one representative on the Affiliate Council. The representative shall be a member of IAMFES.

ARTICLE VI.

MEETINGS

Section 1. Each year, IAMFES shall hold an Annual Business Meeting.

A. A quorum, for any meeting to conduct business, shall consist of at least 50 voting members.

Section 2. Other meetings of IAMFES may be called by the Executive Board by duly announcing any called meeting in the official publication of IAMFES at least 60 days prior to the date of the meeting.

Section 3. In case there is no quorum present to transact necessary business, the Executive Board is authorized to act for the best interests of IAMFES.

Section 4. The Executive Board shall meet at each IAMFES Annual Business Meeting and at such other times as the President shall deem necessary.

A. A quorum for Executive Board meetings shall consist of at least four members and decisions shall be by a majority vote of those present.

B. In the event of a tie vote, the presiding officer will be permitted to vote.

ARTICLE VII

AMENDMENTS

Section 1. Any member may propose amendments to the Constitution by submitting them in writing to the Executive Manager, at least 60 days before the date of the next announced Annual Meeting.

A. The Executive Manager shall notify all members, at least 30 days before the Annual Meeting that the proposed amendments will be open for discussion at that meeting.

B. Such proposed amendments, upon a majority affirmative vote of the members present shall, within 60 days, be submitted to the entire membership of IAMFES by the Executive Manager.

C. All members voting on such amendments shall, within 45 days after issuance of such notification, register their vote in writing with the Executive Manager, on ballots furnished by IAMFES.

D. These ballots shall be opened, recorded and filed, and the results shall be reported by the Executive Board to the IAMFES membership.

E. If the proposed amendments are passed by a two-thirds affirmative vote of those members who register their votes with the Executive Manager, they shall become a part of the Constitution from the date of such report and notice by the Executive Board.

ARTICLE VIII.

BY-LAWS

Section 1. The IAMFES parliamentary procedure shall be governed by By-Laws, adopted by majority vote of voting members in attendance at a duly called meeting.

BY-LAWS

ARTICLE I.

MEMBERSHIP AND DUES

Section 1. Regular Members:

A. Regular members of IAMFES shall be those persons who are engaged in milk, food or environmental inspection, or the laboratory control of, or the administration of such function, or engaged in research or education work relating to any aforesaid function or otherwise interested in the objectives of IAMFES.

B. Regular members may attend meetings of IAMFES and shall be entitled to vote and hold office.

Section 2. Student Members:

A. Students pursuing undergraduate or graduate degrees in colleges or universities are entitled to membership in IAMFES at one-half the dues of regular members.

B. Student members may attend meetings of IAMFES, be accorded privilege of the floor, **but shall not be entitled to vote.**

C. Student members may not hold office in IAMFES, but may serve on committees, as Affiliate representatives and as appointed representatives of IAMFES.

Section 3. Retired Members:

A. Retired members who are no longer receiving compensation for work relating to the objectives of IAMFES and who have been regular members for at least ten (10) years are entitled to membership at one-half (1/2) the dues of regular members.

B. Retired members may attend meetings of IAMFES and shall be entitled to vote and hold office.

Section 4. Sustaining Members:

A. Sustaining members shall be organizations or persons who are interested in the objectives of IAMFES.

B. Sustaining members are entitled to special services as determined by the Executive Board of IAMFES.

C. Sustaining members shall be entitled to one (1) Regular membership in IAMFES for their representative at no additional cost.

1. The name of the representative must be submitted to the Executive Manager of IAMFES at the time of membership.

2. Other persons associated with the Sustaining Members's organization are not members of IAMFES unless they have individual memberships.

Section 5. Honorary Life Members:

A. The Honorary life membership shall be composed of persons who, on account of their substantial contributions to the objectives of IAMFES, have been nominated by a member(s) and confirmed by the Executive Board.

B. Honorary life members shall not be required to pay dues.

C. Honorary life members may not hold office in IAMFES, but may serve on committees, as Affiliate representatives and as appointed representatives of IAMFES.

D. Honorary life members may attend meetings of IAMFES, be accorded privilege of the floor, and shall be entitled to vote.

Section 6. Composition of Executive Board and Committees

A. Any person serving as an officer of IAMFES must be a regular or retired member of IAMFES.

B. Any person serving on IAMFES committees, as an Affiliate representative, or as an appointed representative of IAMFES, shall be a current regular, student, retired or honorary life member of IAMFES.

Section 7. Any person desiring membership in IAMFES shall submit an application to the Executive Manager. It is the responsibility of the Executive Board to insure that applicants meet the eligibility requirements for membership.

Section 8. The Executive Board is authorized to set dues as may be necessary to achieve the objectives of IAMFES and shall notify the members of amount of dues.

Section 9. Any person, having once become a member, may continue membership in IAMFES so long as the annual membership dues are paid, except as provided in Article II, Section 5, Subsection F of these By-Laws.

A. Any member who shall fail to pay annual dues by due date shall be placed on the inactive list.

1. Members on the inactive list shall not receive publications of IAMFES.

B. Such member(s) may be reinstated within 90 days thereafter, upon payment of dues.

C. Any member who is delinquent in dues after 90 days will be dropped from the inactive list.

1. Membership may be renewed by filing an application and payment of annual dues.

Section 10. Each paid-up member of IAMFES, in good standing, shall receive, at no extra cost, the regular issues of the Official Publication and such other publications as the Executive Board may direct, for the period in which the dues are paid.

Section 11. Collection of Dues:

A. The Executive Manager shall collect annual membership dues for each member paying directly to IAMFES.

B. Affiliate Associations may authorize the Executive Manager to bill their members for both Affiliate and IAMFES dues. In such case, the Executive Manager will forward to the Affiliate, within 30 days of collection, the dues paid for Affiliate membership.

C. Affiliate Associations may collect both the Affiliate and IAMFES dues. In such case, the Treasurer of the Affiliate will forward to IAMFES, within 30 days after collection, the dues paid for IAMFES Membership.

D. Members of IAMFES who pay local dues to more than one Affiliate Association will pay annual membership dues only once to IAMFES and shall receive only one annual subscription to the Official Publication of IAMFES.

ARTICLE II.

**DUTIES OF OFFICERS AND THE
EXECUTIVE BOARD**

Section 1. The President shall preside at all meetings of IAMFES and the Executive Board.

A. The President shall appoint all Committees, unless otherwise directed by the Constitution and By-Laws.

B. The President shall perform such other duties as that usually devolve upon the presiding officer or are required of this officer by the Constitution and By-Laws.

Section 2. The President-Elect shall perform the duties of the President, in the latter's absence, and shall succeed the President when the latter's term expires.

A. The President-Elect shall be Chairperson of the Program Committee which will be responsible for planning the program for the Annual Meeting.

B. The President-Elect will also appoint the Teller's Committee and the Nominating Committee.

Section 3. The Vice President shall perform the duties of the President and President-Elect in their respective absences.

A. The Vice President shall serve on the Program Committee.

B. The Vice President shall study the organization and operation of the committees of IAMFES and make recommendations to the Executive Board regarding said committees.

Section 4. The Secretary shall perform the duties of the President, President-Elect and the Vice President, in their respective absences.

A. The Secretary shall be responsible for maintaining correspondence and minutes of IAMFES proceedings.

B. The Secretary, with the assistance of the Executive Manager and Staff, shall record and report all minutes of meetings of the Executive Board, including the Business Meeting at the Annual Meeting.

Section 5. The full management of the affairs of IAMFES shall be in the hands of the Executive Board as provided in the Constitution. The duties of the Executive Board shall be:

A. To direct the administrative work of IAMFES, including all matters connected with its collaboration with other groups, institutions and its professional development;

B. To act as trustee of IAMFES property;

C. To fix the time and place for the Annual Meeting;

D. To act for and in behalf of IAMFES in any administrative, financial, legislative, educational, or other capacity as IAMFES may direct, or to act on its own initiative between meetings and report such action at the next Annual Meeting;

E. To make protem appointments to fill any vacancy or vacancies, that may occur among the officer(s) between IAMFES meetings, and to recommend the replacement of an officer at the Annual Meeting, because of inability or inactivity or for other causes which may be in the best interest of IAMFES;

F. To recommend expulsion from membership for cause by two-thirds of all votes cast, but in no case to recommend revocation without giving the member written notice of reasons for the contemplated action at least one month before action is taken and an opportunity for a hearing in person and/or a rebuttal in writing;

G. To employ personnel, as the situation demands, and fix their compensation and duties;

H. To execute the policies of IAMFES and report to the members at the business meeting at the Annual IAMFES Meeting, any action taken that was not specifically authorized;

I. To set the amount of the Registration Fee for the Annual Meeting;

J. To authorize the issuance or revocation of a Charter to an Affiliate Association.

K. In the absence of an Executive Manager, due to illness, death, resignation, or prolonged absence, the Executive Board will be responsible for all duties shown in Article III of these By-Laws.

ARTICLE III
EXECUTIVE MANAGER

Section 1. The Executive Board shall hire an Executive Manager to perform the following duties:

- A. Keep a list of members and their addresses.
- B. Assemble and transmit to the Editors of the publications of IAMFES, all papers, addresses, and other matter worthy of publication as soon as possible after the Annual Meeting.
- C. Keep a current list of names and addresses of IAMFES members entitled to receive the publications.
- D. Issue notices of all meetings, conduct correspondence pertaining to the affairs of IAMFES and perform other duties incident to the office as the Executive Board may authorize.
- E. Receive all monies due IAMFES, giving receipt therefore, and keeping account thereof.
- F. Faithfully care for all monies received, paying out expenses as authorized by the Executive Board and keeping account thereof.
- G. File a surety Bond with the President of IAMFES in an amount as directed by the Executive Board.
- H. Provide a detailed statement of the financial condition of IAMFES at the Business Meeting of the Annual Meeting.
- I. Provide other services as directed by the Executive Board.

ARTICLE IV
AFFILIATE ASSOCIATIONS

Section 1. The conditions for authorizing the issuance of a Charter to an Affiliate Association are as follows:

A. When a regional group of members of IAMFES want to form an Affiliate Association, a group of at least ten members of IAMFES will sign the application and forward it to the Executive Manager of IAMFES with the following information:

1. A list of the names, addresses and phone numbers of the IAMFES members forming the proposed Affiliate Association;
2. A list of names, addresses and phone numbers of the temporary officers of the proposed Affiliate Association, at least one of which shall be a member of IAMFES;
3. The name of the proposed Affiliate Association, and
4. A definition of the geographical area desired to be covered.
5. A copy of the proposed Affiliate Constitution and By-Laws.

B. When an already-existing organization with at least ten (10) members of IAMFES wants to become an Affiliate Association, the Secretary or other duly authorized officer of the applicant organization will make written request for affiliation status and provide the following information:

1. A list of the names, addresses and phone numbers of the IAMFES members forming the proposed Affiliate Association;
2. A list of names, addresses and phone numbers of its officers, at least one of which shall be a member of IAMFES;
3. The name of the organization;
4. A definition of the geographical area desired to be covered;
5. A copy of the Affiliate Constitution and By-Laws, and
6. An attested copy of the minutes authorizing said application.

Section 2. Upon majority vote of the Executive Board, the Executive Manager, or, in the absence thereof, the Secretary of IAMFES will notify the responsible officer of the applicant organization concerning the action taken.

A. Upon receipt of any further information requested by the Executive Board, a Charter will be executed to an Affiliate Association in form and substance as approved by the Executive Board.

1. The Charter will be presented to the duly authorized Affiliate representative member at the IAMFF'S Annual Meeting or at the Annual Meeting of the Affiliate.

B. After the granting of the Charter by IAMFES, and yearly thereafter, the Secretary of the Affiliate Association or other duly authorized officer shall submit the names, addresses and phone numbers of each IAMFES member and Affiliate member, and other official business to the Executive Manager of IAMFES.

Section 3. Any Affiliate Association may use the expression "Affiliated with the INTERNATIONAL ASSOCIATION OF MILK, FOOD, AND ENVIRONMENTAL SANITARIANS, INC.," or an equivalent legend that is approved by the IAMFES Executive Board.

Section 4. An Affiliate Association Charter may be revoked by the IAMFES Executive Board:

A. Upon recommendation by the Affiliate Council, on two-thirds (2/3rds) vote of the total number of votes cast by that Council after due and reasonable notice has been given in writing at least three months before such a vote is to be taken and a reasonable opportunity is given for a hearing.

B. A Charter may be revoked for the following causes:

1. When the affairs of the Affiliate Association are not conducted consistent with the Constitution and By-Laws of IAMFES.
2. When the Affiliate Association has ceased to function for two years, or
3. When the Affiliate Association fails to maintain at least ten (10) members in IAMFES for two (2) consecutive years.

ARTICLE V

AFFILIATE COUNCIL

Section 1. The duties of the Affiliate Council shall be:

- A. To Act as an advisory body to the Executive Board;
- B. To serve as the means for the interchange of ideas and recommendations or programs, activities, and procedures among and between the Affiliate Associations and the Executive Board;
- C. To aid in putting into effect, policies and programs authorized by IAMFES and by the Executive Board;
- D. To convey to the respective Affiliate Associations, information on the activities on IAMFES;
- E. To make a report of its activities to the Executive Board and at the Business Meeting of the Annual Meeting.

Section 2. Duties of the Officers of the Affiliate Council:

A. The Chairperson shall:

1. Preside at all meetings of the Council;
2. Serve as a voting member of the IAMFES Executive Board;
3. Appoint all Council committees unless otherwise directed by vote of the Council, and
4. Perform other duties as usually devolve upon the presiding officer.

B. The Secretary shall:

1. Keep an accurate record of the proceedings and activities of the Council;
2. Preside over Council Meetings in the absence of the Chairperson, and
3. Keep an up-to-date record of authorized representatives to the Council.

Section 3. The Affiliate Council shall meet at the Annual Meeting.

- A. Official business may be transacted by a majority vote of the authorized representatives present.

ARTICLE VI

COMMITTEES

Section 1. Standing committees of IAMFES shall consist of the following: Program Committee, Journal of Food Protection Management Committee, Journal Dairy, Food and Environmental Sanitation Management Committee and Past Presidents' Advisory Committee.

A. The Program Committee shall include the officers of IAMFES, Chairperson of the Program Advisory Committee, the Executive Manager and the Chairperson of the Local Arrangements Committee. The President-Elect shall chair the Committee.

B. The Journal Management Committees shall consist of Chairpersons, appointed by the President, the Editors of the IAMFES publications, three members appointed for 3-year terms and the Executive Manager, who shall serve as the Managing Editor of the publications, unless otherwise designated by the Executive Board.

1. The Committees shall handle all editorial matters concerning publications of the Journal(s) and other publications of IAMFES, with the approval of the Executive Board.

C. The Past Presidents' Advisory Committee shall be composed of Past Presidents of IAMFES.

1. The Immediate Past President will act as liaison between this committee and the Executive Board.
2. This committee will meet at each Annual Meeting.
3. In the absence of all Executive Board members, this committee would select interim officers until new officers could be elected.

4. Advise Executive Board on any IAMFES matters as deemed advisable.

Section 2. Each year, prior to the Annual Meeting, the President-Elect shall appoint a seven-member Nominating Committee.

A. At least one member shall have served on the Nominating Committee the previous year, and the members should be representative of geographical and membership groups.

B. The Chairperson of the committee shall be a Past President (not on the Board), whose name shall be announced at the Annual Meeting, and published in the official publication of IAMFES the month following the Annual Meeting, together with the date by which candidates for nomination(s) for office(s) shall be submitted.

C. The Nominating Committee shall submit the names of at least two nominees for the office of Secretary to the Executive Manager as directed by the President-Elect. The names, with pictures and biographical sketches, shall be published in the official publication of IAMFES not later than April 1 of the year in which the election is to be held.

D. Ballots shall be distributed by the Executive Manager as directed by the Executive Board and must be returned to the Executive Manager by June 1, for checking against the IAMFES eligible voter list and then forwarded to the Teller's Committee for counting.

E. The person receiving the greatest number of votes shall be certified to the President at least one month in advance of the Annual Meeting.

Section 3. The President-Elect shall appoint a Teller's Committee composed of three persons for the purpose of certifying the results of each election of Officers.

Section 4. Other special committees and regular continuing committees may be authorized by the Executive Board or by the President for special work or assignment.

A. The need for continuation of such committees shall be subject to annual review of the Executive Board.

B. All appointments of Chairpersons to Continuing committees shall be made by the President-Elect prior to the Annual Meeting and shall be subject to annual review of the Executive Board. Proposed members of committees will be designated by the Committee Chairperson and presented to the Executive Board for approval.

Section 5. The terms of office of all committee Chairpersons shall expire at the end of the Annual Meeting next following their appointment, except as provided in the By-Laws.

ARTICLE VII

MEETINGS

Section 1. Each year, IAMFES shall hold an Annual Business Meeting.

A. A quorum for any meeting to conduct business shall consist of at least 50 voting members.

Section 2. Other meetings of IAMFES may be called by the Executive Board, by duly announcing any called meeting at least 60 days prior to the date of the meeting.

Section 3. The Executive Board and the Affiliate Council shall meet at the Annual Meeting.

Section 4. When, in the discretion of the Executive Board, it is considered advisable to conduct a vote on a question by mail ballot, a majority of the votes cast will be necessary to carry the proposition.

Section 5. Robert's Rules of Order shall govern the procedures at all meetings. Voting by proxy shall not be permitted.

ARTICLE VIII

PUBLICATIONS

Section 1. All publications of IAMFES will be issued under the authority of the Executive Board.

A. Any Affiliate Association may publish its own material but must assume full responsibility therefor, and obligate IAMFES in no way.

Section 2. Dairy, Food and Environmental Sanitation shall be the Official publication of IAMFES and the Journal of Food Protection will be the Scientific publication.

A. These Journals will be the property of IAMFES, which will own the copyrights and all the articles published therein.

B. The Editors will serve at the pleasure of the Executive Board.

Section 3. The Executive Board will authorize and direct other publications of IAMFES.

ARTICLE IX

AMENDMENTS

Section 1. Any member may propose amendments to these By-Laws by submitting them in writing to the Executive Manager at least 60 days before the date of the next announced meeting.

A. The Executive Manager shall notify all members, at least 30 days before the next announced meeting, that the proposed amendment(s) will be open for discussion and voting at the next meeting.

B. These By-Laws may be amended by majority affirmative vote of the voting members present.

New IAMFES Members

Arkansas

Roger Poerschke
Tyson Foods, Inc.
Springdale

California

Donna Lynn Johnson
Dole Packaged Foods
San Jose

Rambod Omid
Curtis & Tompkins, Ltd.
Los Angeles

Richard Sanchez
San Bernardino County
Ontario

Donald P. Swan
Sunkist Growers, Inc.
Ontario

District of Columbia

Kathryn H. Fleming
Technical Assessment Systems, Inc.
Washington

Florida

Sara J. Stinson
Pepperidge Farm
Lakeland

Georgia

Amenan Rose Koffi
Univ. of Georgia
Athens

Illinois

October G. Bansil
Kraft, Inc.
Skokie

Joe DeLaney
Prairie Farms Dairy
Carlinville

Tom W. Dowdy
The Quaker Oats Company
Barrington

Iowa

Marie D. Barclay
Iowa Dept. of Agri. & Land Stewardship
Des Moines

Ruby Muk-Lan Lee
ISU
Ames

Phillip A. O'Berry
US Dept. of Agri.
Ames

Steven E. Smit
Wells Blue Bunny
LeMars

Kansas

Renee' A. Hart
Kansas State Univ.
Manhattan

Kentucky

Tara Hendrix
Boyle Co. Hlth Dept.
Danville

E. Edsel Moore
Dept. for Hlth Svcs.
Frankfort

Louisiana

John U. McGregor
Louisiana State Univ.
Baton Rouge

Maine

Munimbazi Celestin
Univ. of Maine
Orono

Maryland

Erick Babilonia
USDA
Beltsville

Anne Marie McKenzie
Coldwater Seafood Corp.
Cambridge

John R. Molenda
Salisbury State Univ.
Salisbury

Massachusetts

Al DePaoli
Waltham Beef & Provision
Boston

Robert M. Simek
Arthur D. Little, Inc.
Cambridge

Robert Sturtevant
Purity Supreme, Inc.
Billerica

Michigan

Ted Havens
Calhoun County Hlth Dept.
Battle Creek

Georgia Markakis
State of Michigan
Lansing

Brock A. Marlin
Cass County Hlth Dept.
Cassopolis

Steve Wysong
Wayne State Univ.
Midland

Minnesota

Joellen Fiertag
Fresh Check
St Paul

Ken Knutson
Goldberger Foods
Minneapolis

Missouri

David L. Kruse
St. Louis Div. of Hlth
Willow Springs

New Jersey

Daryl E. Bentivenga
Silliker Laboratories, Inc.
Parlin

Margarat A. Fraser
Silliker Laboratories, Inc.
Plainfield

Paulette J. Simonetti
Stockton State College
Atlantic City

North Carolina

Joseph M. Stout
Planters Life Savers Co.
Winston Salem

Ohio

Randy Minck
Stouffer Foods
Solon

Stephen R. Schulte
Hixson
Cincinnati

Oregon

Robert W. Blue
Seafood Technologies, Inc.
Astoria

Victoria E. Look
Oregon State Univ.
Albany

Kathleen Wickman
OSDA - Lab Svcs
Salem

Pennsylvania

James N. Hastings, Jr.
H.J. Heinz Co.
Pittsburgh

David A. Jackson
Chester County Hlth Dept.
West Chester

Arnold J. Roseman
Penn State Univ.
Reading

A. Paul Strauss
Acme Markets
Philadelphia

Texas

Parmel O. Blakes
Sea World of Texas
San Antonio

Diane M. Carson
Campbell Taggart, Inc.
Dallas

Hal Coleman
Texas Dept. of Corrections
Huntsville

John Duke
Tyler-Smith County Hlth Dept.
Tyler

Gordon Heber
Americana Foods, Inc.
Dallas

Rod Smith
Campbell Taggart, Inc.
Dallas

Utah

Jeffrey J. Murray
Smith's Management Corp.
Layton

Virginia

James O. Bowman
Fairfax County Hlth Dept.
Fairfax

Constance L. Kazovich
Planters LifeSavers Co.
Suffolk

Wisconsin

David Anderson
Anderson Custom Processing
Belleville

Michael R. Jacobson
Land O'Lakes
Eau Claire

Carol Martin
Food & Drug Professionals
Juneau

Jill M. Reitz
Fred Usinger, Inc.
Milwaukee

Canada

Ray Cheung
JR Laboratories, Inc.
Burnaby, B.C.

Blaine G. LaBrash
Etobicoke, Ontario

Janet Rice
J.M. Schneider, Inc.
Ajax, Ontario

Ireland

William Charteris
SciEng Tech Ltd.
Cork

Korea

Chung Duck-Hwa
Gyeongsang Nat'l Univ.
Jinju

Mexico

Erasmus Herman y Lara
Tuxtepec

Marcela Vehs
Sabritas S.A. de C.V.
Barrilaco

Before you buy a product . . .



- Read the label**
- Check the package**

If *anything* seems wrong, tell the store manager.

When you open it, CHECK IT OUT again. If it looks or smells wrong, take it back.

— A message from this magazine and the Food and Drug Administration

Dairy, Food and Environmental Sanitation Instructions for Authors

Nature of the Magazine

Dairy, Food and Environmental Sanitation 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: 1) practical articles in milk, food and environmental protection, 2) new product information, 3) news of activities and individuals in the field, 4) news of IAMFES affiliate groups and their members, 5) 3-A and E-3-A Sanitary Standards, amendments, and lists of symbol holders, 6) 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

All manuscripts and letters should be submitted to the Editor, Kathy R. Hathaway, IAMFES, P.O. Box 701, Ames, Iowa 50010.

Articles are reviewed by two members of the editorial board. After review, the article is generally returned to the author for revision in accordance with reviewer's suggestions. Authors can hasten publication of their articles by revising and returning them promptly. With authors' cooperation articles are usually published within three to six months after they are received and may appear sooner.

Membership in IAMFES is not a prerequisite for acceptance of an article.

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All manuscripts should be typed, double-spaced, on 8-1/2 by 11 inch paper. Side margins should be one inch wide.

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Examples of Proper Bibliographic Citations

Paper in a journal

Alderman, 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 a 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

Fennema, O. R., W. D. Powrie, and E. H. Marth. 1973. *Low-temperature preservation of foods and living matter.* Marcel Dekker, Inc., New York. 598 p.

Patent

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

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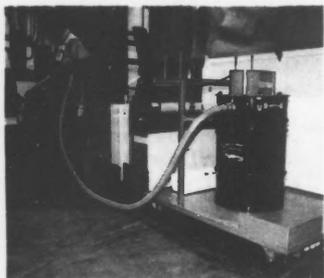


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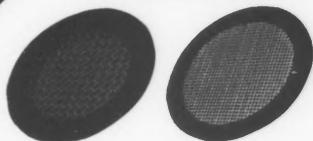


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Amendments To 3-A Sanitary Standards For Non-Coil Type Batch Pasteurizers For Milk and Milk Products

Number 24-02

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

The 3-A Sanitary Standards for Non-Coil Type Batch Pasteurizers for Milk and Milk Products, Number 24-01, are hereby amended as indicated in the following:

- D.17.1 The inside diameter of the outlet passage of pasteurizers shall not be less than the nominal inside diameter of a 1-1/2-inch (1.402-inches) 3-A Sanitary Fitting. The outlet shall be in a position that will provide complete drainage of the pasteurizer. The outlet and the outlet valve shall be so designed that either a single service or a multiple-use gasket can be used.

These amended standards shall become effective November 1, 1989, at which time the 3-A Sanitary Standards for Non-Coil Type Batch Pasteurizers for Milk and Milk Products, Number 24-01 are rescinded and become null and void.

Amendments To 3-A Sanitary Standards For Non-Coil Type Batch Processors For Milk and Milk Products

Number 25-02

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

The 3-A Sanitary Standards for Non-Coil Type Batch Processors for Milk and Milk Products, Number 25-01, are hereby amended as indicated in the following:

- D.17.1 The inside diameter of the outlet passage of processors shall not be less than the nominal inside diameter of a 1-1/2-inch (1.402-inches) 3-A Sanitary Fitting. The outlet shall be in a position that will provide complete drainage of the processor. The outlet and outlet valve shall be so designed that either a single service or multiple-use gasket can be used.

These amended standards shall become effective November 1, 1989, at which time the 3-A Sanitary Standards for Non-Coil Type Batch Processors for Milk and Milk Products, Number 25-01 are rescinded and become null and void.

3-A Sanitary Standards For Stainless Steel Automotive Milk and Milk Products Transportation Tanks For Bulk Delivery and/or Farm Pick-Up Service

Number 05-14

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

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Milk transportation tank specifications heretofore and hereafter developed which so differ in design, material and fabrication or otherwise as not to conform with the following standards, but which, in the fabricator's opinion are, equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS, and DIC at anytime.

A

SCOPE

A.1

These standards cover the sanitary aspects of automotive transportation tanks for milk and fluid milk products.

A.2

In order to conform with these 3-A Sanitary Standards, transportation tanks shall comply with the following design, material and fabrication criteria.

B

DEFINITIONS

B.1

Bulk Milk Transportation Tank: Shall mean an over the road truck or trailer tank used to transport milk and milk products. It may have more than one compartment.

B.2

A Farm Pick-Up or Multiple Pick-up and Delivery Tank: Shall mean a bulk milk transportation tank as defined in B.1 with milk transfer attachments and facilities, including a pump and/or hose cabinet, as specified herein.

B.3

Product: Shall mean the milk or fluid milk product transported in the tank.

B.4

Product Contact Surfaces: Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop or be drawn into the product.

B.5

Non-Product Contact Surfaces: Shall mean all other exposed surfaces.

B.6

Product Outlet: Shall mean the opening in the lining of a tank or a compartment and the outlet passage for product to the exterior of the tank or compartment. The outlet passage starts at the opening in the lining and terminates at the connection for the outlet valve.

B.7

Pump and/or Hose Cabinet: Shall mean a cabinet used to house the pump and/or transfer hose and may also house a compartment for product sample trays and samples.

B.8

Deck Plate: Shall mean the manhole dust cover seat or that part of the outer jacket on which the cover rests.

B.9

Mechanical Cleaning or Mechanically Cleaning: Shall denote cleaning, solely by circulation and/or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned, by mechanical means.

C

MATERIALS

C.1

Product-contact surfaces shall be of stainless steel of the AISI 300 series*¹ or corresponding ACI*² types (See Appendix, Section E.) or metal which under conditions of intended use is equally corrosion-resistant as stainless steel of the foregoing types, and is non-toxic and non-absorbent, except that:

C.1.1

Rubber and rubber-like materials may be used for flexible transfer tubing, gaskets, seals, vents and parts having the same functional purpose.

C.1.2

Rubber and rubber-like materials when used for the above specified applications shall comply with the applicable provisions of the 3-A Standards for Rubber and Rubber-Like Materials, Number 18-00.

*The data for this series are contained in the following reference: AISI Steel Products Manual, Stainless & Heat Resisting Steels, December 1974, Table 2-1 pp. 18-19. Available from American Iron & Steel Institute, 1000 16th St., NW, Washington, DC 20036.

²Steel Founders' Society of America, Cast Metals Federation Bldg., 455 State St., Des Plaines, IL 60016.

- C.1.3 Plastic materials may be used for flexible transfer tubing, gaskets, seals, vents, hose/pump cabinets and parts having the same functional purpose.
- C.1.4 Plastic materials when used for the above specified applications shall comply with the applicable provisions of the 3-A Standards for Multiple-Use Plastic Materials, Number 20-14.
- C.1.5 Where functional properties are required for specific applications such as agitator bearing surfaces and rotary seals, where dissimilar materials are necessary, carbon, and/or ceramics may be used. Ceramic materials shall be inert, non-porous, non-toxic, non-absorbent, insoluble, resistant to scratching, scoring, and distortion when exposed to the conditions encountered in the environment of intended use and cleaning and bactericidal treatment.
- C.1.6 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformation characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.
- C.1.7 The final bond and residual adhesive, if used, of bonded rubber and rubber-like materials and bonded plastic materials shall be non-toxic.
- C.2 The gauge of material for the lining shall be not less than the following:
 16 U.S. Standard Gauge for tanks of capacities of 1,000-gallons (4,000-liters) or less;
 14 U.S. Standard Gauge for tanks of capacities of over 1,000-gallons (4,000-liters) and not exceeding 2,000-gallons (7,500-liters);
 12 U.S. Standard Gauge for tanks of over 2,000-gallons (7,500-liters) capacity, except that lighter gauges of material shall be permitted if they are so supported that they will have equal resistance to denting, buckling and sagging, as provided by the three gauges specified above for the respective sizes of tanks.
- C.3 All non-product contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion-resistant. If coated, the coating shall adhere. All non-product contact surfaces shall be relatively non-absorbent, durable and cleanable. Parts removable for cleaning having both product contact and non-product contact surfaces shall not be painted.
- C.4 The lining of the pump and/or hose cabinet shall be stainless steel, plastic or equally corrosion-resistant durable material.
- C.5 Gasket material for pump and/or hose cabinet doors

shall be smooth, easily cleanable and non-absorbent.

- C.6 Sample trays and insulated sample boxes that will be in the pump and/or hose cabinet shall be made of stainless steel, plastic or other equally corrosion-resistant durable material.

D FABRICATION

- D.1 All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds and crevices in the final fabricated form. (See Appendix, Section F.)
- D.2 All permanent metallic joints in product contact surfaces shall be continuously welded. All welded areas on product contact surfaces shall be at least as smooth as a No. 4 ground finish on stainless steel sheets free of imperfections such as pits, fold and crevices.
- D.3 All product contact surfaces shall be easily accessible for cleaning and inspection, either when in an assembled position or when removed. Removable parts shall be readily demountable.
- D.4 All product contact surfaces shall be self-draining except for normal clingage. Tanks shall be so constructed that the lining will not sag, buckle or prevent complete drainage of water when the tank has a pitch of not more than one-inch (25.4-mm) in 100-inches (254-cm).
- D.5 The height of the vertical axis of the lining of the tank shall not be less than the minimum heights shown in the following tables:

TABLE 1. Tanks Having Uniform Vertical Axes
 Note: 1-inch = 2.54-cm

	Minimum Height	
	inch	cm
Up to and including 500-gallons (2,000-liters)	36	91
Over 500-gallons (2,000-liters) and up to and including 2,000-gallons (7,500 liters)	40	102
Over 2,000-gallons (7,500-liters) and up to and including 2,800-gallons (10,500-liters)	42	107
Over 2,800-gallons (10,500-liters) and up to and including 3,500-gallons (13,000-liters)	44	112
Over 3,500-gallons (13,000-liters)	46	117

TABLE 2. Tanks Having Varying Vertical Axes
Note: 1-inch (2.54-cm)

	Minimum Height			
	Front		Rear	
	inch	cm	inch	cm
Up to and including 500-gallons (2,000-liters)	36	91	36	91
Over 500-gallons (2,000-liters) and up to and including 2,000-gallons (7,500-liters)	40	102	40	102
Over 2,000-gallons (7,500-liters) and up to and including 2,800-gallons (10,500-liters)	41	104	51	130
Over 2,800-gallons (10,500-liters) and up to and including 3,500-gallons (13,000-liters)	43	109	55	140
Over 3,500-gallons (13,000-liters)	43	109	57	145

D.6

All internal angles of 135-degrees or less on product contact surfaces shall have a minimum radii of 1/4-inch (six-mm) except that:

D.6.1

Where the head(s) and the partition wall(s) join the lining of the tank, the radius shall not be less than 3/4-inch (19-mm).

D.7

There shall be no threads on product contact surfaces.

D.8

All sanitary tubing shall conform with 3-A Sanitary Standards for Polished Metal Tubing, Number 33-00.

D.9

All sanitary fittings and connections shall conform with the applicable provisions of the 3-A Sanitary Standards for Fittings, Number 08-17 rev., and supplements thereto except that materials conforming to C.1.2 or C.1.4 may be used for caps of sanitary design for the protection of terminal ends of sanitary tubes, fittings, or vents.

D.10

The outer shell shall be smooth and effectively sealed except for a vent or weep hole in the outer shell of the tank. The vent or weep hole shall be located in position that will provide drainage from the outer shell and shall be vermin proof. The outer jacket and doors of the pump and/or hose cabinet shall be smooth and effectively sealed. Outside welds need not be ground.

D.11

Non-product contact surfaces shall be smooth, free of pockets and crevices and be readily cleanable and those to be coated shall be effectively prepared for coating.

D.12

The amount of insulating material shall be:

D.12.1

The farm pick-up tank and divider between the compartments of a multi-compartment tank shall be insulated in such a manner that, in a 24-hour period, when the tank is full of water, the average change in the temperature of the water will not exceed two-degrees F (one-degree C) when the average difference between the temperature of the water and that of the atmosphere surrounding the tank is 30-degrees F (17-degrees C). Insulation material shall be installed in such a manner as to prevent shifting or settling.

D.12.2

The bulk delivery tank and divider between the compartments of a multi-compartment tank shall be insulated in such a manner that, in a 48-hour period, when the tank is full of water, the average change in the temperature of the water will not exceed four-degrees F (two-degrees C) when that average difference between the temperature of the water and that of the atmosphere surrounding the tank is 30-degrees F (17-degrees C). Insulating material shall be installed in such a manner as to prevent shifting or settling.

D.13

Outlet and Outlet Valve:

D.13.1

Each tank or compartment shall have a separate outlet passage. The outlet shall be of all welded construction with the exception that a rolled-on fitting may be used on the terminal end. The inside diameter of the outlet shall be at least as large as that of two-inch (five-cm) 3-A sanitary tubing. The outlet(s) shall provide complete drainage of the tank(s) or compartment(s). In multi-compartment or multi-tank units, the top of the outlet passage(s) of the front compartment(s) or the front tank(s) shall be as low as the low point of the lining at the outlet and shall provide for complete drainage toward the outlet. The horizontal distance from the opening in the lining to this point shall not be more than four times the diameter of the outlet passage. The outlet passage downstream of this point shall pitch towards the connection for the outlet valve. The terminal end shall have a bolted or a clamp-type flange or a 3-A sanitary threaded connection. The terminal end of the outlet passage shall not extend more than six-inches (fifteen-cm) beyond the inside lining of the tank or compartment(s). The outlet passage may be increased in length provided that:

D.13.1.1

The outlet passage is straight or is straight downstream of the elbow(s) or bend(s) used either to change the direction of product flow from a bottom outlet or to comply with the requirement in D.13.1 that at a specified point the top of the outlet passage shall be as low as the low-point of the lining at the outlet.

D.13.1.2

The outlet and outlet passage may be adequately cleaned manually or the tank or compartment with

the increased outlet passage is provided with a fixed spray device(s) so that the outlet passage may be mechanically cleaned and sanitized.

D.13.1.3

The outlet passage is insulated sufficiently that the temperature rise of the water in the outlet passage does not exceed the allowable average temperature rise of the tank full of water specified in D.12.1 or D.12.2.

D.13.1.4

The outlet passage is protected against damage (denting) and is braced and sloped.

D.13.2

Outlet valves: Valves, when provided, shall conform to D.9 or if the valve is within the lining or in the outlet passage, and the seat is an integral part of the lining or the outlet passage, a compression-type valve conforming to the applicable provisions of D.13.2.1 may be used.

D.13.2.1

Compression-type valve in the tank or outlet passage: This type of valve shall have a metal to metal or rubber or rubber-like materials to metal seat. The rubber or rubber-like material may be either removable or bonded.

D.13.3

The tank outlet and valve bore shall be the same size and concentric or the product passage of the outlet valve (1) shall have an inside diameter no less than that of the tank outlet and (2) shall be self-draining.

D.13.4

A sanitary 3-A cap conforming to D.9 shall be furnished for the outlet opening of the outlet valve, except when the outlet opening of the valve is located in the pump and/or hose cabinet that is connected to the pump piping.

D.14

Unless the outlet valve is located in the pump and/or hose cabinet, it shall be provided with a dust cover which (1) encloses the entire valve assembly, (2) is dustproof and (3) has a smooth interior finish. Dust covers shall be provided with means of sealing to prevent opening or removing the cover without breaking the seal.

D.15

Manhole Opening and Cover:

D.15.1

A manhole(s) opening shall be provided and shall be not less than 16-inches (41-cm) by 20-inches (51-cm) oval or 18-inches (46-cm) in diameter. It shall be located in the top portion of the tanker and approximately in the center of each compartment.

D.15.2

The upper edge of a top manhole opening shall be not less than 3/8-inch (ten-mm) higher than the surrounding area and if an exterior flange is incorporated in it, it shall slope and drain away from the opening.

D.15.3

Manholes shall be located so that the solutions from mechanical cleaning device(s) are applied to all product contact surfaces. Permanently installed mechanical device(s), if used, shall be designed and installed so that solutions are applied to all product contact surfaces.

D.15.4

Manhole cover gaskets shall be readily removable and may have any one of the following cross-sections: flat, rectangular, square, oval, round, "L" or "Z" shape, or any other section which is easily cleanable.

D.15.5

Gasket grooves or gasket retaining grooves shall not exceed 1/4-inch (six-mm) in depth or be less than 1/4-inch (six-mm) wide. The minimum radius of any internal angle in a gasket groove or gasket retaining groove shall be not less than 1/16-inch (two-mm).

D.15.6

A sanitary vent of sufficient free opening to prevent excess vacuum and/or internal pressure, shall be installed under the manhole dust cover.

The air vent shall be designed so that parts are readily accessible, easily removable and readily cleanable. (See Appendix, Section G.)

D.16

Manhole Dust Cover:

D.16.1

Each manhole shall be provided with a dust cover.

D.16.2

The interior finish of the dust cover shall be smooth, readily cleanable and free from bolts and screws. Round or oval head rivets shall be deemed acceptable.

D.16.3

Welded interior attachments shall have minimum radii of 1/16-inch (two-mm).

D.16.4

A suitable vent shall be provided to relieve vacuum and pressure when the dust cover is closed. The vent shall be located in the side wall of the rear half of the dust cover.

D.16.5

The dust cover when closed shall provide an effective seal to prevent entrance of dust.

D.16.6

The dust cover shall be provided with means of sealing to prevent opening the dust cover without breaking the seal.

D.16.7

If a rubber or rubber-like, or plastic gasket is used as a seal, it shall be smooth, either removable or firmly bonded to the dust cover to provide a smooth, easily cleanable surface without crevices.

D.16.8

Deck plate, if attached to the outer jacket, shall be effectively sealed and firmly bonded.

D.17

Agitation:

D.17.1

When specified, the tank or compartment thereof shall be provided with means for mechanical and/or air agitation (See Appendix, Section J.) that when operated 20-minutes in whole milk that has been stored 24-hours at 40-degrees F (4.4-degrees C) will result in the milk fat content of the product throughout the tank or compartment being within a variation of plus or minus 0.1% by an official AOAC*³ milk fat test.

D.17.2

The agitator, if not designed for mechanical cleaning, shall be located in such a manner that it shall be readily accessible for manual cleaning and inspection.

D.17.3

A mechanical agitator shall have a seal of the packless type, sanitary in design with all parts accessible for cleaning.

D.18

Air Under Pressure and/or Mechanical Cleaning:
(See Appendix, Section J.)

D.18.1

Tubing and related fittings within the tank shall be designed to be mechanically cleaned.

D.18.2

Openings for air agitation and/or mechanical cleaning applications shall be protected against contamination by means of a removable dust cover, except where such openings are within the pump and/or hose cabinet.

The dust cover shall be provided with means of sealing to prevent opening the dust cover without breaking the seal.

D.18.3

Permanently mounted air or solution tubing shall be constructed and installed so that it will not sag, buckle, vibrate or prevent complete drainage of the tank or tubing, and shall be located so that the distance from the outside of the tubing to the lining is at least two-inches (51-mm), except at point of entrance. The tubing and all related fittings shall be self-draining.

D.18.4

Means for mechanically cleaning the tank or compartment, when provided, shall clean the product contact surfaces and all non-removable appurtenances thereto except those areas that may be manually cleaned without entering the tank. (See Appendix, Section H.)

D.19

Baffles:

D.19.1

Baffles, when provided, shall not interfere with the

free drainage of the tank or compartment.

D.19.2

The area of any one baffle plate shall not exceed 40% of the cross-sectional area of the tank and the entire baffle shall be on one side of the longitudinal center line of the tank. If more than one baffle is installed, consecutive baffles shall be installed on opposite sides of the tank and shall be at least 48-inches (122-cm) apart. Baffles shall be so designed that walk-through accessibility will be provided to all areas for inspection, and if the tank is not provided with means for mechanically cleaning the tank or compartment, for cleaning purposes.

D.19.3

Baffles shall be permanently attached to the tank. The radius of inside corners formed where baffles are attached to the lining shall be at least 1/4-inch (six-mm). There shall be no sharp edges on baffles.

D.20

Hose/Pump Cabinets:

D.20.1

Hose/pump cabinets shall comply with the following as well as other applicable provisions of the Fabrication Section D:

D.20.2

The lining of cabinets, doors and fixed attachments shall be smooth.

D.20.3

All permanent metallic joints in the lining shall be continuously welded. All welded areas in the lining shall be at least as smooth as the adjoining surfaces.

D.20.4

If plastic material is used to fabricate or to line the hose/pump cabinets, it shall meet the applicable criteria found in 3-A Sanitary Standards for Multiple-use Plastic Materials, number 20-14. It shall be fabricated so that all joints are welded, bonded, or permanently sealed to be watertight and as smooth as the adjoining surfaces.

D.20.5

The bottom shall be constructed so that it will not sag, buckle or prevent complete drainage when the truck is on a level surface.

D.20.6

All inside corners shall have minimum radii of 1/8-inch (three-mm).

D.20.7

Cabinets shall be dust tight and doors shall be equipped with a compression type closing device. Gasket material for sealing cabinet doors may be installed on the face of the cabinet or on the doors except along a drainage area where it shall be attached to the doors. Gasket material shall be removable or firmly bonded to provide smooth, easily cleanable surfaces without crevices.

D.20.8

A roof overhang or suitable drip molding shall be provided over the cabinet doors.

*The method of making these tests will be found in the following reference: *Official Methods of Analysis*; Available from the Association of Official Analytical Chemists, 1111 N 19th St., Suite 210, Arlington, VA 22209.

D.20.9

The cabinet and doors shall be insulated with an insulating material having an insulating value of not less than R-4. (See Appendix, Section L.)

D.20.10

A carrier bracket shall be provided to support the flexible transfer tubing. Means shall be provided to support the loose end of the tubing above the cabinet floor.

D.20.11

Fixed attachments such as pump support brackets, tubing carrier brackets and brackets for belt and pulley guards shall be easily accessible for cleaning. A pump having a base area of one-square foot (930-sq.cm) shall be installed so that there will be a minimum clearance of two-inches (five-cm) between the base and the cabinet floor and three-inches (eight-cm) between the pump assembly and the cabinet walls. The minimum clearance between the base and the cabinet floor shall be increased to three-inches (eight-cm) if the base area of the pump exceeds one-square foot (930-sq.cm). A pump assembly that is to be mounted on the floor of the cabinet shall have a solid base and be installed with a non-absorbent sealing gasket. It shall be installed in a position that (1) will not interfere with drainage and (2) will provide minimum clearance of three-inches (eight-cm) between the pump assembly and the cabinet walls. A side wall mounted pump assembly shall be installed with a non-absorbent sealing gasket.

D.20.12

The size and location of the cabinet shall be such that will afford easy accessibility for assembly and disassembly of removable parts and provide ample clearance around permanently installed equipment and parts. (See Appendix, Section I, Facilities for Extra Fittings.)

D.21

Pumps:

D.21.1

Pumps, when furnished, shall conform to the 3-A Sanitary Standards for Centrifugal and Positive Rotary Pumps, Number 02-08. A sanitary closure shall be furnished for the outlet opening of the pump.

D.22

Motors for Pumps:

D.22.1

An electric or hydraulic motor when located in the pump compartment, shall be totally enclosed and non-ventilated. Electric wiring, if used, shall be waterproof and shall be conducted through the wall of the pump cabinet with water-tight connections.

D.22.2

Storage space for the pump motor electrical extension cord shall be located outside the pump compartment.

D.23

Flexible Transfer Tubing:

D.23.1

Single lengths of transfer tubing shall not exceed eight-feet (2.4-m) except where adequate acceptable cleaning facilities are available at the place of cleaning. The minimum inside diameter of the tubing shall be two-inches (five-cm). A sanitary closure shall be furnished for the open end(s) of the tubing.

D.23.2

If two lengths of flexible tubing are used, they shall be connected either by the use of sanitary coupling or by a piece of rigid 3-A sanitary tubing.

D.23.3

A piece of flexible tubing may be used for the connection from the pump to the tank.

D.23.4

Flexible tubing shall be attached to rigid 3-A sanitary tubing, or to the tank or to the pump in such a manner that the flexible tubing may easily be removed or permanently vulcanized and/or bonded. If clamps are used they shall be readily removable.

D.24

Sample Tray, Insulated Sample Box and Sample Compartments:

D.24.1

Sample trays and insulated sample boxes that are to be in the pump and/or hose cabinet shall be of sanitary design and readily cleanable.

D.24.2

Facilities shall be provided for keeping the samples cold.

D.24.3

Permanently installed insulated sample boxes shall (1) be attached to the cabinets by continuously welding or with bolted connections which have non-absorbent sealing gaskets in the joints, (2) have the supporting member(s) continuously welded if supported from the floor of the cabinet and (3) be installed so there is a minimum clearance of six-inches (15-cm) between the insulated sample box and the cabinet floor.

APPENDIX

E

STAINLESS STEEL MATERIALS

Stainless steel conforming to the applicable composition ranges established by AISI for wrought products, or by ACI for cast products, should be considered in compliance with the requirements of Section C.1 herein.

Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%. The first reference cited in C.1 sets forth the chemical ranges and limits of acceptable stainless steels of the 300 series.

Cast grades of stainless steel corresponding to types

303, 304, and 316 are designated CF-16F, CF-8 and CF-8M, respectively. These cast grades are covered by ASTM*⁴ specifications A351/A351M, A743/A743M and A744/A744M.

F

PRODUCT CONTACT SURFACE FINISH

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in compliance with the requirements of Section D.1 herein.

G

AIR VENTING

To insure adequate venting of the tank which will protect it from internal pressure or vacuum damage, the critical relationship between minimum vent size and maximum filling or emptying rates should be observed.

A venting system of sufficient capacity to provide for venting during filling and emptying is not adequate during mechanical cleaning. During the cleaning cycle, tanks when cleaned mechanically should be vented adequately by opening the manhole cover to prevent vacuum or pressure build-up due to sudden changes in temperature of very large volumes of air*⁵.

Means should be provided to prevent excess loss of cleaning solution through the manhole opening. The use of tempered water of about 95-degrees F (35-degrees C) for both pre-rinsing and post-rinsing is recommended to reduce the effect of flash heating and cooling.

H

MECHANICAL CLEANING

The mechanical cleaning system shall be so designed that solution is applied to all product contact surfaces except those areas requiring manual cleaning. When being cleaned, the tank bottom should have sufficient pitch to accomplish draining and to have a fast flushing action across the bottom. The pitch should be at least 1/4-inch per foot (6.4-mm per 30-cm). Means should be provided for manual cleaning of all surfaces not cleaned satisfactorily by mechanical cleaning procedures.

NOTE: Cleaning and/or sanitizing solutions should be made up in a separate tank -- not in the transportation tank.

*Available from ASTM, 1916 Race St., Philadelphia, PA 19103.

⁴For example, when a 6,000-gallon tank with 800-cu. ft. of 135-degrees F (57-degrees C) hot air after cleaning is suddenly flash cooled by 50-degrees F (28-degrees C) water sprayed at 100-gpm the following takes place:

Within one second, the 800-cu. ft. of hot air shrinks approximately 51-cu. ft. in volume. This is the equivalent in occupied space of approximately 382-gallons of product. This shrinkage creates a vacuum sufficient to collapse the tank unless the vent, manhole, or other openings allow air to enter the tank at approximately the same rate as it shrinks. It is obvious, therefore, that a very large air vent such as the manhole opening is required to accommodate this air flow.

I

FACILITIES FOR EXTRA FITTINGS

If extra sanitary fittings are supplied by the manufacturer of the farm pick-up tank, facilities should be provided in the pump compartment to adequately protect such items.

J

AIR UNDER PRESSURE AND/OR MECHANICAL CLEANING

Equipment and means for applying air under pressure for air agitation or solutions for mechanical cleaning, when provided, shall conform to the applicable provisions of the 3-A Accepted Practices for Air Under Pressure, Number 604-03. Clamp or threaded type fittings shall not be used in the product zone.

K

TEMPERATURE OF THE PRODUCT

The temperature of the product being loaded into the precooled tank must be sufficiently below the final receiving temperature requirements to make up for heat gain during transportation as outlined in Sections D.12.1 and D.12.2.

L

INSULATING VALUES

Table A-1 lists the insulating value for some common insulating materials.

TABLE A-1. Inches of Insulation Material Equivalent to R=4.0 at 75-Degrees F (24-Degrees C)

Material Type	inches	cm
High Density Fiberglass Sheets	0.88	2.23
Soft Fiberglass Rolls	1.12	2.84
Polystyrene Foam Sheets	1.02	2.59
Corkboard Sheets	1.04	2.64
Polyurethane Sheets	0.66	1.68

These standards shall become effective November 1, 1989 at which time the 3-A Sanitary Standards for Stainless Steel Automotive Milk and Milk Products Transportation Tanks for Bulk Delivery and/or Farm Pick-Up Service, Number 05-13 are rescinded and become null and void.

3-A Sanitary Standards For Fittings Used on Milk and Milk Products Equipment and Milk Products

Number 08-17H
(Thermoplastic Plug Type Valves)

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

It is the purpose of IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Thermoplastic plug type valve specifications heretofore or hereafter developed which so differ in design, material, and fabrication, or otherwise as not to conform with the following standards but which, in the manufacturer's or fabricator's opinion are equivalent or better may be submitted for the joint consideration of IAMFES, USPHS, and DIC at any time.

A

SCOPE

A.1

These standards cover the sanitary aspects of thermoplastic plug type valves used on processing equipment for milk or milk products and on equipment and lines which hold or convey milk or milk products.

A.2

In order to conform to these 3-A Sanitary Standards thermoplastic plug type valves shall comply with the following in design, material and fabrication criteria.

B

DEFINITIONS

B.1

Product: Shall mean milk and milk products.

B.2

Surfaces:

B.2.1

Product Contact Surfaces: Shall mean all surfaces which are exposed to the product and surfaces from which liquid may drain, drop or be drawn into the product.

B.2.2

Non-Product Contact Surfaces: Shall mean all other surfaces.

B.3

Thermoplastic:

Thermoplastic, n.-A plastic which is thermoplastic in behavior.

Thermoplastic, adj.-Capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature.

NOTE: Thermoplastic applies to those materials whose change upon heating is substantially physical.

C

MATERIALS

C.1

Product contact surfaces shall be of thermoplastic material conforming to the applicable provisions of 3-A Sanitary Standards for Multiple-Use Plastic Materi-

als, Number 20-14, and shall retain their surface and conformation characteristics when exposed to conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C.1.1

Rubber and rubber-like materials may be used for O-Rings and parts having the same functional purposes.

C.1.2

Rubber and rubber-like materials when used for the above specified applications shall comply with the applicable provisions of the 3-A Sanitary Standards for Rubber and Rubber-Like Materials, Number 18-00.

C.2

Non-product contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion-resistant. If coated, the coating used shall adhere. Non-product contact surfaces shall be relatively non-absorbent, durable and cleanable. Parts removable for cleaning having both product contact and non-product contact surfaces shall not be painted.

D

FABRICATION

D.1

Product contact surfaces shall be at least as smooth as a No. 4 ground finish on stainless steel sheets free of imperfections such as pits, folds and crevices in final fabricated form. (See Appendix Section E.)

D.2

Product contact surfaces shall be easily accessible for cleaning and inspection either when in an assembled position or when removed. Removable parts shall be readily demountable.

D.3

Product contact surfaces shall be self-draining when properly installed.

D.4

Radii

D.4.1

All internal angles of 135-degrees or less on product

08-17H

inch, except that:

D.4.1.1

Where smaller radii are required for essential functional reasons such as those in O-Ring grooves. In no case shall such radii be less than 1/32-inch.

D.4.2

The radii in grooves for standard 1/4-inch O-Rings shall not be less than 3/32-inch and for standard 1/8-inch O-Rings shall be not less than 1/32-inch.

D.5

There shall be no threads in contact with the product.

D.6

Non-Product Contact Surfaces

Non-product contact surfaces shall be smooth, free of pockets and crevices and be readily cleanable, and those to be coated shall be effectively prepared for coating.

D.7

Powered Valve Actuators

Valves with powered actuators shall have an open space of at least one-inch, clear for inspection, between the actuator and the valve.

D.7.1

Powered actuators shall be readily demountable from the valve and stem.

APPENDIX

E.

PRODUCT CONTACT SURFACE FINISH

Surface finish equivalent to 150 grit or better as obtained with silicon carbide properly applied on stainless steel sheets, is considered in compliance with the requirements of D.1 herein.

These standards shall become effective November 1, 1989.

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Coming Events

1989

JULY

- **7-14, 9th International Workshop on Rapids Methods & Automation in Microbiology** will be held at Kansas State University, Manhattan, Kansas. For more information, contact: Dr. Daniel Y.C. Fung (913) 532-5654. Certified by the American Society for Microbiology.
- **9-12, International Conference on Technical Innovations in Freezing and Refrigeration of Fruits and Vegetables.** For more information, contact: Robert C. Pearl, Food Science & Technology, University of California, Davis, CA 95616 916/752-0981.
- **17-28, Dairy Laboratory Workshop** to be held at Penn State University in State College, PA. Contact Sidney E. Barnard, Food Science Dept., 8 Borland Lab., University Park, PA 16802 for more details. Telephone (814) 863-3915.

AUGUST

- **9-10, The Second Annual Fruit Juice Authenticity Workshop** will be sponsored by General Physics Corporation. It will be held at the Washington, D.C. Dulles Airport's Ramada Renaissance Hotel. For more information or to register, contact the Course Registrar, Frances McGeehan, General Physics Corp, (301)290-2300.
- **13-18, The Society for Industrial Microbiology** announces the 1989 Annual Meeting to be held at the Westin Hotel, Seattle, Washington. For more information, contact: Mrs. Ann Kulback, Business Secretary, Society for Industrial Microbiology, PO Box 12534, Arlington, VA 22209-8534 703/941-5373.
- **14-18, Biotechnology: Principles and Processes** to be held at the Massachusetts Institute of Technology, Cambridge, Massachusetts. For more information, contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139 or Anthony J. Sinskey, Dept. of Biology, MIT, Cambridge, MA 02139 617/253-6721.

SEPTEMBER

- **11, Pesticide Applicator Certification Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.
- **11-15, Food Microbiology Short Course.** Sponsored by the University of California and University Extension. To be held at the Dept. of Food Science and Technology, Cruess Hall, UC Davis Campus. For further information, contact: Kathryn J. Boor, Food Science and Technology, University of California, Davis, CA 95616 (916)752-1478.

- **12-14, Basic Pasteurization Course,** to be held at Howard Johnson, 8887 Gateway West, El Paso. For more information, contact: Ms. Janie F. Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363 512/458-7281.
- **18-22, Food Protection and Quality Assurance Technology Short Course.** Sponsored by the Food Sanitation Institute, EMA, and Michigan State University, East Lansing, MI. Contact: Dr. William Haines, Food Industry Institute, Michigan State University (517) 355-8295.
- **19-21, New York Association of Milk and Food Sanitarians,** will hold its annual meeting in Buffalo at the Sheraton-Buffalo Airport Hotel. For information concerning the meeting, contact: Paul Dersam, 27 Sullivan Rd., Alden, NY 14004, 716/937-3432.
- **25-27, Acceptance Testing.** Developing a product acceptance capability; qualification of employees and consumers; procedures for laboratory, central location, and home-use testing; design and analysis of acceptance tests. For more information contact: Marjorie Sterling Stone 415/365-1833.
- **25-28, 103rd AOAC Annual International Meeting and Exposition** to be held in St. Louis, Missouri. For more information contact: Marilyn Taub, AOAC, Suite 400, 2200 Wilson Blvd, Arlington, VA 22201-3301. 703/522-3032.
- **25-27, Indiana Environmental Health Association Fall Conference** will be held at the Howard Johnson, Lafayette, Indiana. For more information, contact: Tammy Barrett, IN State Board of Health, (317) 633-0173.
- **27-29, Colonization Control of Human Bacterial Enteropathogens in Poultry,** will be held in Atlanta, Georgia. It is sponsored by the USDA, Agricultural Research Service. For more information, contact: Dr. L.C. Blankenship, USDA, ARS, Russell Research Center, PO Box 5677, Athens, GA 30613 (404) 546-3152.
- **27-28, The 1989 Annual Convention of the South Dakota Dairy Association** will be held at the Ramkota Inn, Sioux Falls, SD. For information, contact: Dr. John Parsons, Dairy Science Dept., SDSU, Box 2104, Brookings, SD 57007 605/688-4116.
- **27-29, Liquitex Expo '89.** For more information contact: Carolyn Mesce, Marketing Manager, Liquitex Expo Inc., PO Box 630, West Paterson, New Jersey 07424 201/256-0011.

OCTOBER

- **1-4, Fourteenth Annual Tropical and Subtropical Fisheries Technological Conference of the Americans.** To be held at Buckhead Holiday Inn, Atlanta, GA. For more information, contact: Keith Gates, The University of Georgia Marine Extension Service, PO Box Z, Brunswick, GA 31523 (912) 264-7268.
- **23-24, Pests Associated with Food Industry and Environmental Sanitation Seminar,** Okumura Biological Insti-

tute, Holiday Inn, Elk Grove Village, IL. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **23-25, Quality Control and Stability and Testing.** Organizational approaches to establishing product quality monitoring systems within manufacturing and R&D: methods for measuring product quality and stability, including design and analysis. For more information, contact: Marjorie Sterling Stone 415/365-1833.

• **23-25, California Association of Dairy & Milk Sanitarians** will be held at the Holiday Inn, Visalia, CA. For more information, contact: Jack Coppes (213) 699-4313.

• **25-26, Advanced Course on Pest Recognition and Food Industry Problems,** Okumura Biological Institute, Holiday Inn, Elk Grove Village, IL. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

NOVEMBER

• **4-9, EMA 1989 National Educational Conference and Trade Show** to be held in Clearwater Beach, Florida at the Holiday Inn Surfside. For more information, contact EMA headquarters at 1019 Highland Ave., Largo, FL 34640 (813) 586-5710.

• **6-8, 1989 Food Processing Waste Conference,** will be held at the Omni International Hotel, Atlanta, GA. For more information, contact: Edd Valentine or Chuck Ross, Georgia Tech Research Institute, Economics Development Laboratory, Environment, Health and Safety Division, O'Keefe Bldg, Atlanta, GA 30332 (404) 894-3412.

• **11-15, Dairy and Food Industries Supply Assoc., Inc.** McCormick Place, Chicago, Illinois.

• **13-14, Tailoring Dairy Packaging & Distribution - Tomorrow's Needs** sponsored by the International Dairy Federation and the U.S. National Committee of the International Dairy Federation. This Seminar will be held in conjunction with the DIFSA Expo in Chicago. For more information, contact: Harold Wainess, Secretary, U.S. National Committee of the IDF, 464 Central Ave., Northfield, IL 60093 (312) 446-2402.

DECEMBER

• **4, Pesticide Applicator Certification Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **5-6, Pests Associated with Food Industry and Environmental Sanitation Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **7-8, Advanced Course on Pest Recognition and Food Industry Problems,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

1990

FEBRUARY

• **26-27, Kentucky Association of Milk, Food and Environmental Sanitarians' Annual Conference** to be held at the Holiday Inn Convention Center, Louisville, KY. For more information, contact Debbie Pierce, Secretary, KAMFES, PO Box 1464, Frankfort, KY 40602 (502) 564-3340.

AUGUST

• **15-18, FOOD PACIFIC, 1990** will be held at Vancouver's domed stadium, B.C. Place. Those wishing to attend may obtain further information by contacting: B.C. Food Exhibitions Ltd., 190-10651 Shellbridge Way, Richmond, B.C., Canada V6X 2W8 (604) 660-2288.

OCTOBER

• **7-12, Twenty-Third International Dairy Congress,** will be held in Montreal, Canada. For further information, contact: Richard Stern, Executive Director, International Dairy Congress, 1990, PO Box 2143, Station D, Ottawa, Ontario, Canada K1P 5W3 (613)238-4116.

DECEMBER

• **12-18, American Society of Agricultural Engineers** will be sponsoring the International Symposium on Agricultural and Food Processing Wastes. For more information contact: Jon Hiler, American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MO 49085 616/429-0300.

To insure that your meeting time is published, send announcements at least 90 days in advance to: K.R. Hathaway, Editor, IAMFES, PO Box 701, Ames, IA 50010.

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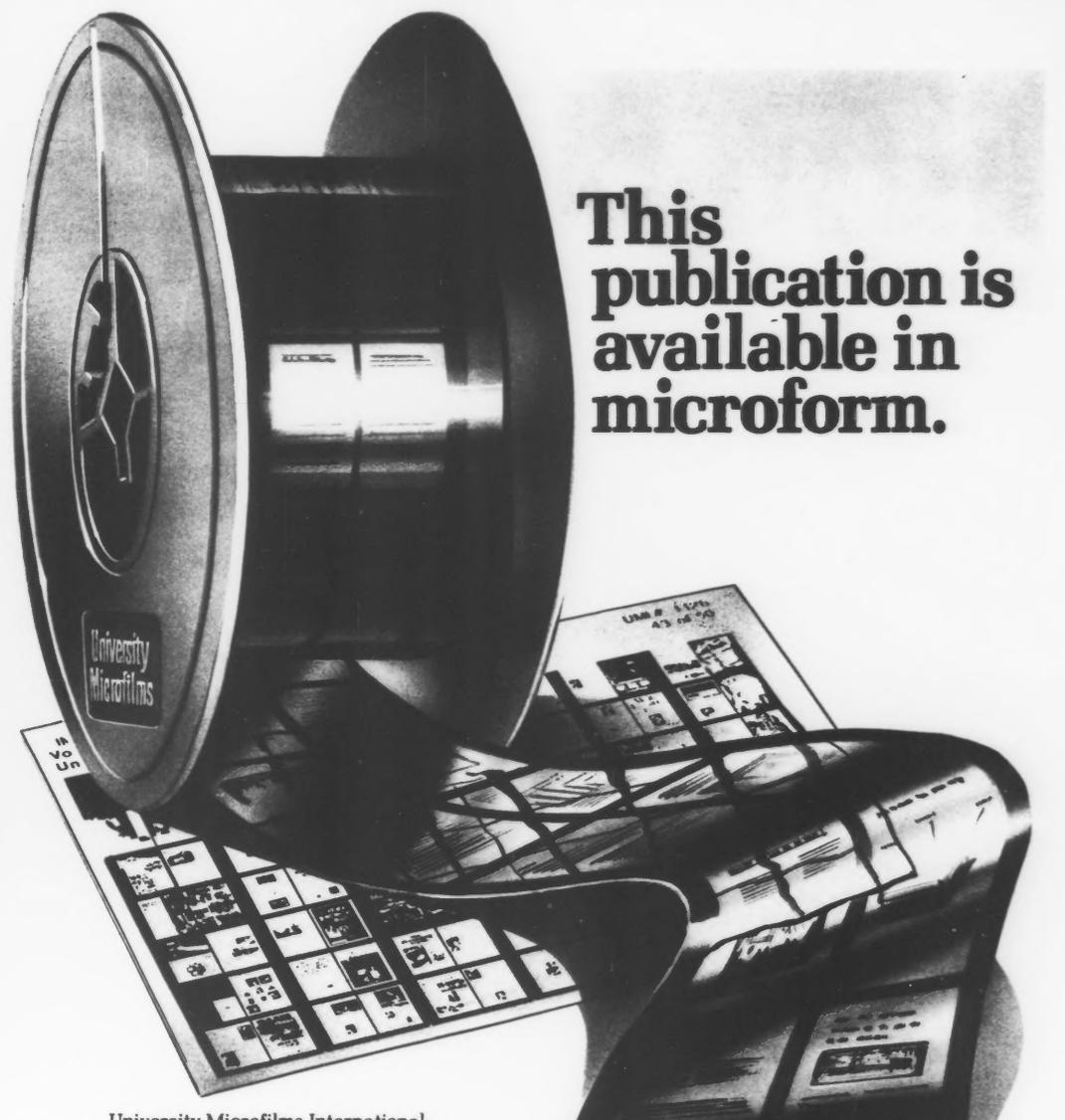
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