

November, 1983
Vol. 3, No. 11
Pages: 405-448
ISSN:0273-2866
Box 701
Ames, Iowa 50010

\$5.00

XEROX UNIV MICROFILMS
SERIALS DEPT
300 N ZEEB RD
ANN ARBOR MI
48106

Dairy and Food Sanitation

A Publication for Sanitarians and Fieldmen

- How to Get a Million Bacteria in a Product Without Really Trying
- *Salmonella* in Meat and Poultry Products
- Effect of a Refrigerated Milk Receiver on Raw Milk Quality

**CALL FOR RESEARCH PAPERS
FOR 1984 ANNUAL MEETING**

Contributed research papers will be an important part of the program at the 1984 Annual Meeting of IAMFES scheduled for Aug. 5-9, 1984 in Edmonton, Alberta, Canada. See the October issue.



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

Few things are as consistent as the reproducible performance of Bacto[®] dehydrated culture media.

For more than 80 years, Difco Laboratories has served the world with products universally recognized as being unsurpassed for quality.

The Difco concept of quality is exemplified by Bacto dehydrated culture media. These media exhibit consistent, performance-standardized reproducibility and a rigidly controlled level of biological activity, assuring accurate interpretation of test results.

The quality of every batch of Bacto dehydrated culture media is protected by the stringent quality control techniques you expect from a leader. This, plus on-going collaboration between Difco and leading international microbiologists in developing and improving culture media, are definitive factors in helping you maintain your laboratory's reputation for integrity of test results.

For information, contact your Difco representative or write Difco Laboratories, P.O. Box 1058A, Detroit, Michigan 48232, USA.

Difco and Bacto are trademarks of Difco Laboratories: Reg. U.S. Pat. Off.

The Difco logo is a stylized, bold, serif font enclosed within a decorative, rounded rectangular border with a central dot above the 'I' and below the 'O'.

DIFCO

MEMBERSHIP APPLICATION

All memberships on calendar year basis. Memberships include subscription to *Journal of Food Protection*, *Dairy and Food Sanitation*, or both journals.

BEST BUY Check one:

- I want to receive BOTH journals \$50
 I want to receive *Dairy and Food Sanitation* \$28
 I want to receive *Journal of Food Protection* \$40

FOREIGN:

Add \$7 for each Journal ordered for postage

*Student Membership \$10 for 1 Journal - \$20 for both — please include student verification

SUBSCRIPTION APPLICATION for agencies, associations, and institutions

All subscriptions on a calendar year basis.

BEST BUY

- BOTH Journals \$75
 Dairy and Food Sanitation \$60
 Journal of Food Protection \$60

FOREIGN:

Add \$7 for each Journal ordered for postage

PUBLICATION ORDER FORM

3-A Sanitary Standards

- () Complete set 3-A Dairy ea \$20.00
 () Complete set 3-A & Egg 3-A Stds ea \$25.00
 () Egg 3-A Stds ea \$15.00

Five-Year Service on 3-A Sanitary Standards

- () 3-A Stds Five years \$12.00
 () Egg 3-A Stds Five years \$ 6.00

- Procedures to Investigate Waterborne Illness ea \$ 1.75
 25-99 copies, \$1.50 ea., 100 or more, \$1.15 ea.
 Procedures to Investigate Foodborne Illness ea \$ 1.50
 25-99 copies, \$1.25 ea., 100 or more, \$.90 ea.
 Procedures to Investigate Arthropod-borne and Rodent-borne Illness ea \$ 2.00
 25-99 copies; \$1.75 ea., 100 or more, \$1.50 ea.

Please fill out completely

Name _____ Company Name _____

Address _____

City _____ State _____ Province _____ Zip _____

- Payment enclosed
 Mastercard/Visa (circle appropriate card)
 Card # _____
 Expiration Date _____
 Bill me (payment due upon receipt)
 Please check here if you would like information
 on joining your state/province association.

MAIL ENTIRE FORM TODAY TO:

**IAMFES—Dept. C
 P.O. Box 701
 Ames, IA 50010**

**For faster service use your
 charge card & call
 515-232-6699
 extension C**

IAMFES Sustaining Members

Alpha Chemical Services, Inc.
P.O. Box 431
Stoughton, MA 02072

Anderson Chemical Co.
Box 1041
Litchfield, MN 55355

Angenics, Inc.
100 Inman St.
Cambridge, MA 02139

Associated Milk Producers, Inc.
830 N. Meacham Rd.
Schaumburg, IL 60195

Babson Bros. Co.
2100 S. York Road
Oak Brook, Illinois 60521

Borden, Inc.
Dairy & Services Div.
16865 Northchase
Houston, TX 77060

C.I.S.I.
Via Massarenti 54
40138 Bologna, Italy

Dairymen, Inc.
10140 Linn Station Road
Louisville, KY 40223

Darigold
635 Elliott Ave. W.
Seattle, WA 98109

Dean Foods
1126 Kilburn Ave.
Rockford, IL 61101

De Laval Agricultural Division
Alfa-Laval Inc.
11100 North Congress Avenue
Kansas City, MO 64153

Difco Laboratories
P.O. Box 1058-A
Detroit, MI 48232

Eastern Crown, Inc.
P.O. Box 216
Vernon, N.Y. 13476

GAF
140 West 51st St.
New York, NY 10020

G. B. Fermentation, Inc.
PO Box 241068
Charlotte, NC 28224

Gerber Products Co.
445 State St.
Fremont, MI 49412

W. A. Golomski & Associates
1006 Martin Dr. West
Bellevue, NE 68005

H. B. Fuller Co.
Monarch Chemicals Div.
390 Jackson St. NE
Minneapolis, MN 55421

Kendall Co.
One Federal St.
Boston, Massachusetts 02101

Klenzade Division
Economics Laboratory, Inc.
Osborn Building
St. Paul, MN 55102

The Kroger Co.
1212 State Avenue
Cincinnati, OH 45204

**Maryland & Virginia Milk Producers
Assn., Inc.**
P.O. Box 9154 Rosslyn Station
Arlington, Virginia 22209

Michigan Milk Producers Assoc.
24270 W. Seven Mile Road
Detroit, MI 48219

Mid America Dairymen, Inc.
P.O. Box 1837 SSS
800 W. Tampa
Springfield, MO 65805

M. M. Muzzarelli Modena s.r.l.
P.O. Box 469
41100 Modena Ferrovia, Italy

Nasco International
901 Janesville Ave.
Fort Atkinson, Wisconsin 53538

National Mastitis Council
1840 Wilson Blvd.
Arlington, VA 22201

National Milk Producers Federation
30 F St. NW
Washington, DC 20001

Norton Co.
P.O. Box 350
Akron, Ohio 44309

Oxoid USA, Inc.
9017 Red Branch Rd.
Columbia, MD 21045

Reitman Manufacturing Co.
10319 Pearmain St.
Oakland, CA 94603

Roslita, Inc.
P.O. Box 685
Wood Dale, IL 60191

Seiberling Associates, Inc.
11415 Main St.
Roscoe, IL 61073

SmithKline Animal Health Products
P.O. Box 2650
West Chester, PA 19380

United Industries, Inc.
1546 Henry Avenue
Beloit, WI 53511

Universal Milking Machine Div.
Universal Cooperatives Inc.
408 S. First Ave.
Albert Lea, MN 56007

Walker Stainless Equipment Co.
601 State St.
New Lisbon, WI 53950

Webco Chemical Corporation
Rt. 197
Dudley, Massachusetts 01570

Dairy and Food Sanitation is published monthly by the International Association of Milk, Food and Environmental Sanitarians, Inc., executive offices at PO Box 701, 413 Kellogg, Ames, IA 50010. Printed by Heuss Printing, Inc, 911 Second St, Ames, IA 50010. **Second-class postage paid at Ames, IA. Postmaster: Send address changes to IAMFES, 413 Kellogg, Ames, IA 50010-0701.**

Manuscripts: Correspondence regarding manuscripts and other reading material should be addressed to Kathy Hathaway, PO Box 701, Ames, IA 50010-0701. 515-232-6699.

"Instructions to Contributors" can be obtained from the editor.

Orders for Reprints: All orders should be sent to

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 regarding business matters should be addressed to Kathy R. Hathaway, IAMFES, PO Box 701, Ames, IA 50010-0701

Subscription Rates: \$60.00 per volume, one volume per year, January through December. Single copies \$5.00 each.

Sustaining Membership: A sustaining membership in IAMFES is available to companies at a rate of \$300 per year, which includes \$100 credit toward an ad in the "annual meeting issue" of the Journal, usually the July issue. For more information, contact IAMFES, PO Box 701, Ames, IA 50010-

0701, 515-232-6699.

Membership Dues: Membership in the Association is available to individuals only. Direct dues are \$28.00 per year and include a subscription to **Dairy and Food Sanitation**. Direct dues and both journals are \$50.00. Affiliate membership is \$28.00 per year, plus state dues, and include a subscription, also. Affiliate dues and both journals are \$50.00, plus state dues. Student membership is \$10.00 per year, with verification of student status, and includes one journal.

Claims: Notice of failure to receive copies must be reported within 30 days domestic, 90 days foreign. All correspondence regarding changes of address and dues must be sent to IAMFES, Inc., P.O. Box 701, Ames, IA 50010-0701, 515-232-6699.

**IAMFES
OFFICERS AND EXECUTIVE BOARD**

President, A. RICHARD BRAZIS, W. A. Golomski & Assoc., South West Region Manager, 1006 Martin Drive West, Bellevue, NE 68005.

President-Elect, ARCHIE C. HOLLIDAY, VA Dept. of Ag., 1100 Bank St., Suite 600, Richmond, VA 23219.

First Vice-President, SIDNEY BARNARD, 9 Borland Lab, Pennsylvania State University, University Park, PA 16802

Second Vice-President, ROY GINN, Dairy Quality Control Inst., 2353 No. Rice St., Room 110, St. Paul, MN 55113.

Secretary-Treasurer, LEON TOWNSEND, Milk Control Branch, Bureau for Health Services, 275 East Main St., Frankfort, KY 40601.

Jr. Past President, ROBERT MARSHALL, 203 Eckles Hall, Univ. of Missouri, Columbia, MO 65201.

Sr. Past President, HARRY HAVERLAND, FDA Training Facility, Room 8002, Federal Office Building, 550 Main St., Cincinnati, OH 45202.

Affiliate Council Chrmn., HELENE UHLMAN, 1532 W. 4th Place, Hobart, IN 46342.

EDITORS

KATHY MOORE HATHAWAY, *Editor and Executive Secretary*, Box 701, Ames, Iowa 50010

EDITORIAL BOARD

H. V. ATHERTON	Burlington, VT
K. J. BAKER	Rockville, MD
D. K. BANDLER	Ithaca, NY
S. BARNARD	University Park, PA
H. BENGSCHE	Springfield, MO
F. BODYFELT	Corvallis, OR
J. BRUHN	Davis, CA
J. BURKETT	Sioux City, IA
J. CARROLL	Arlington, TX
J. CHAMBERS	West Lafayette, IN
C. D. CLINGMAN	Orlando, FL
R. DICKIE	Madison, WI
F. FELDSTEIN	Culpeper, VA
R. FUQUA	Mt. Juliet, TN
E. GADD	Jefferson City, MO
J. GERBERICH	Eau Claire, WI
P. HARTMAN	Ames, IA
C. HINZ	Alexander, NY
C. JELLINGS	Clinton, IA
J. JEZESKI	Gainesville, FL
W. LAGRANGE	Ames, IA
C. LIVAK	Lancaster, PA
P. MARTIN	Chicago, IL
D. MILLER	Orlando, FL
L. PARHAM	Oklahoma City, OK
C. PRICE	Lombard, IL
D. RACE	Camillus, NY
J. REEDER	Arlington, VA
D. ROLLINS	Springfield, MO
R. SANDERS	Washington, DC
G. SMITH	Schenectady, NY
C. WEBSTER	LeClaire, IA
E. ZOTTOLA	St. Paul, MN

Dairy and Food Sanitation

Vol. 3 **November, 1983** **No. 11**

- **Effect of a Refrigerated Milk Receiver on Raw Milk Quality**
Robert R. Zall, Joseph H. Chen and Steven C. Murphy

408
- **Salmonella In Meat and Poultry Products**
Ralph W. Johnston

415
- **"How To Get A Million Bacteria In A Product Without Really Trying"**
Paul R. Hocking

418

Dairy Quality	422
New Members	424
Calendar of Events	425
Presidential Address	427
70th Annual Meeting Report	431
JFP Abstracts	445

EFFECT OF A REFRIGERATED MILK RECEIVER ON RAW MILK QUALITY

ROBERT R. ZALL
Professor of Food Science

JOSEPH H. CHEN
Research Associate

STEVEN C. MURPHY
Research Support Specialist

*Department of Food Science
Cornell University
Ithaca, New York 14853*

Quantities of raw milk harvested at Cornell's dairy farm were cooled by cascading them over a temp-plate heat transfer surface in place within a milk receiver. The quality of these milks were compared against control portions of milk where the heat transfer surface was not refrigerated and with bulk tank cooling only. From this work it was concluded that a refrigerated receiver was readily cleanable and did not contribute to the problems of milk quality. In fact, milk cooled with a refrigerated receiver was less apt to be subject to an increase in acid degree values.

Milk contains few bacteria in the cow's udder but is later subject to contamination by man and his habits. The farmer contaminates milk by his or her animal husbandry methods and by the expertise one uses in harvesting milk from cows. Milk is prone to contamination as it is sent through different-milking systems due, in part, to the way a system is cleaned. Both numbers and kinds of contaminants to

be found in milk depend on animal health and the way milk is handled. Milk quality is impaired when processed on hard to clean equipment. Of special interest to the dairy industry is the problem of psychrotrophic bacteria because they grow in refrigerated milk and much of today's milk is held cold for two or more days. It's neither easy nor efficient to control or destroy microorganisms after they get into milk as opposed to preventing milk from contamination in the first place. The growth of psychrotrophs in cold milk is a major quality problem. These problems appear in the fresh product and in ultra high heat products due to the presence of heat resistant proteases produced by psychrotrophs as they multiply. The milking system is complex because it incorporates varied plumbing joints which connect stainless steel, plastic, rubber and glass lines. These separate lines are further joined to milking claws which are also hard to clean. Assuming we can routinely clean milk harvesting machinery well enough to keep milk bacteria free, then we look to cooling systems to refrigerate milk to keep it fresh longer. For the most part, farm milk is being cooled mostly by bulk tanks and much of it in concert with in-line tube or plate coolers. It is not uncommon to find in-line cooling systems dirty, due to residues left in tubes or on surfaces of plates post cleaning. Cooling units are not being dismantled on any regular basis on most farms.

This study deals with a cooling system where milk is refrigerated by cas-

cading it over a "temp-plate heat transfer" surface in place within a milk receiver. The goal of the study was to identify whether or not benefits might be realized by cooling milk in a system that outwardly appeared easy to clean. Vessel interior is more visible to day-to-day scrutiny by a dairy farmer than would be plate or tube refrigeration systems.

MATERIALS AND METHODS

The normal mode of cooling at the University's farm is one where milk is cooled to below 40°F using in-line tube and shell equipment (four 10 ft, 8 cm diameter cooling sections; each section contains 18-6 mm diameter tubes). Milk is then stored in one or two refrigerated bulk tanks.

A series of trials were made where samples of milk were cooled using a refrigerated receiver and were compared for select quality parameters with samples of control milk; control milk being the regular Cornell supply harvested without use of a refrigerated (Mueller) receiver (Figure 1) and which was cooled only using a refrigerated bulk tank. Standard practices in the parlor were that milk was harvested and quantified using weigh jars and later released to the receiver vat as milk volume data were recorded. Milk in the parlor was harvested and quantified using this system. Such practices produced milk flows as surges which fed the Mueller system at rates of about 3000 pounds/hr. Milk was cooled to 70-80°F when refrigerated in this mode. When milk was harvested without using the weigh jars, flow rates approximated 1250 pounds/hr and milk in this amount was cooled to 60-65°F. In some trials, milk was deliberately held in the receiver until the temperature fell below 50°F and was then pumped into a refrigerated storage tank.

Test conditions included trials where milk flowed to the Mueller receiver with and without refrigeration in the system so as to measure the impact of vessel structure on milk quality. Control milk was also monitored much the same

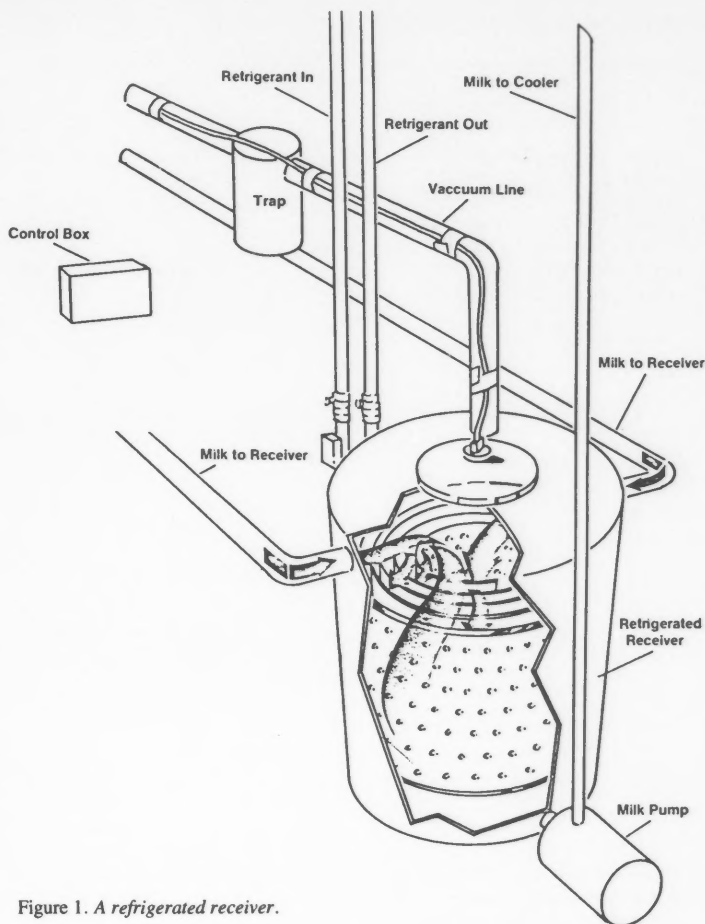
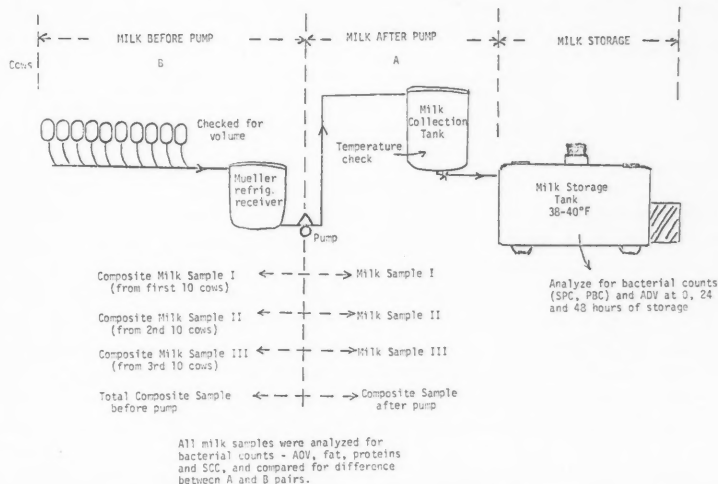


Figure 1. A refrigerated receiver.



Note: A similar sampling technique was used on the control side of the milking parlor.

Figure 2. Schematic Diagram of Sampling and Experimental Procedures Studying the Effect of a Mueller Refrigerated Receiver on Milk Quality.

way as experimental milk so as to measure the impact of the existing receiver on milk quality. Milk was also challenged for different quality parameters by cooling it only with the refrigeration supplied to it by a refrigerated bulk tank (250-gallon capacity).

Chemo-physico-biological tests used to evaluate milk quality were butterfat, protein, acid degree value, somatic cell counts, standard plate counts, and psychrotrophic plate counts. Equipment cleanliness was monitored by using swab tests. Sufficient numbers of trials were carried out in the different testing schemes to develop statistically significant data with 95% or better confidence levels.

Fresh milk samples were collected from the Cornell University dairy herd where approximately 400 cows were milked twice daily in a double ten herringbone Alfa Laval milking parlor. One side of the milking parlor was equipped with a Mueller refrigerated receiver which served as the test side of the parlor while the other side was designated the control.

Samples of milk were either cooled or not cooled prior to pumping on the experimental side before being stored in a 1100-liter capacity bulk refrigerated tank for two days. Post storage, the milk was picked up by an over-the-road tanker and brought to the University Dairy Plant where it was pasteurized and packaged.

Fresh and stored samples of milk were analyzed for bacterial counts using the standard plate test and psychrotrophic counts according to a rapid method described by Oliveria and Parmelee (1). The rapid psychrotrophic count and the 10-day standard psychrotrophic method had a correlation of 0.99.

All milk samples were tested for inhibitory substances using the Delvotest Method (2). Fresh and stored samples of milk were analyzed for acid degree values (ADV) following the procedure of Thomas et al. (3).

As shown in Figure 2, samples of milk were taken at different places in the milking system; these were from weight jars or at the receiver vat both before and after cooling prior to being pumped to storage. Samples of milk were collected post pumping at a surge tank and again from the bulk tank and these too were tested bacteriologically and chemically as above. Portions of these same samples were also analyzed for butterfat content using the Babcock Method and then again with Milkoscan 300 A/S, N. Foss electronic equipment using a wavelength of 5.73 μ . Protein analysis was carried out using the same instrument but at 6.5 μ for proteins.

Somatic cell counts were determined on portions of the samples using Fossomatic A/S N equipment.

RESULTS AND DISCUSSION

The question was raised whether or not a Mueller milk receiver containing a refrigeration coil was more difficult to clean than more conventional receivers without coils. In the side-by-side experiments where cleaning effi-

TABLE 1. Bacterial Counts Obtained by Swabbing the Different Surfaces in a Mueller Receiver and a Control Receiver After Cleaning.

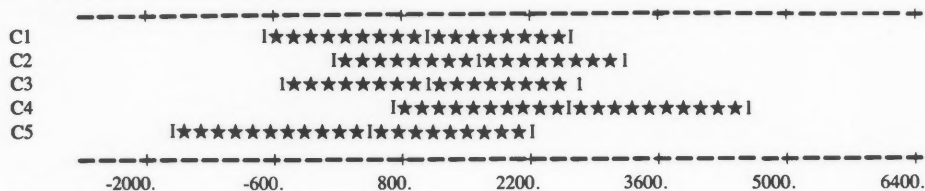
COLUMN COUNT ROW	Mueller Refrigerated Receiver			Non-Refrigerated Control		
	C1	C2	C3	C4	C5	C6
	10	10	10	8	8	6
1	1.0	2800.00	7800.00	700.0	260.	4100.
2	47.0	10.00	26.00	450.0	900.	520.
3	5.0	2700.00	320.00	180.0	560.	120.
4	25.0	2100.00	2.00	4500.0	1.	140000.
5	1.0	45.0	1.00	210.0	210.	17.
6	21.0	1400.00	3.00	470.0	500.	350.
7	75.0	450.00	1.00	2300.0	200.	
8	17.0	5000.00	4.00	12000.0	15.	
9	10000.0	5.00	3000.00			
10	1.0	650.00	4.00			

ANALYSIS OF VARIANCE

DUE TO FACTOR	DF	SS	MS = SS/DF	F-RATIO
TOTAL	45	310951680.		
ERROR	41	288298240.	7031664.	0.81
	4	22653616.	5663404.	

LEVEL	N	MEAN	ST. DEV.
C1	10	1019.	3156.
C2	10	1516.	1638.
C3	10	1116.	2527.
C4	8	2601.	4078.
C5	8	331.	305.

POOLED ST. DEV. = 2652.

INDIVIDUAL 95 PERCENT C. I. FOR LEVEL MEANS
(BASED ON POOLED STANDARD DEVIATION)

ciency was measured bacteriologically by determining bacterial numbers on different areas in the different receivers by swab testing 50 cm² sections of both types of milk receivers, there appeared to be no cleaning problem. Data in Table 1 show the number of bacteria found on test areas at the top wall, lid and refrigeration coil areas in the test and control milk receivers. These counts were subjected to computer analysis and the results indicate no statistical difference in cleaning efficiency. The different swab areas are identified by numbers as follows:

Refrigerated Unit

- C1 Bacterial counts of the top wall
- C2 Bacterial counts of the lid
- C3 Bacterial counts of the refrigeration coils

Control Non-Refrigerated Unit

- C4 Bacterial counts of the top wall
- C5 Bacterial counts of the lid
- C6 Bacterial counts of the inside wall

Table 1 data show no statistical difference in cleanability. The Mueller refrigerated system could be cleaned just as well as a unit without a coil cooler.

Legend of terms used in Tables 2 through 6 appear on page 410 to identify data in different trials. Butterfat values using Milkoscan and Babcock methods in samples of milk with different farm treatments appear in Tables 2 and 3. With the exception of samples of milk cooled prior to pumping, only a very slight increase in butterfat content occurred. Samples tested by Milkoscan show the samples of milk cooled prior to pumping seemed to be lower in fat. However, statistically, no evidence appears to show that significant changes oc-

TABLE 2. Milkoscan Test Results of Butterfat Content in Samples of Milk Before and After Pumping from Milk Receivers Under Different Cooling Conditions.

Systems	No. of Trials	B Before Pumping	A After Pumping	A-B	St. Dev.	ttest ^a
----- % -----						
Control	8	3.7612	3.7700	0.0088	0.0957	N.S.
Coil-MR	9	3.6256	3.6556	0.0300	0.1030	N.S.
Coil-MR + Cooling 60-65°F	25	3.6292	3.5840	-0.0452	0.0905	p<0.05
Coil-MR + Cooling <50°F	8	3.4300	3.4100	-0.0200	0.0882	N.S.

A-B differences in individual systems were analyzed statistically by ttest¹ minitab methods and were shown under the column test.

Note: A-B differences between system were evaluated statistically using pool-minitab methods. No significant difference was found.

N.S. means not significant.

¹t-test used to evaluate statistical difference between milk treatments before and after pumping.

TABLE 3. Babcock Test Results of Butterfat Content in Samples of Milk Before and After Pumping From Milk Receivers Under Different Cooling Conditions.

Systems	No. of Trials	B Before Pumping	A After Pumping	A-B	Std. Dev.	ttest
----- % -----						
Control	8	3.7462	3.7512	0.0050	0.0278	N.S.
Coil-MR	9	3.5456	3.5722	0.0267	0.0461	N.S.
Coil-MR + Cooling to 60-65°F	25	3.5244	3.5248	0.0004	0.0422	N.S.
Coil-MR + Cooling <50°F	8	3.3212	3.3350	0.0138	0.0487	N.S.

A-B differences in individual systems were analyzed by ttest-minitab methods. No significant difference occurred at the 95% level.

A-B differences between systems were also analyzed by pool-minitab methods. No significant difference was found at 95% level.

N.S. means not significant.

curred at the 95% confidence level. Where milk was cooled to 60-65°F, the statistical confidence level was significant ($P < 0.05$) at the 95% confidence level using milk testing data. However, this fact was not found to be so with Babcock Methods (Table 2).

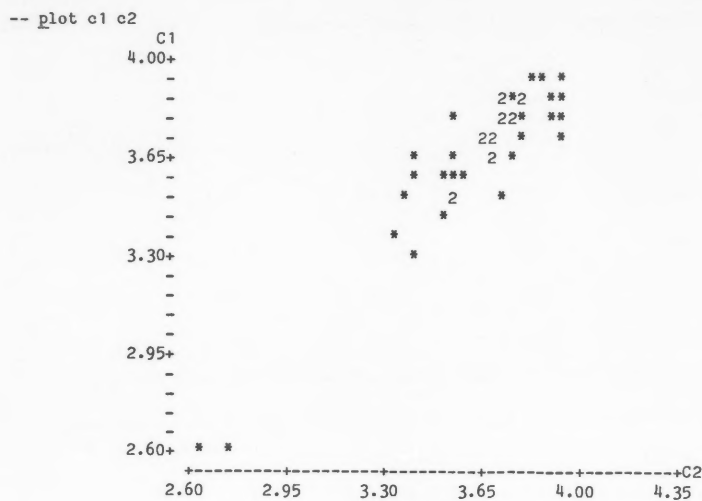
Butterfat analysis data in Table 3 showing the results of split samples of milk analyzed by the Babcock Method indicate no statistical difference in fat tests in samples of milk before and after pumping under different test conditions.

While there was a slight increase or perhaps a trend for fat content to increase after pumping, no statistical

difference was evident. Figures 3 and 4 show a scattering of fat test plots of both methods of analysis before and after pumping.

Table 4 shows variations in butterfat tests for 42 trials testing samples of milk both before and after pumping. The differences before and after pumping are small and not significant, however, the difference between the two kinds of fat tests was significant. The Milkoscan results are significantly higher. The r value in Figure 5 of 0.965 dropping to 0.94 probably suggests some structural change in the fat globule and as a result of pumping caused some influence in fat reading by the Milkoscan Method.

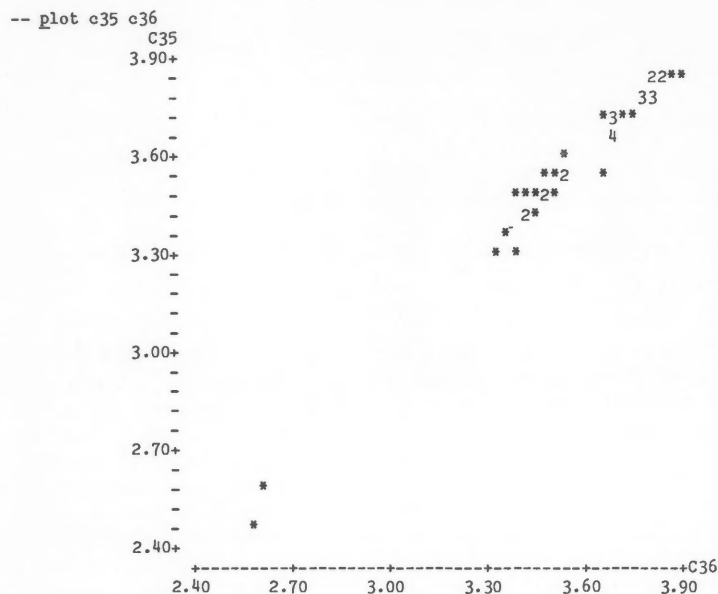
As to the changes which occurred to acid degree values in sample milks collected pre- and post-pumping from the control, non-refrigerated and refrigerated receiver trials, data shown in Table 5 indicate a statistically significant increase in ADV post-pumping in all trials. What is most interesting, however, is that ADV changes are less in the Mueller receiver with and without refrigeration. One might speculate that the coil itself probably acts as a baffle and as such decreases shear action. Perhaps this effect might be utilized elsewhere in milk harvesting systems to control ADV damage which might be used to help protect delicate milk flavor.



C1: % fat in milk before pumping
C2: % fat in milk after pumping

A wider scattering of the plots indicated that there may be some influence on milk fat test by the temperature of the milk being pumped.

Figure 3. Scattering Plots of Milk Fat Test by Infra-Red Method on the Milks Before and After Pumping.



C35: % fat in milk before pumping
C36: % fat in milk after pumping

A narrow scattering of the plots indicated that there is no influence on milk fat test by the temperature of milk being pumped.

Figure 4. Scattering Plots of Milk Fat Test by Babcock Method on the Milks Before and After Pumping.

While there was no real reason to believe there might be a measurable change in protein content in samples of milk before and after pumping from refrigerated milk receivers, this parameter was also monitored using a Foss Milkoscan 300 instrument. Table 6 contains protein content information in samples of milk before and after pumping from different milk receiver situations. There were no statistically significant differences in protein content in milk before and after pumping.

From this work it was concluded that a refrigerated receiver, Mueller in this case¹, does not contribute to the problem of cleaning milking systems when compared with more conventional receivers. The refrigerated receiver was shown to be better than a more conventional milk receiver in that it was less apt to cause an increase in ADV. There was no significant change in the fat or protein content in milk due to using a refrigerated receiver in a milking system.

ACKNOWLEDGMENTS

This study was made possible by a grant from the Paul Mueller Company which supplied both funds and equipment. We also acknowledge with thanks the support provided by the New York State Milk Promotion Advisory Board.

Special acknowledgments are due to Mr. Leo Bernholz, Manager of Cornell's Teaching and Research Farms; Mr. Jerry Phelps, Milking Parlor Chief; and farm personnel in general for their patience and support to researchers working in the milking parlor.

Special acknowledgment is due to Cornell University's College of Agriculture administrators who supplied farm and laboratory facilities needed to carry on the study.

REFERENCES

1. Oliveria, J. S. and C. E. Parmelee. 1976. Rapid enumeration of psychrotrophic bacteria in raw and pasteurized milk. *J. Milk Food Technol.* 39:269.
2. Delvotest, P. Standard diffusion test for the determination of antibiotic residues in milk. Gist-Brocades N.V., Des Plaines, IL.
3. Thomas, E. L., D. J. Nielson and J. C. Olson, Jr. 1955. Hydrolytic rancidity in milk - A simplified method for estimating the extent of its development. *Amer. Milk Rev.* 17:50-58, 85.

¹The use of the Mueller system does not mean that like equipment produced by another manufacturer would not perform as well.

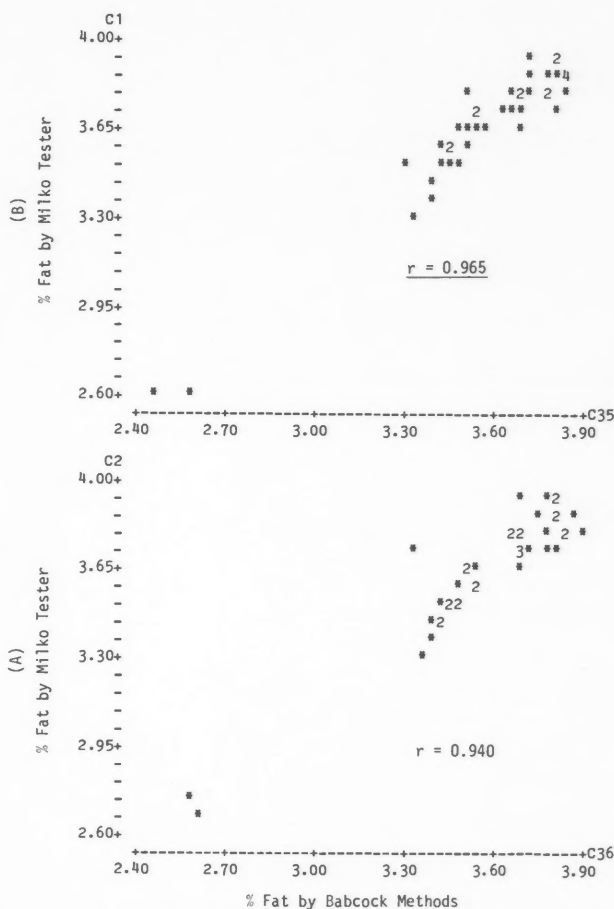
TABLE 4. Milk Fat Test on Split Samples of Milk by Two Different Methods: Milko and Babcock Methods.

	Milko	Babcock	Babcock-Milko Difference	Std. Dev.	ttest
No. of Trials	42	42	-	-	-
B	3.6536	3.5712	-0.0824	0.0751	0.0000
A	3.6348	3.5781	-0.0567	0.0942	0.0004
A-B	-0.0018	0.0069	-	-	-
Std. Dev.	0.0976	0.0412	-	-	-
ttest	N.S.	N.S.	-	-	-

For fat tests in the milks before and after pumping, there is no significant difference indicated either by milko test or Babcock method.

Comparing the two milk fat test methods, the Milko test definitely shows higher readings. This difference has been researched by others and their data suggest protein interference or attachment to fat globules.

N.S. means not significant.



(A) Milk after pumping. (B) Milk before pumping. A drop in correlation between the two tests on the milk after pumping suggested that the structural changes of fat particles may effect the reading of the Milko Tester.

Figure 5. A scattering of Fat Test Plots by Two Methods on Split Samples of Milks Before and After Pumping. Milko Test Versus Babcock Method.

LEGEND INFORMATION

- Control:
Non-refrigerated milk receiver.
- Coil - MR:
Refrigerated Mueller receiver with refrigeration "OFF".
- Coil - MR + Cooling:
Refrigerated Mueller receiver with refrigeration "ON".
- Cooling <50°F:
Milk was held in the refrigerated Mueller receiver (approximately 130 pounds) approximately 15-20 minutes so as to cool milk to the range of 44-50°F.
- A:
Denotes milk samples taken after being pumped from the milk receiver into tank prior to storage.
- B:
Denotes milk samples taken from milk weigh jars before pumping to storage.
- A - B:
Difference when subtracting B from A.
- N.S.:
Not significant.

TABLE INFORMATION

Efficiency for cleaning two different Mueller receivers (regular receiver and refrigerated receiver) were tested side by side. Bacterial count (50 cm²) of the inside surface of the Mueller receiver by the swab test was used as the indicator for the efficiency of cleaning. The result of tests indicated there was no significant difference in the cleaning efficiency for the two receivers.

Salmonella in Meat and Poultry Products

RALPH W. JOHNSTON

Presented at the ABC Research 9th Annual Technical Seminar by Ralph W. Johnston, Director, Division of Microbiology, FSIS, USDA, February 22, 1983, Holiday Inn - University Center, Gainesville, FL.

I am always pleased to present the activities and findings of the Microbiology Division, FSIS, to you who are responsible to your companies for sanitation, quality control and safety of the food products produced by your companies. Governmental concerns and findings need to be expressed to food processors. When these concerns are accepted by food processors, the ultimate goal of regulatory agencies of reduced violations is given a shot in the arm. Food safety must begin with a concerned industry but a second step is also necessary which requires that these concerns be translated to effective action programs within the food industry that are designed to insure product safety.

I will explain the microbiological programs of the Food Safety and Inspection Program and provide an update on our current *Salmonella* problems, particularly with roast beef.

The term microbiology in FSIS is commonly used; however, our functions include several very important analysis that involve non microbiological or partial microbiological procedures.

These areas that may be of importance or interest to you include:

- Examination of meat and poultry products for extraneous material. Extraneous materials like glass, wood and metal enter food accidentally, rodent and some insect contamination may result from poor plant management and insect fragments and animal hair or feathers may occur as unavoidable low level contaminants from meat, poultry or spices.
- Antibiotic and sulfonamide residues are determined using microbiological detection and assay procedures. Residues have been and continue to be an important

issue not only in the U.S. but also in world trade.

- Serological tests are used to determine the identity of species of meat or poultry. The species work is important both nationally and internationally and has many interesting facets. Economic aspects occur when a species of lower cost meat is added to another of higher cost. Health implications exist when pork, which may contain trichinae larvae is substituted in part for beef. This mixture combined with the propensity of some people to eat rare or raw ground beef can result in a serious health problem. Governmental officials from middle eastern countries require extensive assurances that the beef, lamb, or poultry that they buy from us has had no pork content and has had no contact with pork in any way.

Microbiological problems are not new to food; their two primary extreme consequences, spoilage and illness, were well known centuries before Pasteur. Today, they are under excellent control throughout most of the world, however, the potential for microbiological problems remains always with us. Neither the consumer nor the food industry can let down their guard without increasing a risk of some kind of a microbiological problem. It should come as no surprise then that with due consideration of the enormous volume of perishable food handled daily in the U.S., a few problems still occur. During this calendar year, approximately half of the FSIS problems considered and resolved by our Emergency Programs Task Force involved microbiological or extraneous materials issues. These problems are easily recognized as spoilage or acute human illness as compared to the chronic toxicity or potential toxicity of

certain residues and carcinogens. In the latter case, incriminated food products may not be recognized because the effects may be cumulative and require decades to develop.

Operational microbiology laboratories in FSIS are located at Beltsville, MD; San Francisco, CA; Athens, GA; and St. Louis, MO. The Beltsville Laboratory is responsible for methods development and special projects while the remaining three laboratories are primarily responsible for analysis. Programs for these three laboratories are planned by my office in Washington, DC.

When FSIS perceives a need for long term basic research, these needs are formalized and provided to USDA's Agricultural Research Service which is our research arm. Formal procedures have been initiated that result in FSIS/ARS consultations, annual meetings, and semi-annual reports on progress on the research needs.

Food samples are sent to FSIS microbiology laboratories under a number of different programs; examples of the more important of these are as follows:

- Inspector generated samples: FSIS inspectors are on duty at or regularly visit all meat and poultry processing facilities in the U.S. These inspectors collect samples whenever they observe an unusual condition. This could be product abnormalities such as odor, appearance or packaging or it could constitute samples of normal product collected because of processing or formulation deviations such as low oven temperatures, poor cooling, ingredient mix up, insanitary conditions, etc. Through this mechanism, many problems are detected early.
- Complaint samples: Our Epidemiology Branch is a part of a national epidemiology communications network composed of Federal agencies and states. Complaints concerning meat and poultry are channeled to FSIS. For those that involve microbiology, appropriate establishment, retail and index samples are obtained to attempt to determine causes or to verify that no concern exists. During some years, as few as 1% of the investigations show processing involvement. However, the approximate 1% group that is verified is extremely important and triggers emergency concerns.
- Formal Monitoring, Surveillance and Exploratory Surveillance Programs (MMSP): Some of these programs can lead to subsequent regulatory actions such as salmonellae in ready to eat product but most serve as data gathering mechanisms. MMSP programs are started because of chronic problems within an industry, the need for more information or simply as a deterrent program. Several definitions of the basis for programs will be helpful at this point. Monitoring programs differ in that firms producing a given product are sampled because data exist that some degree of a problem exists in the product. A good example of this is our surveillance program for cooked beef products produced by establishments in the Northeastern Region. Here, epidemiological evidence of occa-

sional salmonellae outbreaks during the past 13 years indicates occasional problems. An exploratory surveillance program is one where no data are available and we wish to gather data to evaluate some food product. The following programs are now in effect:

Precooked pork sausage links and patties
Salmonella incidence in fresh broilers
Salmonella incidence in chill tank water
 Cooked diced poultry
 Species verification, imported product
 Species verification, domestic
 Cooked and roast beef and cooked corned beef (monitoring)
 Antibiotic residues (monitoring)
 Antibiotic residues (surveillance)
 Cooked and roast beef/cooked corned beef.

Surveillance program for NE establishments

For most of these programs, no significant problems have developed. In some of this work, we are simply conducting benchmark studies on the incidence of *Salmonella* in raw meat. We continue to perceive low levels of *Salmonella* in raw meat and poultry as an unavoidable defect and have asked the Agricultural Research Service to conduct research on ways to reduce *Salmonella* contamination in warm blooded animals. This is the only option available on this issue but it means that those of you who prepare ready to eat products must control your cooking procedures and your post cook sanitation with intensity.

In California, an outbreak of human salmonellosis occurred last year caused by Basturma which is an Armenian dried beef product. This resulted in a recall and the firm has been under hold and test restrictions since the incident. Basturma, Sojouk and Manna are three dried Armenian beef products that have been produced in the U.S. in small quantities for many years. We are very much concerned with the issue because products are dried by pressing and by holding at room temperatures. They are not cooked during production and are usually eaten without cooking.

Our greatest concern is the area of *Salmonella* in cooked beef products. During the fall of 1981, there were a number of outbreaks of *Salmonella* in the Northeast which were alleged to have been caused by roast beef. Five different producers were thought to be involved by the State epidemiologists investigating the illnesses. Subsequently, intensive epidemiological in-plant and laboratory investigations showed that cooked beef products from two producers were contaminated with *Salmonella* and recalls were made. No involvement was proven for the other three firms. In plant and laboratory investigations in the two plants that shipped contaminated product indicated that processing and sanitation procedures were poorly controlled. The most likely cause of the problem in both firms was cross contamination of cooked product after cooking and inadequate cooling. However, since operational controls and procedures were lax, inadequate cooking could also be involved. These were the first confirmed salmonel-

lae problems since 1978 and clearly indicated the need for returning to microbiological monitoring programs. The Microbiology Division planned two such programs. A decision was made to sample *all* processors not just those on the alternative schedule and to include corned beef.

The first program planned was a surveillance program for all processors in the Northeast Region. This was planned for 12 consecutive months beginning in January 1982. The second program planned was to monitor at a lower level, all other cooked beef processors in the U.S.

In January of 1982, a contingent of epidemiologists from the Northeastern States led by epidemiologists from the State of New York and CDC petitioned Dr. Houston to improve the public health record of cooked beef. Among the approximate 20 mandates were requests to abandon alternative cooking temperatures and to require process operator training similar to requirements of FDAs low acid canned food to cooked beef. We have met several times with this group and have implemented many of their suggestions. We continue to believe that the alternative cooks are as good or better than the 145°F process. It is not likely that we will mandate industry training because of lack of funds and legal questions. The industry, however, has begun to prepare training documents for dissemination. It is apparent that the industry, FSIS and the epidemiology group all have the same goals and are beginning to work together to attain these goals. I thought you would be interested in the results of our testing program.

As an example of the data obtained, I will summarize the surveillance program for beef in the NE U.S. to date.

All samples

3,821 samples of all types have been collected and analysed. Of these, 21 have been positive for salmonellae or 0.57%.

Total establishment samplings

Through this period, 819 multiple sets of samples were collected at establishments. Of these, 15 establishments showed one or more positive samples or 1.8%.

Individual establishments

114 different establishments were sampled during this period. Of these, 15 had one or more salmonellae in one or more of the multiple samples tested (13.1%).

Recalls

Of the 15 establishments from which salmonellae were found in the surveillance samples, the problem was confirmed in whole intact wrapped final product in 4 instances. These led to 1 recall of roast beef, and 3 recalls of cooked corned beef. Thus 26% of the follow up efforts were positive.

In the monitoring program, the results to date are as follows:

Samples Tested	414
Samples Positive	2
Establishments Samples	197
Recalls	0

The results for the monitoring program for 1982 represent processors *other than* those located in the Northeast. These results indicate that there is a problem with processors other than those located in the Northeast but that it may not be as great as it is in the Northeast.

12 month assessment by microbiology division of the cooked beef results

- Inspection Operations, Compliance and Science laboratories have exerted a tremendous effort to prevent human salmonellosis from precooked beef. The efforts have achieved their goal. There have been no reported outbreaks of human salmonellosis from cooked beef products during 1982.
- The original concern was for roast beef. There has been only one recall of roast beef to date. FSIS recognized similar potential hazards in corned beef and include this product in its efforts. There have been three cooked corned beef recalls and no human illnesses from this product. It appears that FSIS has headed off problems from corned beef.
- No firm involved in a recall has had any positive sample after the recall.
- Many processors have voluntarily made significant and probably permanent sanitation and processing improvements. They are also better organized with trade institutes and associations that are capable of providing expert consultation and technical assistance. This is very significant in that these kinds of efforts promote long range compliance.
- The data presented supports our original contention that the alternative processing procedures are as safe or safer than the 145° requirement. Data from alternatively processed products agree closely with a 1978 study on alternative processed product. There were only 2 or 3 of the 23 isolations from alternative process products and no recalls. On the other hand one recall involved cooked beef cooked to 145° and re-bagged and 3 recalls of corned beef cooked under water to temperatures above 155°C.
- Although we have isolated more *Salmonella* than we expected to, we need to keep this in appropriate perspective. In terms of frequency of sampling, size of samples of meat tested and area of equipment surfaces swabbed, this effort is to my knowledge, the most intensive ever undertaken in any food product in any country. While the need was dictated by a real public health hazard, it is possible that many other food products would show similar results.
- We expect to continue cooked beef programs indefinitely although these will be changed somewhat.

“How To Get A Million Bacteria In A Product Without Really Trying”

PAUL R. HOCKING

Vice President
Technical Services
ESKIMO PIE CORPORATION

Presented at the Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc. August 10, 1983.

Bacteria, both good and bad, dominate the world we live in today. In order to get some perspectives about bacteria, I would like to throw out some figures that may startle you. A box containing one cubic inch of average size bacteria would hold 9 trillion. Every tablespoon of soil on this planet contains at least 2 billion bacteria. Are you aware that the entire human body surface contains an average of 178 different classifications of bacteria that total over an average of 20 billion? Did you know that the air we breathe contains 200,000 bacteria count per milliliter? How about just your hands? As you now look at them you see an average of 100,000 bacteria per milliliter and if that distracts you, go scrub them, sanitize them, and then you will be looking at an average of 20,000. How about this fact. In 1982, over 966 million pounds of cottage cheese and over 4-1/2 billion pounds of hard cheese were produced in the United States. None of this production would have taken place without the bacteria that was used. There isn't a place large enough to write down the zeros to show you how many bacteria were used to produce these cheeses. The point I'm only now coming to realize is just how important bacteria are in our lives, for without them we would surely perish.

There are friendly and unfriendly bacteria; there are desirable and undesirable bacteria; there are bacteria that can exist in our atmosphere and some that can't. There are bacteria that must die to complete a project; conversely there are bacteria that must live for a project to exist. Bacteria must often be separated and even isolated to do specific jobs; a bacteria in one form can be harmful and in another form beneficial. So, as we move into this subject, please bear with me as we attack it on just a few planes to gain some insight into these organisms. Bacteria is defined by Webster as, "A class of microscopic plants having round, rod like, spiral, or filamentous bodies which often exist in colonies, and live in soil, water, organic matter, or the bodies of plants and animals and are crucial to man because of their chemical effects on our lives and environments." Micro-organisms have even been described by ex-

perts as "excellent biochemists" because of their absolute necessity in certain foods. Bacteria can convincingly claim to be among the most representative forms of life on earth. Bacteria increase in numbers by a process of simple binary fission. One bacteria cell increases in size and divides into two similar cells. Each further division produces what is termed a new generation of cells. This is what is known as a logarithmic series, for the population doubles with each successive generation. Under very favorable conditions, some bacteria produce a new generation in 15 minutes or less. Under unfavorable conditions, 24 hours or more may be needed for each generation. The combined weight of all the bacterial cells on earth is about 25 times that of this planet's entire animal life. Many of us take these various forms of bacteria for granted, living here in the United States. Go abroad for a brief trip. Encounter the strange tastes in foods and liquids. If you're fortunate and wise in your selection, you may not become ill. If anyone in this room doesn't know what Montezuma's Revenge is, I certainly hope you don't have to find out! An acquaintance recently abroad said that when he boarded an American jet for the trip home, a drink of American water was more welcome than any champagne or cocktail he could have possibly received. All because of few bacteria!

Let's now branch off this very immense subject and concentrate on the more specific areas in the dairies and frozen dessert plants and the challenge they present to us as sanitarians as they become larger and more complex. The Quality Control Department, while probably small in comparison to the size of the plant is the heart of our company. It is their primary role to monitor friendly and unfriendly bacteria and maintain that crucial balance in our products. Probably one of the areas least talked about and planned for is the Quality Control area of a plant as a new addition is being planned in a dairy. This new addition may take the form of a new operation within a plant, a new physical building to go along with a new operation, or just a new or different piece of equipment that is used in the existing operation. Whatever this change is we must all appeal to our management, that the quality effect this change may have on our end product must be considered clear back at the beginning of the project, and quality control procedures and practices must change to accommodate our operations

without sacrificing the excellence of our end product. Once we have these basic tools with which to adjust and change our procedures, we then are challenged to keep our people abreast of these changes and encourage them to look further and deeper into processes and procedures to find these critical areas we might have overlooked. Because of the Tylenol incident, Quality Control has been redefined in a whole new dimension. The ultimate quality of our end product has now been extended through the distribution system and into the consumer's home. Ben Franklin once said, "A little neglect may breed great mischief - For want of a nail, the shoe was lost - For want of a shoe the horse was lost - and for want of a horse, the rider was lost. Some of us at one time or another have received that late night call to inform us that because someone didn't do as they were told, or neglected their job in Quality Control, something got out that shouldn't have.

I perceive Quality Control as a large triangle; one of the strongest forms known to man. At each corner of the triangle is an important ingredient in Quality Control. If any one facet is missing, your triangle and your Quality Control system loses strength. I call this triangle the 3 "M's." On one corner - Motivation; on the second corner - Management; and on the third corner - Map. Briefly now let us go into these areas.

Motivation is the first ingredient in Quality Control. A story comes to mind when this word comes up. A small six year old boy named Johnny had a rabbit for a pet that he treasured. He carried his pet rabbit everywhere! All of his neighbors and friends got a big kick out of watching Johnny take his rabbit for walks and to watch how close they grew! Johnny's father traveled extensively in his sales work and had to be gone during the week quite a lot, but each weekend he listened to Johnny talk about his rabbit and all of the things they had done together. One Friday afternoon Johnny's father came home a little early and as he drove up he saw Johnny sitting on the porch crying. The boy was beside himself with grief. He hurried to his son's side and asked what had happened. "My rabbit died," Johnny wailed. The father was quite taken with his son's grief and wanted to impress on him that he, too, felt the loss of the rabbit. The father expressed his sorrow to the boy about his loss and then surprised him by telling his son that the least they could do was give the rabbit a funeral. Johnny seemed quite surprised that his father felt this way, but eagerly watched as his father began preparations for the funeral. They worked together excitedly as they secured one of mom's old jewelry boxes for the casket. Satin ribbons were found for the lining of the casket. "Dad, we need some flowers," Johnny said as he rushed outside to mom's flower bed! The house was alive as they rustled from place to place getting the things necessary to give this pet rabbit the greatest funeral in the world. Mom and sister even got involved with getting a linen towel for a cover and making a small pillow out of an old pin cushion. At last, all the preparations were complete and they gathered at the small hole in the back yard for the funeral. Johnny, slowly and meticulously, carried the rabbit out to the casket, setting beside the hole, and ever so carefully, laid the

rabbit's body in the box. Dad started to eulogize the pet and as he talked it brought a tear to everyone's eye. Out of the corner of his eye, Johnny was looking at the rabbit as his father was talking and he saw the rabbit's nose twitch! He looked again in amazement, and the rabbit's ear began to move. All of the family at once noticed, in fact, the rabbit wasn't dead at all. Johnny looked at his mom, his sister, and finally his father in amazement. "Dad," Johnny said with a strong, determined voice, "LET'S KILL THE RABBIT." That's motivation at work, if I ever saw it!

The English philosopher John Locke, who lived in the 1600's once said of motivation, "Good and evil, reward the punishment, are the only motives to a rational creature. These are the spur and reins whereby all mankind are set on work and guided." Our Quality Control people have to have that kind of sincere dedication to look and dig into our operations and new methodology to assure us we can maintain the safeguards of high quality for our products. Awards and recognitions of outstanding performance in this area can be an excellent means to help motivate this kind of action. When you consider a plaque which might even cost \$300 - \$400 at the most, look at the goodwill, hard work, and extra miles your people will go to get the job done one step better.

The second corner of this strong and effective triangle is to manage our people to the utmost to get the strong results desired. As a manager, we must know our people as individuals and how best they fit into our applications of quality. Some people work best alone, while others work better as a group. Some people need to have all of the details spelled out for them, while others take the general assignment and detail it out themselves. Corporations as a whole tend to understaff in this era of time. This means that heavier work loads fall on each of us and our staff people. We must never forget one of our primary goals is to train everyone we work with to be cognizant of Quality Control. If all people contribute to this job, it is done more effectively.

In a book called, "The Cox Report on the American Corporation," the author found that in surveying the top 13 American corporations, 40% of the top executives felt that fewer people will actually complete higher quality of work. We are challenged to keep top management in our companies interested in and appraised of Quality Control's procedures and developments. Give your people responsibility along with authority to follow through on their work. They cannot be effective managers of their area if they don't have both plains of management. As manager, be sensitive to the needs of your people. See that they have the means with which to do their job. General George S. Patton was often heard saying this sentence to his leaders, "Never tell people how to do things - Tell them what to do and they'll surprise you with ingenuity."

The third corner of this triangle, I call "Map." That is to say you have to have a map, a guide, or a manual with which to find your way through all of the procedures and tests to protect your products. A good Quality Control Manager must, of necessity, be a methods person. It is

with respect to systems and procedures that he can contribute effectively to the operation as a whole. The manual must be precise, yet not so specific that a person is not challenged to make judgments when new criteria arise. Mapping out new areas of concern, new types of operations, and plant additions gives our people the challenge to go that extra mile to get the job done. The French writer, Victor Hugo gives a good analogy about planning; "He who every morning plans the transaction of a day and follows out that plan, carries a thread that will guide him through the maze of the most busy life; but when no plan is laid, where the disposal of time is surrendered merely to the chance of incidence, chaos will soon reign."

The 3 "M's" then of Quality Control are Motivate, Manage, and Map out these areas to form a uniform inter-connection for the quality of their product. This trio of verbs gives us the strong base for keeping this control of sanitation. A weakness in any one of these three areas can guarantee you 1 million count of bacteria in your product.

One other area that I wanted to touch on in our industry is the incentives that are available for our companies to use as they grow or expand in the future. The Investment Tax Credit is perhaps the most well known tool used in purchasing new machinery, adding facilities onto an existing plant, or building a brand new plant.

In those applications that qualify, this tax break can mean that you will recapture up to 50% of the value of addition in tax reductions and breaks.

There is also a system known as the "Accelerated Cost Recovery System," that can encourage companies to expend funds on new equipment, new procedures, and new processes. This system is also tied into the five year advanced depreciation system on equipment that is now available. Air pollution control equipment, energy saving devices or equipment and yes, even certain types of pure research expenditures have special tax incentives to those who search them out and qualify for them.

What does all this have to do with the bacteria count in our products? As a Quality Control Manager from way back, I can't help but reflect on the things I wish I had known as I did my job. It's important that we help our management to see and obtain our share of funds available in whatever shape or form to keep the quality in Quality Control. We must be watchful to be sure we are included in all of the preparations and plans right from the start as Quality Control Managers to assure us we keep that ultimate control over the quality of our products. The other reason we need to know about these special tax breaks is because in some cases our own departments might qualify

for special consideration on research projects within the Quality Control area that could be partially or completely justified by tax breaks, grants, and incentives from the government. I encourage each of you to look into this aspect of your company from that viewpoint.

A million bacteria can sit on the head of a pin; a million bacteria can be on the pencil you have in your hand; it can be in the air we are now breathing; it could be in the food we will eat today. We could meet a million bacteria in a hospital as a loved one dies or we could also meet it in a hospital because a loved one lives. We could meet it in a grocery store as we purchase food made by it, or digest the food that we eat. We can be sick with bacteria or get well with bacteria. A seemingly insignificant error such as varying the temperature of our product a few degrees can mean the difference between a million good bacteria and a million bad bacteria. Bacteria is an every encompassing part of our lives all over the world and if you want to find a million bacteria, you certainly won't have to look very far!

This subject of bacteria brings to mind a poem written by Hillaire Belloc which summarizes this subject. The title of the poem is "Small but not Simple." It goes like this:

The bacteria is so very small
you cannot make him out at all,
But many sanguine people hope
to see him through a microscope.
His jointed tongue that lies beneath
a hundred curious rows of teeth;
His seven tufted tails with lots
of lovely pink and purple spots,
On each of which a pattern stands,
Composed of forty separate bands;
His eyebrows of a tender green;
All of these have never yet been seen -
But Scientists who ought to know,
Assure us that they must be so. . .
Oh! Let us never, never doubt
What nobody is sure about.

REFERENCES AND CREDITS:

1. "Dairy Plant Management" by Tracy, Armerding, & Hannah.
2. "Dairy Microbiology" by Foster, Nelson, Speck, Doetsch, & Olson.
3. "Fundamentals of Dairy Chemistry" by Webb & Johnson.
4. "Practical Food Microbiology and Technology" by Weiser, Mountney, & Gould.
5. "Ice Cream, 3rd Edition" by Wendell S. Ar buckle.
6. "The Executive's Illustrated Primer of Long Range Planning" by Dick Levin.
7. "Magnificent Microbes" by Bernard Dixon.
8. "Good Advice" by William Safire and Leonard Safire.

Detect virtually all antibiotics.

How co-ops keep contaminated milk on the farm.

"Penicillin losing punch in mastitis control," headlines a recent article. Producers are turning to other antibiotic materials.

That complicates monitoring. But not for leading dairy co-ops that supply Delvotest® P to their members for on-the-farm use.

Delvotest P detects virtually all growth inhibitors. It's sensitive to residues as minute as 0.005 IU/ml. And it has these advantages:

- Simple to use, requires no special training
- Needs only an inexpensive heat source
- Low cost per test
- Yields easily interpreted and conclusive readings
- No waste, even with one sampling

If you're a milk processor, let us send you information on how



your farmers can set up their own on-the-farm milk sampling tests.

Call or write:



GB Fermentation Industries Inc.

P.O. Box 241068
Charlotte, NC 28224
(704) 527-9000

2055 Bishop Street
Montreal, Quebec, Canada H3G 2E8
(514) 282-0161

Distributor inquiries invited.



Dairy Quality

by DARRELL BIGALKE

*Food and Dairy Quality
Management Inc.
St. Paul, MN*

SUGGESTED TESTING PROCEDURES TO MONITOR THE QUALITY OF PASTEURIZED FLUID MILK

The quality of a food product is always related to consumer acceptance. Certainly in the fluid milk industry, consumer acceptance is the primary objective of a dairy's quality assurance program. When defining a quality fluid milk product, several factors must be considered ... (1) the microbial population of the product, (2) the product must be safe from a public health standpoint, (3) the product must be free from any physical contaminants such as hair, straw, or other foreign materials, (4) the product must be free from physical defects such as ropiness or sweet curdling, (5) the product must maintain acceptable nutritional quality, (6) the product must be free from chemical contaminants such as detergents, pesticides, antibiotics, excessive amounts of added vitamins and the like, and (7) the product must be free from any off-flavors and have an extended shelf-life to assure consumer acceptance.

Quality control is a major management function in the dairy industry. Quality has to be built into a product and cannot be effectively or economically achieved by inspection alone. The primary objective of quality control is to oversee production, however, to assure a high level of consumer acceptance, a dairy must take quality control one step further and develop a quality assurance program. Quality assurance would include ingredients inspection and control, manufacturing and process control, and distribution control. Since dairy products usually obtain the name of the dairy producing the product, distribution control is a very necessary part of a quality assurance program.

A quality assurance program that has been successfully implemented by the food processing industry is the Hazard Analysis Critical Control Point (HACCP) concept (1,3,4,5). While HACCP was developed for food safety by the food processing industry, the HACCP concept can be applied to the dairy industry to assure both product safety and product quality.

The HACCP system is a preventive program for quality assurance designed to inform management of potential risks and what corrective action can be taken if problems are evident. The HACCP concept considers microbiological and physical hazards for ingredients, processing, and the potential for consumer abuse. This system surveys all physical and biological systems, identifies hazards, eliminates correctable hazards, and establishes control for hazards that must remain part of the process. It also selects testing procedures and establishes sampling schedules.

The objective of this month's article is to suggest testing procedures and sampling schedules that are appropriate for the fluid milk industry. The scheme suggested is not exhaustive, however, it does consider ingredients, processing, and finished product inspection. A proposed scheme for monitoring the keeping quality and consumer acceptance of fluid pasteurized milk is as follows:

I. *Monitoring Ingredient Quality (Raw Milk)*

- A. Train each hauler to note the odor of each tank on the farm.
- B. Taste test each load as it is received. Ideally, this should be conducted by lab pasteurizing the sample to 60-70F, and organoleptically evaluating as suggested by Floyd Bodyfelt (2).
- C. Conduct Standard Plate Counts or Preliminary Incubation Counts and inhibitory tests on incoming loads and producer samples as often as necessary.
- D. Determine Standard Plate Counts and taste test the milk at the balance tank and on any milk held at the dairy for longer than 24 hours.

II. *Pasteurized Milk (Process Control)*

- A. Conduct daily line sampling starting with at least two 50+ ml samples from the HTST, one 50+ ml sample from each pasteurized storage tank, and one 50+ ml sample at a site above each filler.
- B. Conduct weekly environmental analysis by determining microbial content of compressed air, glycol, sweet water and water.
- C. Conduct swab tests on suspect product contact areas.
- D. Determine microbial content of packages.

III. *Finished Product Inspection*

- A. Conduct Standard Plate Counts and Coliform Counts on a product from each filler for each six hours of production.
 - B. Taste test a sample from each machine for each six hours of production.
 - C. Conduct 7-day counts on two products from each filler.
 - D. Taste test two products from each filler at 7 days, at the end of code, and at 7 days beyond code for each six hours of production.
 - E. Record all physical defects and any off-flavors that are present.
 - F. Determine net weight, leakers, etc.
 - G. Initiate an effective record keeping system -- documentation is a necessary function of a properly conducted quality assurance program.
 - H. Statistics can be used to place levels of confidence on test results and determine testing frequency.
 - I. Initiate a system of recording consumer complaints and follow-up on these complaints.
- IV. Monitoring temperatures, especially fill temperatures, will be the subject of next month's article.

An effective quality assurance program must include flavor and microbiological analyses. Each dairy should

have two or more people trained in flavor analysis. Several of the state dairy or university extension services offer courses in sensory evaluation of milk. A course such as this is essential for persons responsible for a dairy's quality control program. If these courses are not available, procedures outlined by Shipe, et. al (6) can be used to simulate off-flavors.

In summary, a good quality assurance program for the fluid milk industry must monitor and control ingredients, processes and distribution.

- (1) Bauman, H.E. 1974. The HACCP concept and microbiological hazard categories. *Food Technol.* 28(9):30,32,34,74.
- (2) Bodyfelt, Floyd. 1979. Flavor is the voice of milk. *Dairy Record*, September, 1979.
- (3) Ito, K. 1974. Microbiological critical control points in canned foods. *Food Technol.* 28(9):46-48.
- (4) Kauffman, F.L. 1974. How FDA uses HACCP. *Food Technol.* 28(9):51,84.
- (5) Peterson, A.C., and R.E. Gunnerson. 1974. Microbiological critical control points in frozen foods. *Food Technol.* 28(9):37-44.
- (6) Shipe, W.F. et. al. 1978. Off-flavors of milk: Nomenclature, standards and bibliography. *J. Dairy Science* 61(7):855-869.



Q C Inc.

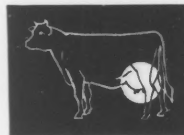
QUALITY CONTROL LABORATORY

Microbiological and Chemical Analyses

Dairy•Food•Beverages
Pesticides•Waters•Wastewaters
Industrial Waste•Inspections

1205 Industrial Highway
P.O. Box 514
Southampton, PA 18966

(215) 355-3900



N.M.C.

NATIONAL MASTITIS COUNCIL

Teat dipping after every milking has been recommended for more than 15 years and about 60% of America's dairy farmers practice this mastitis control procedure. Dairymen should know what results to expect from teat dipping, and equally important, some of the limitations.

The principle of which teat dipping works is simple. The more mastitis organisms (pathogens) on the teat, the greater the chances of an infection. Germicidal teat dips kill most of the pathogens on teats and reduce the likelihood of infection.

Rate of new udder infections caused by *Staphylococcus aureus* (staph) and *Streptococcus agalactiae* (strep ag) is reduced 50% to 80% by teat dipping, but infections caused by other species of streptococci ("other streps") and coliforms are not reduced as markedly. The differences in effectiveness are probably not due to the inability of germicides to destroy some species of bacteria, but are more likely due to differences in the origin of the various mastitis pathogens and when they come in contact with the teats. Strep ag and staph are very contagious and are transmitted from infected to uninfected quarters primarily during the milking process. Effective teat dips usually kill most of these pathogens. "Other streps" and coliforms probably reach the teat from environmental sources (bedding, ponds, loafing areas, etc.) between milking when germicidal activity of teat dips is diminished. Udders and teats can be heavily contaminated with the environmental pathogens when cows enter the milking parlor. Chances of infection occurring are enhanced if the numbers of these pathogens are not reduced before milking. Udders and teats should be clean and dry before attachment of machines.

A second limitation is that teat dips have no effect on existing infections. The level of infection in a herd depends on both duration of existing infections and rate of new infections. Teat dipping will prevent many new infections and the impact of teat dipping on level of mastitis is enhanced by the simultaneous use of dry cow therapy and judicious culling, measures designed to reduce duration of existing infections.

Teat dipping is the most effective means to prevent new infections. A significant decrease in level of mastitis depends on the implementation of a complete mastitis control program. "If I had one cow and she had one teat - I would dip it!"

1840 Wilson Blvd.
Arlington, VA 22201
703-243-8268

Calendar

1984

February 7 & 8, 1984, **FOOD PROCESSORS SANITATION WORKSHOP**. Presented through the cooperation of sanitation organizations, industry trade associations, and the University of California Cooperative Extension. Mission de Oro, Santa Nella, California. For more information contact Paulette De Jong, Food Science and Technology, University of California, Davis, CA 95616, 916-752-1478.

February 15-16, 1984, **DAIRY AND FOOD INDUSTRY CONFERENCE**, The Ohio State University. For information contact: John Lindamood, Dept. of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210.

Feb. 21-23, 1984, **ANNUAL MEETING OF THE KENTUCKY ASSOC. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS**, Executive Inn, Louisville. For more information contact: Dale Marcum, PO Box 139, Frankfort, KY 40602.

March 19-23, 1984, **MID-WEST WORKSHOP IN FOOD SANITATION**, The Ohio State University. For information contact: John Lindamood, Dept. of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210.

April 9 - 11, 1984 **BIOTECHNOLOGY OF MARINE POLYSACCHARIDES** is the topic of the third annual MIT Sea Grant Lecture and Seminar at Massachusetts Institute of Technology, Cambridge, MA. For more information contact Therese Z. Henderson, MIT Sea Grant Information Center, 77 Massachusetts Ave., Bldg. E38-302, Cambridge, MA 02139. 617-253-7041.

April 16-18, 1984---**MIAMI INTERNATIONAL SYMPOSIUM ON THE BIOSPHERE**. For more information contact: Ms.

Grace Mayfield, Miami International Conference on the Biosphere, Clean Energy Research Institute, University of Miami, PO Box 248294, Coral Gables, FL 33124.

April 25-27, 1984 **SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSOC. ANNUAL MEETING**. Staurolite Inn, South Dakota State University, Brookings, SD. For more information contact: Morris V. Forsting, Secretary-Treasurer, 1320 S. Minnesota Ave., Room 101, Sioux Falls, SD 57105.

May 7-11, 1984---**INTERNATIONAL MILK PROTEIN CONGRESS**. For more information contact: International Milk Protein Congress, Congress Secretariat, PO Box 399, 5201 AJ's-Hertogenbosch, The Netherlands.

May 27-30, 1984, **THE CANADIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY'S 27TH ANNUAL CONFERENCE**, Hyatt Regency Vancouver Hotel, 655 Burrard Street, Vancouver, B.C., 604-687-6543. For more information contact: Jerry Hedding, Publicity Chairman, Qwest Food Ltd., 260 E. 5th Ave., Vancouver, B.C., V5T 1H3, 604-873-2647.

June 10-14, 1984, **50th ANNUAL EDUCATIONAL CONFERENCE** of the Canadian Institute of Public Health Inspectors. For information contact: J. Dunlop, CPHI (C), 1984 National Educational Conference Committee, Canadian Institute of Public Health Inspectors, 444 Sixth Street N.E., Medicine Hat, Alberta, Canada T1A 5P1.

July 14 - 21, 1984 **WORKSHOP ON RAPID METHODS AND AUTOMATION IN MICROBIOLOGY**, at Kansas State University, Manhattan, Kansas. Dr. Daniel Fung, Dr. Nelson A. Cox and Dr. Millicent C. Goldschmidt will present lectures. The course will carry 7.2 Continuing Education Credits for the American Society for Microbiology. For more information

contact: Dr. Daniel Y. C. Fung, Call Hall, Kansas State University, Manhattan, KS 66506. 913-532-5654.

July 29 - August 2, 1984 **24TH ANNUAL MEETING OF THE HOSPITAL, INSTITUTION & EDUCATIONAL FOOD SERVICE SOCIETY (HIEFSS)**, at the Riviera Hotel and Convention Center in Las Vegas, Nevada. The HIEFSS Expo '84 will be open on July 31 and August 1, 1984. For more information contact: Carolyn Isch, Asst. Exec. Dir., HIEFSS, 4410 W. Roosevelt Rd, Hillside, IL 60162. 1-800-323-1908 or 312-440-2770.

August 5-9, 1984---**IAMFES ANNUAL MEETING**, Edmonton, Alberta, Canada.

Nov. 22-24, 1984---**14th ANNUAL SYMPOSIUM ON THE ANALYTICAL CHEMISTRY OF POLLUTANTS**, 3rd International Congress on Analytical Techniques on Environmental Chemistry-Expoquimia, Barcelona Spain. For more information write: Av. Reina Ma. Christina Palacio No. 1, Barcelona-4 Spain.

1985

May 20-23, 1985, **FOODANZA '85**, joint convention of the Australian and New Zealand Institutes of Food Science and Technology. To be held at the University of Canterbury, Christchurch, New Zealand. For more information contact: D. R. Hayes, Convention Secretary, 394-410 Blenheim Road, PO Box 6010, Christchurch, New Zealand.

August 25-30, 1985 **9TH SYMPOSIUM OF WAVFH**. The World Association of Veterinary Food Hygienists (WAVFH) will hold their 9th Symposium in Budapest, Hungary. For more information contact: 9th WAVFH Symposium, Organizing Committee, Mester u. 81, H-1453 Budapest Pf 13, Hungary.

Classified Ad

For Sale

Single Service milk sample tubes. For further information and a catalogue please write, Dairy Technology Inc., PO Box 101, Eugene, OR 97401.

NASCO **WHIRL-PAK**

"Sampling Is Our Bag"

Free Sampling Equipment Catalog containing hundreds of work-saving items. For your complimentary copy, just call or write:

Fort Atkinson, WI 53538
Modesto, CA 95352

Nasco

**Free Phone Order Service 1-800-558-9595
In Wisconsin 1-800-242-9587**

Welcome. . . New Members and Subscribers to the IAMFES Family...

Mankato State University
Memorial Library
Mankato, MN

Gerard D. Blais
Fall River, MA

Douglas L. Marshall
University of Nebraska
Lincoln, NE

Miss Maggie Duke
Nestle, sa
Switzerland

Barbara Bohner
Alcide Corporation
Farmingdale, NY

OIC Logistic Library
Singapore

Azienda Comunale
Roma, Italy

Robert J. Harmon
Lexington, KY

Haldane Consultants
Dorset, England

Bioliotheque des Sci. Exactes
Louvain La Neuve, Belgium

Richard Friend
Friend Lab, Inc.
Waverly, NY

Andrew M. Gould
Carling O'Keefe Ltd.
Toronto, Ontario, Canada

Glen Ritchie
Morden, Manitoba, Canada

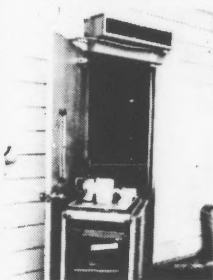
Prof. Dr. H. Glaeser
Sigmaringen, W. Germany

"THE BEST THING NEXT TO YOUR DOOR"

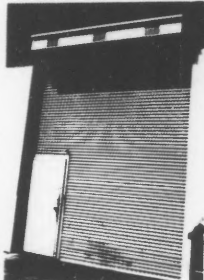
MARS Air Doors

THE MOST EFFECTIVE AIR BARRIER FOR COMPLETE PROTECTION
AGAINST INSECTS, DUST, DIRT AND FUMES

RECEIVING DOORS



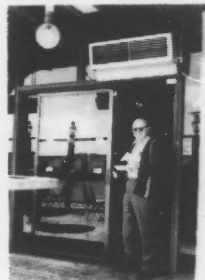
INDUSTRIAL DOORS



SERVICE WINDOWS



CUSTOMER ENTRANCE DOORS



Mars Air Doors create a barrier of high velocity air to stop insects, dirt and dust from infiltrating food facilities and other clean work areas.



APPROVED AS LISTED IN STANDARD 37

**SEND FOR
BROCHURES AND
SPECIFICATIONS.**

114 Sheldon St., El Segundo, CA 90245

Toll Free (800) 421-1266 In CA (213) 772-3321

MARS AIR DOORS are used effectively throughout the U.S.A. to improve sanitation and safety in food processing establishments and many other types of businesses. Sanitarians and engineers are invited to write for further information on the many uses of MARS AIR DOORS.

Calendar

1984

February 7 & 8, 1984, **FOOD PROCESSORS SANITATION WORKSHOP**. Presented through the cooperation of sanitation organizations, industry trade associations, and the University of California Cooperative Extension. Mission de Oro, Santa Nella, California. For more information contact Paulette De Jong, Food Science and Technology, University of California, Davis, CA 95616, 916-752-1478.

February 15-16, 1984, **DAIRY AND FOOD INDUSTRY CONFERENCE**, The Ohio State University. For information contact: John Lindamood, Dept. of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210.

Feb. 21-23, 1984, **ANNUAL MEETING OF THE KENTUCKY ASSOC. OF MILK, FOOD & ENVIRONMENTAL SANITARIANS**, Executive Inn, Louisville. For more information contact: Dale Marcum, PO Box 139, Frankfort, KY 40602.

March 19-23, 1984, **MID-WEST WORKSHOP IN FOOD SANITATION**, The Ohio State University. For information contact: John Lindamood, Dept. of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210.

April 9 - 11, 1984 **BIOTECHNOLOGY OF MARINE POLYSACCHARIDES** is the topic of the third annual MIT Sea Grant Lecture and Seminar at Massachusetts Institute of Technology, Cambridge, MA. For more information contact Therese Z. Henderson, MIT Sea Grant Information Center, 77 Massachusetts Ave., Bldg. E38-302, Cambridge, MA 02139. 617-253-7041.

April 16-18, 1984---**MIAMI INTERNATIONAL SYMPOSIUM ON THE BIOSPHERE**. For more information contact: Ms.

Grace Mayfield, Miami International Conference on the Biosphere, Clean Energy Research Institute, University of Miami, PO Box 248294, Coral Gables, FL 33124.

April 25-27, 1984 **SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSOC. ANNUAL MEETING**. Staurolite Inn, South Dakota State University, Brookings, SD. For more information contact: Morris V. Forsting, Secretary-Treasurer, 1320 S. Minnesota Ave., Room 101, Sioux Falls, SD 57105.

May 7-11, 1984---**INTERNATIONAL MILK PROTEIN CONGRESS**. For more information contact: International Milk Protein Congress, Congress Secretariat, PO Box 399, 5201 AJ's-Hertogenbosch, The Netherlands.

May 27-30, 1984, **THE CANADIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY'S 27TH ANNUAL CONFERENCE**, Hyatt Regency Vancouver Hotel, 655 Burrard Street, Vancouver, B.C., 604-687-6543. For more information contact: Jerry Hedding, Publicity Chairman, Qwest Food Ltd., 260 E. 5th Ave., Vancouver, B.C., V5T 1H3, 604-873-2647.

June 10-14, 1984, **50th ANNUAL EDUCATIONAL CONFERENCE** of the Canadian Institute of Public Health Inspectors. For information contact: J. Dunlop, CPHI (C), 1984 National Educational Conference Committee, Canadian Institute of Public Health Inspectors, 444 Sixth Street N.E., Medicine Hat, Alberta, Canada T1A 5P1.

July 14 - 21, 1984 **WORKSHOP ON RAPID METHODS AND AUTOMATION IN MICROBIOLOGY**, at Kansas State University, Manhattan, Kansas. Dr. Daniel Fung, Dr. Nelson A. Cox and Dr. Millicent C. Goldschmidt will present lectures. The course will carry 7.2 Continuing Education Credits for the American Society for Microbiology. For more information

contact: Dr. Daniel Y. C. Fung, Call Hall, Kansas State University, Manhattan, KS 66506. 913-532-5654.

July 29 - August 2, 1984 **24TH ANNUAL MEETING OF THE HOSPITAL, INSTITUTION & EDUCATIONAL FOOD SERVICE SOCIETY (HIEFSS)**, at the Riviera Hotel and Convention Center in Las Vegas, Nevada. The HIEFSS Expo '84 will be open on July 31 and August 1, 1984. For more information contact: Carolyn Isch, Asst. Exec. Dir., HIEFSS, 4410 W. Roosevelt Rd, Hillside, IL 60162. 1-800-323-1908 or 312-440-2770.

August 5-9, 1984---**IAMFES ANNUAL MEETING**, Edmonton, Alberta, Canada.

Nov. 22-24, 1984---**14th ANNUAL SYMPOSIUM ON THE ANALYTICAL CHEMISTRY OF POLLUTANTS**, 3rd International Congress on Analytical Techniques on Environmental Chemistry-Expoquimia, Barcelona Spain. For more information write: Av. Reina Ma. Christina Palacio No. 1, Barcelona-4 Spain.

1985

May 20-23, 1985, **FOODANZA '85**, joint convention of the Australian and New Zealand Institutes of Food Science and Technology. To be held at the University of Canterbury, Christchurch, New Zealand. For more information contact: D. R. Hayes, Convention Secretary, 394-410 Blenheim Road, PO Box 6010, Christchurch, New Zealand.

August 25-30, 1985 **9TH SYMPOSIUM OF WAVFH**. The World Association of Veterinary Food Hygienists (WAVFH) will hold their 9th Symposium in Budapest, Hungary. For more information contact: 9th WAVFH Symposium, Organizing Committee, Mester u. 81, H-1453 Budapest Pf 13, Hungary.

Classified Ad

For Sale

Single Service milk sample tubes. For further information and a catalogue please write, Dairy Technology Inc., PO Box 101, Eugene, OR 97401.

NASCO **WHIRL-PAK**

"Sampling Is Our Bag"

Free Sampling Equipment Catalog containing hundreds of work-saving items. For your complimentary copy, just call or write:

Fort Atkinson, WI 53538
Modesto, CA 95352

Nasco

**Free Phone Order Service 1-800-558-9595
In Wisconsin 1-800-242-9587**

Welcome. . . New Members and Subscribers to the IAMFES Family...

Mankato State University
Memorial Library
Mankato, MN

Gerard D. Blais
Fall River, MA

Douglas L. Marshall
University of Nebraska
Lincoln, NE

Miss Maggie Duke
Nestle, sa
Switzerland

Barbara Bohner
Alcide Corporation
Farmingdale, NY

OIC Logistic Library
Singapore

Azienda Comunale
Roma, Italy

Robert J. Harmon
Lexington, KY

Haldane Consultants
Dorset, England

Biolotheque des Sci. Exactes
Louvain La Neuve, Belgium

Richard Friend
Friend Lab, Inc.
Waverly, NY

Andrew M. Gould
Carling O'Keefe Ltd.
Toronto, Ontario, Canada

Glen Ritchie
Morden, Manitoba, Canada

Prof. Dr. H. Glaeser
Sigmaringen, W. Germany

"THE BEST THING NEXT TO YOUR DOOR"

MARS Air Doors

**THE MOST EFFECTIVE AIR BARRIER FOR COMPLETE PROTECTION
AGAINST INSECTS, DUST, DIRT AND FUMES**

RECEIVING DOORS



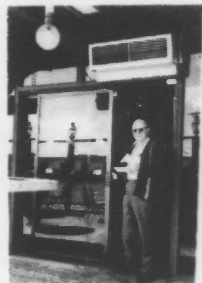
INDUSTRIAL DOORS



SERVICE WINDOWS



CUSTOMER ENTRANCE DOORS



Mars Air Doors create a barrier of high velocity air to stop insects, dirt and dust from infiltrating food facilities and other clean work areas.



APPROVED AS LISTED IN STANDARD 37

**SEND FOR
BROCHURES AND
SPECIFICATIONS.**

114 Sheldon St., El Segundo, CA 90245

Toll Free (800) 421-1266 In CA (213) 772-3321

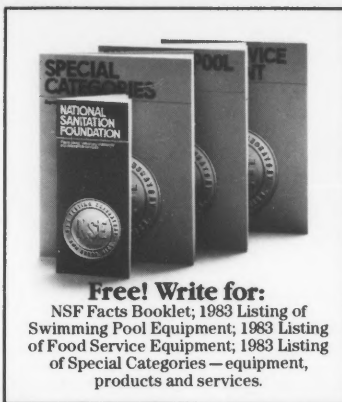
MARS AIR DOORS are used effectively throughout the U.S.A. to improve sanitation and safety in food processing establishments and many other types of businesses. Sanitarians and engineers are invited to write for further information on the many uses of MARS AIR DOORS.

What does NSF do and how do we do it?

The National Sanitation Foundation, known as NSF, is an independent, nonprofit organization of scientists, engineers, technicians, educators and analysts. We serve as a trusted neutral agency for government, industry and consumers, helping these groups to resolve differences and achieve solutions to problems of public health and the environment. Our professional staff is involved in projects related to water treatment, air quality and improved disposal of solid and liquid wastes, including hazardous waste processing. We develop standards and criteria in selected public health and environmental areas and engage in research and testing.



In 1948, the National Sanitation Foundation developed a methodology that could establish uniform national voluntary standards for public health and environmental quality — standards based on facts, sound engineering and fundamental principles. The standard development program which evolved is designed to bring



Free! Write for:

NSF Facts Booklet; 1983 Listing of Swimming Pool Equipment; 1983 Listing of Food Service Equipment; 1983 Listing of Special Categories — equipment, products and services.

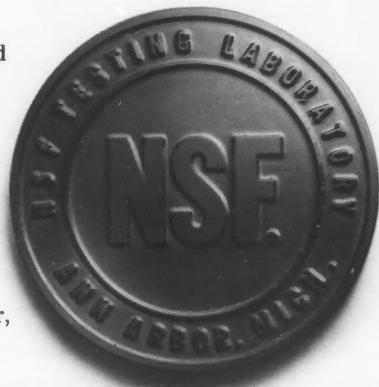
together people with mutual interests to study the problem, define the need, outline the necessary research and establish national uniform voluntary sanitation requirements.

These procedures have resulted in the publication of nearly fifty standards and criteria relating to food service equipment, water and wastewater treatment equipment, swimming pool water circulation equipment, radiation monitoring, health care equipment and plumbing products for mobile homes and recreational vehicles.

The NSF building in Ann Arbor, Michigan, houses the testing

laboratory and staff. Actually, this facility is a number of laboratories which carry out specialized functions in physical, chemical and microbiological testing. The laboratory evaluates products which are shipped to Ann Arbor, hopefully to gain authorization to use the NSF seal, and retests products which already have the seal. This retesting is done to assure continued compliance with the standards under which these products are produced.

If you have a question regarding standards, listings or field services call Tom S. Gable, Senior Vice President, (313) 769-8010. If you prefer to write, our address is listed below.



National Sanitation Foundation

Offices and laboratories, P.O. Box 1468, Ann Arbor, MI 48106 Phone: (313) 769-8010

PRESIDENTIAL ADDRESS

70th Annual Meeting

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

St. Louis, MO

August 9, 1983

Welcome to St. Louis and the 70th Annual Meeting of IAMFES. As a Missourian I share the pleasure of members of the Missouri Milk, Food and Environmental Health Association in hosting your visit here.

I also bring you greetings from the IAMFES Board of Directors and Staff, each of whom I deeply respect and admire. You have chosen your officers well, and they have employed dedicated and capable persons to work for the Association. The system adopted in our Bylaws years ago whereby in successive years officers are chosen from among sanitarians, industry and academia has provided leaders of a mixture that is highly beneficial. The system provides heterogeneity, and heterogeneity begets vigor. We have vigor in our Executive Board along with a variety of ideas.

Variety can make life spicy, but activities of your Board are characteristically tempered by good judgement and insight.

It is my purpose in this address to apprise you of my thinking about the status of the Association and its outlook for the future. Of course, I am addressing you from a biased viewpoint. My loyalty to IAMFES, and I am sure yours, causes me to view the subject with less objectivity than might an outsider.

PUBLICATIONS

We belong to an International organization, one that is best known for its *Journal of Food Protection*. Under the leadership of Editor Elmer Marth, Associate Editor Mike Doyle and Journal Management Chairman Pete Read, all premier scientists, and with contributions from 18 countries and 35 states in 1982, the *Journal* has achieved high status and brought acclaim to IAMFES. Because of its stature the *Journal* attracted sufficient papers to merit publication of two special issues in 1982, and Elmer and Mike successfully solicited contributions from sufficient firms to publish these issues. The journal's Editorial Board consists of 65 scientists from 29 states, 3 provinces and the District of Columbia. Nearly 2900 members and subscribers received *JFP* in June, 1983.

Publication of the *Journal of Food Protection* is a major way the Association accomplishes several of its objectives. It certainly helps us (1) Improve the professional status of sanitarians; (2) Develop methods of inspection and testing; (3) Improve sanitary methods, equipment and supplies; (4)

Assist members in technical work and development; and (5) Disseminate information. It may even help us meet our other objective, i.e., Cooperate with other professional groups.

To broaden and enhance our communications with members and others, the Association began in 1981 to publish *Dairy and Food Sanitation*, a journal designed to disseminate information of nonexperimental nature. By June, 1983, about 2100 copies of this journal were being distributed to members and subscribers. This journal has had growing pains and is, in my opinion, still seeking its niche in our society. It's Journal Management Committee, under the able leadership of Harold Bengsch, and its Editor, Kathy Hathaway, have worked long and hard to make *DFS* speak especially to sanitarians, fieldmen and industrial quality assurance personnel. Most of us agree that the need for such a publication is great. But, writing for it is something other than great to most of us. Credit to academic types for articles of a non-research nature is limited. Extension personnel of our Land Grant institutions are already over-extended. Industry employees and sanitarians frequently feel they have little to write that is new and different. So, obtaining useful material for publication is a continuing concern.

Of some concern to me is the cost of duplication of material placed in both journals. As we talk about this, I want to be strong with my praise of those who have made it possible for IAMFES to publish with a comparatively low per page cost. Based on information obtained in an informal way, I calculated our cost per 100 letters and letter-sized spaces as about \$1 or about 1¢/space. This compares quite favorably to costs of publication in other journals in which the figure is between \$1 and \$2 per 100 letters of spaces.

Nevertheless, the Association could save money by not printing duplicate pages in the two journals.

To date the Executive Board has taken the stance that there is certain information that is important to all members -- this information is therefore duplicated in the journals. Thus, the 2500 members and subscribers who get only one or the other journal receive the information once, whereas the 1200 who purchase both journals get two opportunities to read the same pages. Our pricing structure recognizes this situation. A person who primarily wants *JFP* can have *DFS* for only \$10 additional, a saving of \$50 over the per

issue price, and one who primarily reads *DFS* can have *JFP* for \$22, a cost of only about .22¢/page, including postage and handling. Thus, it appears that our present pricing structure may be retained and that we are advised not to adopt the practice of some associations of having their non-technical publication received by all members, a separate charge being levied for the scientific journal.¹

COMMITTEES

Since I became President-elect and started pondering appointments to committees, I have been both vexed and pleasantly amazed by the structure and function of IAMFES committees.

Unlike the American Dairy Science Association, of which many of us are members, IAMFES has no procedure of rotation and appointment of committees. We work on a much less formal basis, allowing members to choose the committee(s) with which they work and often leaving a chairperson in a position for many years.

This procedure has many advantages. It gives members opportunity to be involved with practices, issues and policies of greatest interest to them. It provides for continuity in that the tenure of persons on a committee is not limited.

However, it also has significant disadvantages among which is the loss of drive on the part of leaders who too long are charged with the great responsibilities of keeping a committee on course and active. When one or a few people have to carry the load for a long time, the load gets awfully heavy, and, sometimes, one gets tired of carrying a load of milk and would like to haul cattle for awhile.

Last Fall we asked First Vice-President Archie Holliday to study our Committee structure and duties. We presented him with the results of a survey of committee chairs that I did at the Louisville meeting. As Archie moves into the President-elect's position and begins to work with committees, we expect him to be well-informed on the subject.

Those of you who read my President's Perspective on Committees learned that IAMFES has about 225 persons on committees and that their contributions to IAMFES, and to sanitarians in general, have been great. There is no way we could meet our organizational objectives without this valuable input of so many of you. My most sincere and cordial thanks goes to each of you who came a day before the technical sessions started so you could help us meet several of our objectives. It is my hope that each of our committees will prepare, for publication, information on their activities and particularly that studies done by IAMFES Committees will be completed in a timely manner and that the results will be quickly disseminated.

AFFILIATE COUNCIL

Our Constitution and Bylaws provide for a Council made up of representatives from each Affiliate. For four or more years I have attended each meeting of the Council

and have listened as interested representatives presented persuasively their thoughts about policy and practice. Our forebears truly intended that the Council advise the Executive Board of the needs, concerns, interests and programs of the Affiliates and their members. What I have seen happen in the Council both enheartens and disheartens me. I'm enheartened by the participation of several who, having discerned the wishes of their Affiliate, bring those wishes before the Council. I'm disheartened that too often an Affiliate has no representative or that the representative is not informed regarding the subjects that may be discussed.

To help alleviate this problem it is important that there be two-way communications between Council members and the Council chairman. Affiliates not represented at the Annual Meeting should receive a letter informing them of what transpired. Then, before the Annual Meeting the Chairman should inform representatives of subjects expected to be discussed. I hope that our efforts to communicate this year have aided representatives in their tasks.

REPRESENTATIVES TO OTHER ORGANIZATIONS

By having representatives to the National Mastitis Council, the 3-A Sanitary Symbols Council, the International Dairy Federation, the Conference of State Sanitary Engineers, the Sanitarian's Joint Council, the National Conference on Food Protection and the Interstate Shellfish Sanitation Conference, IAMFES is able both to give and to get information.

Many of you represent us well in other capacities. We all profit from your memberships and activities in that you are kept well informed and are more productive in IAMFES.

I address this subject because I feel it illustrates the wealth of our organization and that it gives us cause to expect our members to provide each other with sound advice. Our collective wealth of education and experience is great. Our challenge is to use it wisely and to provide incentive to pass it on and around.

AWARDS

Your President has many pleasant opportunities. One of those is to serve on the Crumline Award Jury -- the body composed of the Presidents of IAMFES, the National Environmental Health Association, the Chairman of the Environmental Health Section of APHA, a consumer advocate, and three other professional sanitarians or public health workers. The award is given by the Single Service Institute for excellence in food sanitation at the local level.

I have been most favorably impressed with the high quality of food sanitation programs described in the applications for the award. I want to publically thank the Single Service Institute for sponsoring the award and to encourage each of you to strive for the excellence that merits your departments application. It surely can be done, even by a small unit.

We continue to have the support of 1) Diversey Wyandotte, The H. B. Fuller Company, and Klenzade Division of Economics Laboratories for our Sanitarian's Award, 2) The Milking Machine Manufacturer's Council of the Farm and Industrial Equipment Institute for our Educator Award,

¹Subsequent to delivery of this speech, the IAMFES Board voted to tentatively adopt the practice in 1985 of having every member receive *Dairy and Food Sanitation* and thus, all organizationally related items would be published in *DFS* and only scientific materials in *JFP*.

3) NASCO International for our Barnum (Industry) Award and 4) Red Lobster Inns of America for our Sherman Award.

For this support we are most grateful. Excellence in these phases of work should be recognized. As individuals lead the way to high levels of attainment, others are caused to follow. If we are to improve the professional status of all our members, some people must lead the way. I'm sure that each of you has already found an arena in which you have become a leader. I wish that we could recognize all of you. Your dedication to the betterment of the lot of your fellow man is an honorable quality -- your daily striving to protect the health and welfare of your people is commendable and rewarding. When you've become well informed, have studied the pertinent facts and have acted rationally and positively, you will have done your job well.

INTERNATIONAL OFFICE

You and I have been most fortunate to have enjoyed membership in IAMFES as it was being managed by Dr. Earl O. Wright. This will be Earl's last meeting as Executive Secretary. Many of you have been privileged to work closely with Earl, have learned how dedicated he has been to the International, have seen him direct its growth and development and have continued to discover that Earl is long on love, big of heart, and in every way sincere.

We wish Earl and Sally the best of life as they retire to Arkansas, and, no doubt, more will be said about this retirement in the future.

It is the future on which I want to now focus--on the leader your Board has chosed to manage International's affairs tommorrow. That person is Kathy Hathaway.

Kathy began working for IAMFES and to study in Professor Wright's School in December, 1981. She had three years experience with Hot Line, Inc. where she was manager of the Composition Department and the Subscription departments and where she worked as a public relations specialist. Previously, Kathy had worked for two radio stations in Iowa performing sales, writing, programming and public affairs duties. Kathy has a bachelors degree in Communications.

In her work with IAMFES in Ames, Kathy Hathaway has added a new dimension, she has created direct mail pieces, trained an advertising representative to solicit advertising for the Association, created an Association brochure, became qualified to do all sorts of things with the Apple III computer, edited the Milk and Food Sanitation Journal, managed the office and learned what IAMFES is all about.

Kathy has regularly informed your President and President-elect of what has been happening in the Ames office. As Earl has given her progressively more of his responsibilities, she has incorporated them well into her routine. As her knowledge of the organization and its needs has increased, Kathy's mind began to suggest new projects, new ways to serve members, and new ways to obtain members, subscribers and advertisers.

Furthermore, at one time when the Executive Board was considering what way to go in managing the office as Earl

retired, Kathy and her two assistants prepared a statement that showed the Board their concept of the operation, their strong interest in serving us well, and their abilities to get the job done. This impressive statement increased the Boards confidence in our operations team.

Now a word about the other two members of the team. Jeanine Strodman primarily works in member and affiliate services and circulation while Suzanne Trcka has major responsibilities in recording, billing and acting as receptionist. These are loyal and dedicated employees who get along well with each other. Jeanine and Suzanne know who is in charge, but I like to view them as the team that they claim to be. They complement each other well. They are happy people when you ring them up. It's my impression that they intend to do such a good job that there will be no question that (1) IAMFES remains a vibrant and vital organization and (2) they obtain for themselves the job security that everyone seeks and for us the confidence that those who perform the many daily tasks that keep IAMFES going are people we can depend on.

I would be remiss to fail to compliment our printer, Don Heuss. In the two visits I have had with him and in the tour of his plant, all reactions are strongly positive. I consider Mr. Heuss to be a progressive business man who runs an efficient shop. All indications are that we can expect him to assist us toward further advances in computerization of our publications processes.

THE FUTURE

Some have asked, Why doesn't the International do more for the Affiliates? Consideration of the question prompted me to list the member services we currently provide. As the top of the list and far ahead of all others in importance are:

- 1) publication of our journals which include newsletters, and
- 2) provision of an Annual Meeting.

Nearly all our other activities are in some way linked with these two.

Committees meet at the annual meeting. Much of their reporting is done at the meeting or in a journal. Proceedings of the Annual Meeting are largely reported in the journal. See this issue.

Member services can also include direct billing of affiliate members through the International Office. Having been Secretary-Treasurer of a state organization, I've learned how much work it is to keep up with members and their dues. Since we have the Apple III in Ames, we are able to provide an important member service to those affiliates that wish to turn over collection of dues. In fact, Kathy's notice to numerous direct members that their affiliate needed them resulted in several new affiliate memberships.

Sometimes Affiliates need to have a representative of IAMFES at their meeting. Travel expenses have gotten so high that your Executive Board has had to curtail travel somewhat. In the past year Kathy and/or Earl visited 5 Affiliates plus an organizational meeting in Arizona. However, the officers of the Association also attended meetings

of 9 Affiliates. The purposes of these visits include promotion of the journals and of the benefits of membership in IAMFES, explaining procedures and practices of the International, and providing technical, scientific or operations advice to the affiliate. Frequently, there are also chances to contact prospective Sustaining Members.

For 1983-84 we plan to continue to ask our Board members to make themselves available to the Affiliates within their area. We like to split the cost of travel equally.

For those Affiliates that especially need Kathy's assistance we want to make her available. However, we must limit expenses for such travel, and this means she can make about 5 visits per year.

In the upcoming Business Meeting you will hear in detail how the financial picture of IAMFES has improved markedly in 1982-83, viz., how we went from a loss of about \$30,000 in 1980-81, to a balanced budget in 1981-82, to a net income of about \$43,000 in 1982-83.

This was the best of news. Of course, we have Earl and Sally to thank for a good part of our savings--they took only \$6,000 salary this past year. You may recall that Earl asked that the salary he gave up be used to replenish the Foundation Funds from which IAMFES borrowed the previous year.

Now that the Foundation Funds have been restored (with interest) I have asked Harry Haverland and Earl Wright to consider and to recommend to the Board how these funds may best be used. Our Sustaining Members are told that the monies they contribute will be used to promote research and education to aid workers in the field of milk, food and the environment. We want to affirm that this is our intent.

We have many reasons to rejoice over our organization's accomplishments in 1982-83. We started the year with a fine meeting in Louisville and end it with you at the Gateway to the West. What more could we ask?

1983-84 will present new challenges. New affiliates are contemplated for Nebraska, Wyoming and Arizona. Some mature affiliates need rejuvenation. Our staff must continue to contact and convince people that membership is meaningful. Our editors and their helpers must maintain and even advance the quality of our journals. The Program Committee and Alberta's Local Arrangements Committee must prepare well and persuade convincingly that it is really worth the extra cost to travel to Alberta next August 4-9. Kathy, Jeanine and Suzanne must keep the Ames office running smoothly and efficiently. They'll have more work to do than ever before, but they'll be better equipped to do it.

It will be done! When President Brazis stands before you in Edmonton on August 8, I predict his smile will be big, his enthusiasm will be strong and his audience will be large.

You, my friends, are going to be the ambassadors of IAMFES. You, this year, are going to sell our organization as the premier representative and servant of sanitarians and related individuals in this world. I'm confident that the fellowship of this occasion, the education you receive, and the benefits you and yours otherwise derive will motivate you to enlist your co-workers and friends as dues-paying, benefit-receiving members of IAMFES.

You will do it, won't you?



70th Annual Meeting Report



A look at the arch from the Marriott.



Local Arrangements Committee, front row, l to r, Betty Lange, Dorothy Schilling, John Schilling, Jo Cupps and Grace Steinke. Back row, l to r, Erwin Gadd, Harold Bengsch, Hugh Mooney, Conn Roden, Vernon Cupps and Wendell Allen.



Attentive listeners during an educational session



Registration (l to r) John Schilling, Vernon Cupps, Ray Lange, John Norris, and John Nahlik.

The Marriott Pavilion, St. Louis, Missouri was the site of the 1983 IAMFES Annual Meeting, held August 7-11.

The Local Arrangements Committee chaired by John Schilling, provided a smooth, educational and entertaining annual meeting.

Each and everyone involved in the planning of the Annual Meeting is to be commended. A special thank you to the entire Local Arrangements Committee: Chairman, John Schilling; Co-Chairman, Erwin Gadd; Finance, Joe Reitz, Chairman; William Phipps, East Vice Chairman; Paul Meredith, West Vice Chairman; Bill Johnson, So. West Vice Chairman; Leland Scroggins, Illinois Vice Chairman; BANQUET, ENTERTAINMENT AND TRANSPORTATION, Jim Kennedy, Chairman; Ray Lange, Co-Chairman; SPEAKERS HOSPITALITY; Joe Edmondson; REGISTRATION, Vernon Cupps, Chairman; Harold Bengsch, Co-Chairman; HOUSING, Bill Goldman, Chairman; PUBLICITY, Ron Tess, Chairman; VISUAL AIDES, Bob Arnold, Chairman; Grace Steinke, Co-Chairman; DOOR PRIZES, Wendell Allen, Chairman; MILK BREAKS, Ben Spencer, Chairman; Bud Lindwedel, Co-Chairman; SOCIAL FUNCTIONS (Spouse Entertainment), Dorothy Schilling, Co-Chairperson; Jo Cupps, Betty Lange, PHOTOGRAPHER, Dietrich Wolframm.

Entertainment for the meeting included a Beer and Baseball Night on Monday in the hotel with the film of the 1982 Worlds Series game.

Charter buses took the group to the Ralston Purina Farm Tuesday evening. After a family style dinner, a tour of the farm was conducted. Then the Ralston Purina Entertainers took over with music, dancing and comedy on stage. An enjoyable evening for all.

The traditional Annual Awards Banquet Wednesday evening included a delicious steak meal, followed by the awards and entertainment by the Bert Troll Singers, Inc.

Spouses activities included the Missouri Botanical Gardens, Forest Park, scene of the 1904 World's Fair, the Hoffman-Ward House featuring eight

boutique and craft shops of early handcrafts and antiques of fine quality, as well as the Kirkwood History House a home dating back to 1878.

The IAMFES Annual Meeting in 1984 will be held in Edmonton, Alberta, Canada. Once again, an enthusiastic Local Arrangements Committee will make for a very successful, as well as educational meeting.

Plan your vacation to coincide with the meeting and see beautiful Canada, August 5-9, 1984. FREE travel brochures are available for your convenience through the IAMFES office. Simply write or call to receive information on vacationing in Canada.

A detailed account of the 70th Annual IAMFES meeting follows...



Your 1983-84 Executive Board, front row, l to r, Sid Barnard, Dr. A. Richard Brazis, retired Executive Secretary Earl Wright, Archie Holliday, Harry Haverland. Back row, l to r, Dr. Robert Marshall, Helene Uhlman, Kathy Hathaway, Leon Townsend, and Roy Ginn.



Retired Executive Secretary, Earl O. Wright and new Executive Secretary, Kathy Hathaway.



Reception before Awards Banquet.



Relaxing during the Early Bird Reception.



Reception before Awards Banquet.



Ralston Purina Farm.



Meal at the Ralston Purina.

The 70th Annual Meeting of the IAMFES Executive Board convened at 1:30 p.m. at the Marriott's Pavilion Hotel, St. Louis, Missouri. Board members present were Wright, Haverland, Barnard, Brazis, Townsend, Arledge, Doyle, Hathaway, Marshall, Ginn and Holliday. President Marshall introduced and congratulated Leon Townsend, who was elected Secretary-Treasurer.

Minutes of Previous Meeting: The minutes of the November 12 and 13 board meeting were passed out and approved as corrected.

Finance and Budget Report: Earl distributed the certified public accountant's audit as well as the profit and loss statement for 1982-83. The Income was at \$309,993.80, with expenditures at \$264,795.55 for a profit of \$45,198.25.

Local Arrangements Committee Report: John Schilling reported that there were 356 registrations (with approximately 75 of these being spouses), 273 reservations for the Ralston Purina Farm Tour and 240 tickets for the Awards Banquet. The meeting was determined to be in the black, with approximately \$1200 left. John suggested that the women be charged a token cost for the tours, as a lot of money was spent on them, and then not all of the women took the tours.

Foundation Fund Committee Report: The Foundation Fund received its income from 1/3 of the sustaining membership money. The goal of the Fund is for educational purposes. As of June 30, 1983 there is 9,190 designated for the Fund. It was motioned and seconded that the second vice president each year serve as a member of the Foundation Fund Committee. The members of the committee were designated as Haverland, chairman; Wright, Pascal, and Ginn (as second vice president this year).

Name Change Proposal: Of over 800 responses to the vote by the membership of changing the name of the association, 2/3 of them were in favor of changing the name to the International Association for Food Protection. Arledge said the National Milk Producers Federation Committee



Ralston-Purina Farm.



Ralston-Purina Farm.

made a resolution that they would not approve a name change eliminating the word milk. After discussion by the board it was felt that there could be problems registering the name and that many of our members are connected with milk. It was motioned and seconded that the proposal be tabled.

Award Committee Report: It was suggested that the rotation of the Sanitarian's Award between state, federal and local people should be changed in such a manner that if we have not received a nomination for the one that would normally come up, then we go on to the next class. It was motioned and seconded that the Sanitarian's Award be revised to indicate that nominations are encouraged for candidates in the appropriate area (local, state and federal), but that nominations will be accepted in any area. The Awards Committee is encouraged to alternate its selection between these areas, however in the absence of a qualified candidate in the appropriate area, a qualified candidate from the alternate area may be selected.

1986 Meeting Plans: Minnesota put in a bid for the 1986 meeting. It was motioned and seconded that the meeting take place in Minneapolis, Minnesota in 1986.



Ralston-Purina Farm.

International Dairy Federation Committee

As a member of the United States National Committee for the International Dairy Federation (USNAC) the IAMFES has an excellent opportunity to participate in the many technical activities of the IDF. There is much to be learned from the research and development that is taking place in other countries.

The number of IDF members who are active in Groups of Experts is increasing steadily, although not as fast as needed. At present, there are 28 members active in 26 groups.

In a later issue of *Dairy and Food Sanitation* an article will be published entitled "The Role of the United States in the International Dairy Federation", which includes details on the activities of IDF and describes those groups you will find of personal and technical interest.

If you are interested in joining this part of our organization, contact Harold Wainess, Chairman, IDF Committee, 464 Central, Room 24, Northfield, IL 60093.

Respectfully submitted,
Harold Wainess, Chairman
IDF Committee

*Journal of Food Protection
Management Committee*

The Committee met on August 8, 1983 and discussed the status of the Journal. Twelve recommendations were made for consideration by the Executive Board. They were as follows:

1. As we recommended last year, we recommend that the Affiliate Newsletter not appear in the Journal.
2. We recommend that the page welcoming new members not appear in the Journal.
3. We recommend that advertising be placed together and not mixed with Letters to the Editor, Calendar, Book Reviews and similar material which should be contiguous with the scientific content of the Journal.
4. We recommend that the placement of material after the scientific articles be consistent. We further recommend that the following order be used after the general interest articles (1) Letters to the Editor, (2) Book Reviews, (3) Selected news and events confined to scientific activity, (4) Calendar followed by other appropriate material.
5. We recommend that 3A Standards not be published in the Journal.
6. We recommend that the Editors of the Journal be recognized as Editors of the entire Journal and that they approve proposed changes in the Journal format and content prior to these changes being made.
7. We recommend that the text of articles not be separated. Further we recommend that references be separated only under unusual circumstances.
8. We recommend that "Procedures to Investigate Arthropod-Borne and Rodent-Borne Illness" and similar publications be reviewed as a book review and the review published in the Journal.
9. We recommend that a committee of scientists be appointed to explore methods and to make recommenda-

tions to strengthen the scientific content of the program of the annual meeting. We further recommend that the chairman of this committee meet with the executive board when the program is developed.

10. We recommend that classified advertisements not appear in the Journal. The advertisements concerning employment should not be excluded.

11. We recommend that the editors of the Journal prepare an addendum to the guidelines for authors to include acceptance of letters to the editor. These letters would report results of scientific investigations or opinions on scientific matters that are appropriate for reporting in a letter format.

12. We recommend that the Association solicit subscriptions to the Journal from European and Asian scientists. Dr. Daniel Fung has volunteered a list of about 200 scientists and an appropriate letter urging membership.



1983-84 Missouri Affiliate President, Conn Roden (l) and Past-President, Ron Blumer (r).

*Dairy and Food Sanitation
Management Committee*

At the meeting on August 9, 1983 the following recommendations were made by the committee chaired by Harold Bengsch:

1. Recommend that the editor of *Dairy and Food Sanitation* request from each affiliate, possible papers for publication which are presented at the affiliate meetings.
2. Recommend that a question and answer section be added to the publication.
3. It is recommended that a disclaimer clause be inserted in the section "New Product News".
4. Recommend that format changes in the journal cover be considered which more graphically suggest the practical nature of the publication.
5. Recommend the table of contents be revamped to more clearly present the news and events section.
6. Recommend a "tear-out" page be included in a future issue that solicits feed-back from subscribers concerning comments and suggestions on the publication.



Dr. R. B. Read Jr. (Pete), JFP Committee Chairman.

Committee on Food Equipment Sanitary Standards

The following recommendations were made by the Committee:

1. That the International Association of Milk, Food and Environmental Sanitarians reaffirm its support of the National Sanitation Foundation and the National Automatic Merchandising Association and continue to work with these two organizations in developing acceptable standards and educational materials for the food industry and public health;
2. That the Association urge all sanitarians to obtain a complete set of the National Sanitation Foundation's Food Equipment Standards and Criteria and a copy of the National Automatic Merchandising Association-Automatic Merchandising Health Industry Council's Vending Machine Evaluation Manual and related educational materials, to evaluate each piece of food equipment and vending machine in the field to determine compliance with the acceptable sanitation guidelines (construction and installation specifications), and to let this Committee and the appropriate evaluation agency know of any listed manufacturer or fabricator failing to comply with these guidelines;
3. That the Association urge all sanitarians and regulatory agencies to support the work of the Committee; to submit suggestions for developing new guidelines and for amending same; and to subscribe, by law or administrative policy, to the principles represented by the Standards, Criteria, and Evaluation Manual for food equipment and vending machines.

Respectfully submitted by:

Karl K. Jones, Chairman

3-A Sanitary Standards Committee

The Committee on Sanitary Procedures Ad-Hoc-Task Committee met on October 26, 1982 at the DFISA Office in Rockville, MD. IAMFES was represented by F. Stacy Schonrock. There were a total of fifteen

from regulatory and industry present for the discussion. In summary the task committee will prepare a series of new documents. One or more standards will be prepared to cover the modules and membrane elements. Two accepted practices will be developed - one each for RO and UF. The UF accepted practice will include diafiltration. A summary of the twelve points of major discussion and the names of those present will be made available upon written request of DFISA.

The 3-A Sanitary Standards Committee met May 17-19, 1983 in Nashville, Tennessee. Thirteen amendments, revisions and new standards were discussed.

The 3-A Honor Award was presented to Robert L. Nissen for his many contributions to the 3-A Sanitary Standards Program over 25 years.

Respectfully submitted by:

O.M. Russell, Chairman

Harold E. Thompson, Secretary



Karl K. Jones, Chairman, Food Equipment Sanitary Standards Committee.



Dale Termunde, Sustaining Member Committee Chairman (l) and Harold Thompson, 3-A Standards Committee Secretary (r).

Applied Laboratory Methods Committee

Several topics were discussed by the committee. They are as follows:

1. Delayed and interrupted incubation procedures for standard plate counts were discussed to allow labs to run samples on Thursdays and Fridays without having to do laboratory work on the weekends.
2. Piggy Back on Split Sampler.
3. The role of antibiotic tests such as those specific for beta lactams, was discussed. Their usefulness as quick tests for evaluating milk tankers was pointed out.
4. There is a need for improving laboratories for testing farm dairy water supplies. A motion was made and passed to request the IAMFES Executive Board to refer this problem to the NCIMS Executive Board for implementation of a uniform nationwide laboratory approval program for the certification of laboratories testing farm dairy water supplies.

There was also a resolution made on point 4, it follows:

Testing of farm dairy water supplies is required by the Grade A Pasteurized Milk Ordinance. No organized system for approval of the laboratories testing these water supplies exists. The Ap-

plied Laboratory Methods Committee of IAMFES believes that these laboratories need to be approved on a nationwide basis. Since these results are utilized in the cooperative State-FDA-NCIMS interstate shipment of milk from producer dairies utilizing these water supplies, the Applied Laboratory Methods Committee of IAMFES requests that the Executive Board refer this problem to the NCIMS Executive Board for the implementation of a uniform nationwide laboratory approval program for the certification of laboratories testing farm dairy water supplies.

Respectfully submitted by:

Ken Smith, Chairman



Dr. Frank Bryan, Chairman, Committee on Communicable Diseases Affecting Man.

3-A Sanitary Standards Symbol Administrative Council

Robert (Pinkie) Holtgrieve took over the administrative duties from Earl O. Wright during the months of March and April of 1983. The office was fully operational by May 1, 1983.

One Council Meeting has been held since that time, on May 18 in Nashville, Tennessee. Four revisions or amendments were authorized for signing and publication at this meeting.

The number of holders of the 3-A Symbol is up from 206 last year to 235 this year. From the calls received for information about the 3-A Symbol, and the requests for applications there is indication of a large increase in 3-A Symbol activity.

Mr. Don Colony has retired and left the Symbol Council, he has served since 1966. Mr. Robert L. Nissen of Kenosha, WI has been appointed to replace him.

Respectfully submitted,
Robert E. Holtgrieve
Asst. Sec'y-Treasurer



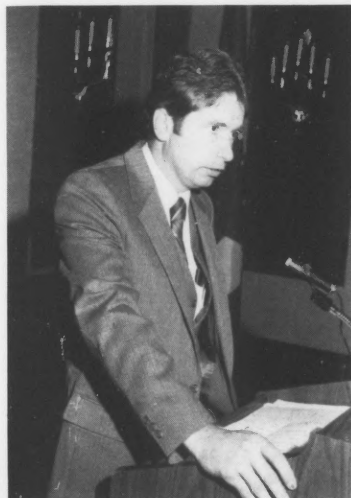
Robert (Pinkie) Holtgrieve, Asst. Secretary-Treasurer, 3-A Symbol Council.

Nominating Committee

During the 1982 Annual Meeting the Nominating Committee was asked to find two regulatory members to stand election for the office of Secretary-Treasurer of IAMFES for 1983-84.

The committee placed in nomination the names of Ms. Helene Uhlman of the Gary, Indiana Health Department and Mr. Leon Townsend of the Kentucky Department of Health Services.

Mail ballots were sent to the membership in January of 1983, and by March 31 a total of 337 ballots had been returned with a majority of them cast in favor of Leon Townsend.



Phil Hermesen, Membership Committee Chairman.

Shellfish Sanitation Conference

Representatives of the Food and Drug Administration and the newly created Interstate Shellfish Sanitation Conference will begin working on a Memorandum of Understanding (MOU) that will make the new Conference fully operational within two years.

The Conference was officially put in operation after approval of a constitution for the group after three days of meetings last week in Annapolis, MD.

Industry was given a larger voice on the Board of Directors, with an increase in representation from three members to six, but without voting rights. Receiving or inland States were restricted to 1/2 votes, a source of dissatisfaction which may be corrected in time by the shipping States, which hold a full vote in all Conference deliberations.

The new Conference will be a State-operated organization, structured along the lines of the National Conference on Interstate Milk Shipments, and FDA will play the same type of advisory role.

If an acceptable MOU can be developed, the Conference will be able to take over the functions of the National Shellfish Sanitation Program which has fallen on poor times because of FDA's inability to strengthen its operation.

Neil B. Travis, Chief of the Division of Shellfish Sanitation in the Texas Department of Health, was elected President of the new Conference. Travis was one of the chief organizers of the Conference. Three Task Forces were organized to deal with: (1) growing waters; (2) processing and handling; and (3) administrative functions, including the development of the MOU.



David Thompson, speaker.



"Early Bird" Reception.

Baking Industry Sanitation Standards Committee (BISSC)

The 71st meeting of the BISSC was held February 25, 1983 in Chicago, Illinois. Four task committees were engaged in updating and formulating standards for Standards 24, 27, 28 and 35.

At present there are BISSC Standards covering 42 categories of baking equipment with 86 registrations and 187 authorizations for equipment manufactured in compliance with the Standards.

The BISSC now has a slide presentation available, without charge, to members of IAMFES upon request to the Executive Secretary of BISSC. The 1984 meeting will be held in Chicago on March 1, 1984. All members of the IAMFES are encouraged to attend.

Respectfully Submitted by:
Martin A. Ronge, Chairman



New Farm Methods Committee officers, (l to r), Steven Simms, Asst.; Ken Kirby, Asst.; and Maynard David, Chairman.

Join your Local Arrangements Committee Chairman, Don Paradis, next year in Edmonton, Alberta, August 5-9, 1984.

Office of Executive Secretary Report

These past ten years that I have served as the Executive Secretary of the IAMFES, Inc. have been both challenging and rewarding. Ten years ago in 1973 the executive office was moved from Shelbyville, Indiana to Ames, Iowa. Red Thomasson who was retiring gave careful guidance in this transition.

Since then, the *Journal of Food Protection* has been enlarged from about a 50 page journal to over 90 pages at present. It has gained in prestige and international reputation and is now being received on a regular basis in 90 different countries. Under the guidance of our editor, Dr. Elmer Marth, the Journal has spread into all fields of food protection.

At the annual conference in 1979 the membership requested the publication of a second journal. This was to provide a more practical basis for fieldmen and industry workers. The first journal was published in January 1981. The journal was given the title *Dairy and Food Sanitation*. It is now in its third volume. Its progress has been very satisfactory and it is growing in numbers every year.

The Committee on Communicable Disease Affecting Man, chaired by Dr. Frank Bryan, has written three outstanding publications that were published and distributed by the IAMFES office.

"Procedures to Investigate Food-borne Illness" was published in 1976. This publication is in its third edition.

"Procedures to Investigate Water-borne Illness" was published in 1979.

The newest publication is "Procedures to Investigate Arthropod-Borne and Rodent-Borne Illness". This was published this year.

Many other committees have contributed to the success and growth of our association.

Last year we purchased our own computer system. All of our mailing data and manuscript programs have now been transferred to our own computer system.

Kathy Hathaway was employed to replace Jan Richards in December of 1981. At this time new emphasis was



Earl O. Wright, retired Executive Secretary.

placed on advertising and membership. We have gained marked momentum in both categories. Our advertising dollars have increased approximately \$9,000 over last year. In 1973 our membership was slightly over twelve hundred and in 1983 we now have over two thousand members. These figures do not include the subscribers to the journals.

About two years ago a Sustaining Membership Program was developed. Under the direction of chairman Dale Termunde we now have thirty eight industry members participating. At the same time a Foundation Fund was established to be used for development and educational purposes. One third of the funds created by the Sustaining Memberships go into the Foundation Fund. The fund now contains \$9,100. This money has been used to develop new programs. At present this fund is now under the di-

rection of a committee to determine the best use for it.

The annual budget in 1973 was \$90,000. In 1983 it was over a quarter of a million dollars.

During my term of service, the IAMFES has received exceptionally fine cooperation from the members and supporters of the organization. The IAMFES is one of the greatest organizations in food protection in the world today. Our organization now has the frame work and reputation to develop and grow in all phases of its program.

Although I am now retiring as your Executive Secretary, I am planning to be an active member of IAMFES and continue to support and help its program to grow in any way I can.

Respectfully submitted,

Earl O. Wright

Entertainment at the Annual Meeting



Awards Banquet.



Awards Banquet.



Ralston Purina Farm.



Ladies Fashion Show.



Ladies Fashion Show.



"Early Bird" Reception.



"Early Bird" Reception.

RESOLUTION I.**WHEREAS:**

The Missouri Milk, Food and Environmental Health Association and Local Arrangements Committee labored long and diligently, with exceptional success, to host the Seventieth Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians in St. Louis, Missouri, and

WHEREAS:

The facilities for both the technical sessions and the social occasions were anticipated and provided with the usual generosity and style by the Missouri Milk, Food and Environmental Health Association and Local Arrangements Committee, and

WHEREAS:

These same hosts exercised the highest standards of the International Association of Milk, Food and Environmental Sanitarians in Coordinating the efforts of their Industry, Educational and Regulatory members toward the success of the Association's Annual Meeting, and

WHEREAS:

The 1983 meeting was in ever respect "Par Excellence" that will long be remembered;

THEREFORE, BE IT RESOLVED:

That the International Association of Milk, Food and Environmental Sanitarians adopt this resolution of appreciation and gratitude to the Missouri Milk, Food and Environmental Health Association and further, that a copy of the Resolution be sent to the Missouri Milk, Food and Environmental Health Association and be published as well in the *Journal of Food Protection and Dairy and Food Sanitation*.

RESOLUTION II.**WHEREAS:**

The Marriott's Pavilion Hotel, St. Louis, Missouri, was the site of the 1983 International Association of Milk,

Food and Environmental Sanitarians Seventieth Annual Meeting, and

WHEREAS:

The personnel of the Marriott's Pavilion Hotel were most accommodating to the needs of the members and their families of the International Association of Milk, Food and Environmental Sanitarians, and

WHEREAS:

The facilities for the program sessions and the members and their families' personal comfort were outstanding;

THEREFORE, BE IT RESOLVED:

That an appropriate expression of gratitude be sent to the management and staff of the Marriott's Pavilion Hotel.

RESOLUTION III.**WHEREAS:**

Improper self-service of bulk foods in retail stores (excluding foods with peels or shells, foods normally washed or cooked before consumption and wrapped foods) facilitates contamination of food products by filth or other foreign matter, and

WHEREAS:

Current state standards and guidelines vary from prohibiting self-service of bulk foods to a trial and error approach or to no prohibition, and

WHEREAS:

Uniform standards or guidelines need to be developed to address this public health concern;

THEREFORE, BE IT RESOLVED:

The International Association of Milk, Food and Environmental Sanitarians urges FDA to assess the potential for contamination and the possible health effects from utilizing these practices and to provide suggestions or recommendations should such potential be recognized.

It is further resolved that a copy of this Resolution be forwarded to the Acting Commissioner of the Food and Drug Administration for urgent action on this request.



Your Executive Board at work.

Awards. . .

EDUCATOR AWARD TO BRUHN

John Bruhn was the recipient of the Educator Award. Bruhn was awarded \$1000 and a plaque for outstanding academic contributions made to the field of dairy sanitation.

Bruhn is a University of California Extension Dairy Specialist in Davis, California.

He has been instrumental in the state of California in reducing the iodine content of milk. He also has made a significant improvement in the flavor of milk by advising milk producers, processors, wholesalers and retailers in ways to avoid light flavors, oxidized flavors, feed and weed flavors and rancid flavors.

Dr. Bruhn has been the Educational Chairman for the California Dairy Industry Association for many years. He has served as the Program Chairman at many meetings of the California Dairy Industry Association and the California Association of Dairy and Milk Sanitarians. He has also been involved with committees on the above mentioned associations as well as the California Creamery Operators Association.

His educational expertise has also been utilized by the California Dairy Council, the California Department of Food and Agriculture - Milk and Dairy Foods Control, California Dairy Museum, Dairy Institute of California, Milk Advisory Board, League of California Milk Producers, the Future Farmers of America and many 4-H groups.



John Bruhn (l), accepts Education Award from Charles Clay (r), sponsored by Milking Machine Manufacturer's Council of the Farm and Industrial Equipment Institute.



C. Dee Clingman (r), accepts the Harold Barnum Industry Award from John Meyer (l) of Nasco.

C. DEE CLINGMAN RECIPIENT OF HAROLD BARNUM AWARD

C. Dee Clingman, Vice President, Quality Control, Red Lobster Inns of America, Orlando, Florida, was the recipient of the \$500 Harold Barnum Award.

Clingman has been instrumental in developing the quality control department at Red Lobster. He is recognized

by foodservice leaders and in industry publications for advancing foodservice food protection.

He is active in the IAMFES, National Environmental Health Association, National Restaurant Association, Ohio, Illinois and Florida Environ-

mental Health Associations, Society for the Advancement of Foodservice Research, American Public Health Association, American Society for Testing Materials, American Society for Quality Control, and the Institute of Food Technologists.



1983 Citation Award presented to William B. Hastings (l) by Dr. A. Richard Brazis (r), IAMFES President.

CITATION AWARD PRESENTED TO HASTINGS

The Citation Award was presented to William B. Hastings, Manager, Quality and Field Service Division, Inter-State Milk Producer's Cooperative, Southampton, Pennsylvania.

Hastings was cited for his outstanding contributions to the Association. Mr. Hastings is active in numerous professional associations in addition to IAMFES, of which he has been a member for 29 years, including Delmarva Dairy Sanitarians, Pennsylvania Dairy Sanitarians, Dairy Technology Society of Maryland and District of Columbia, Approved Milk Inspectors Association of Southeastern Pennsylvania, Northeast Dairy Practices Council, Pennsylvania and Maryland Mastitis Councils, National Milk Producers, Pennsylvania Milk Flavor Advisory Committee, and the Interstate Milk Shippers.

1983 SHERMAN AWARD PRESENTED FOR FOOD PROTECTION ARTICLE

The 1983 Norbert F. Sherman Award was presented to Mr. Tim Sly and Mr. Elmor Ross. C. D. Clingman, Director of Quality Control, Red Lobster Inns of America and Paul F. Martin, Director of Instructional Planning, National Institute for the Foodservice Industry (NIFI), presented the award for NIFI.

The Sherman Award is offered annually by NIFI, the foodservice industry's not-for-profit educational foundation, to provide recognition to articles that best reflect the principles of Norbert F. Sherman, late chief executive of North American Foodservice Companies, Inc. and former NIFI Treasurer.

The 1983 winners published an article in the February 1982 issue of the *Journal of Food Protection* entitled "Chinese Foods: Relationship Between Hygiene and Bacterial Flora".



1983 Sherman Award presentation (l to r), Paul Martin, NIFI; Tim Sly, recipient; Elmor Ross, recipient; C. D. Clingman, Red Lobster Inns of America.



Sally Wright (l), Robert Marshall, Sr. Past-President, IAMFES and Earl O. Wright (r), retired Executive-Secretary of IAMFES.

HONORARY LIFE MEMBERSHIP TO OSTEN

Orlowe Osten, who recently retired as Director of the Dairy Industries Division of the Minnesota Department of Agriculture after 33 years, has been named as an Honorary Life Member of the IAMFES.

Osten has been a member of the IAMFES for 26 years. He served as President in 1971-72 and has been an IAMFES representative to the 3-A for 17 years. He is also a member of the Minnesota Sanitarians Association and served as their Secretary/Treasurer for 18 years, as well as being their president in 1959.



The Shogren Award for 1983 was presented to the Washington Milk Sanitarians Association. They are represented by George Andrews (middle) and Lloyd Luedecke (r).

PLAQUE PRESENTED TO EARL O. WRIGHT

Earl O. Wright, Executive Secretary of IAMFES for the past 10 years, and his wife Sally, were presented a plaque for their service and dedication. Earl and Sally have retired to Bella Vista, Arkansas.



Orlowe Osten (r) is presented the Honorary Life Membership Award by Harry Haverland (l).

WMSA PRESENTED WITH SHOGREN AWARD

The Shogren Award is presented to the Affiliate Association nominated for service to their members.

The Shogren Award was given to the Washington Milk Sanitarians Association, represented by Lloyd Luedecke and George Andrews, during the banquet at the 70th Annual Meeting in St. Louis, Missouri.

The WMSA holds three sectional meetings each year, as well as one annual meeting each year. The Association has many active committees, among them are the Laboratory Methods, Program, Membership, Farm Methods, Pipeline, Bulk Handling, Farm Buildings, Scholarship, Milk Plant Methods and Publicity. They also give a \$250 scholarship each year with funds earned by selling ice cream at the State Fair each year.

CERTIFICATE OF MERIT

The Certificate of Merit Award is presented each year to those members who are active within their state and international group.

This years winners include: George Andrews, WA; Lloyd O. Luedecke, WA; Ms. Gudalupe Wiltsey, FL (not pictured); Dr. J. J. Jezeski, FL; Cecil White, TN; and Joseph M. Schureck, KY.



Certificate of Merit presented to Joseph Schureck (r).



Certificate of Merit presented to Cecil White (r).



Certificate of Merit presented to Dr. James J. Jezeski (r).



Certificate of Merit presented to George Andrews (middle) and Lloyd Luedecke (r).



A very organized and enthusiastic local arrangements committee (pictured l to r) James Steele, Lawrence Roth, Glen Evoy and Don Paradis, will make the '84 meeting another success. Register early for Canada in '84. August 5-9, Edmonton, Alberta, Canada.

JFP Abstracts

Abstracts of papers in the November Journal of Food Protection

To receive the Journal of Food Protection in its entirety each month call 515-232-6699, ext. A.

Effects of Potassium Sorbate on Growth and Aflatoxin Production by *Aspergillus parasiticus* and *Aspergillus flavus*, Lloyd B. Bullerman, Department of Food Science and Technology, University of Nebraska, Lincoln, Nebraska 68583

J. Food Prot. 46:940-942

Growth and aflatoxin production by selected strains of *Aspergillus parasiticus* and *Aspergillus flavus* in the presence of potassium sorbate at 12°C were studied. Potassium sorbate at 0.05, 0.10 and 0.15% delayed or prevented spore germination and initiation of growth, and slowed growth of these organisms in yeast-extract sucrose broth at 12°C. Increasing concentrations of sorbate caused more variation in the amount of total mycelial growth and generally resulted in a decrease in total mycelial mass. Potassium sorbate also greatly reduced or prevented production of aflatoxin B₁ by *A. parasiticus* and *A. flavus* for up to 70 d at 12°C. At 0.10 and 0.15% of sorbate, aflatoxin production was essentially eliminated. A 0.05% sorbate, aflatoxin production was greatly decreased in *A. flavus* over the control, but only slightly decreased in *A. parasiticus*.

Comparison of Barrier Creams and Germicides for Hand Hygiene, A. Z. Sheena and M. E. Stiles, Departments of Food Science, Foods and Nutrition and Microbiology, The University of Alberta, Edmonton, Alberta, Canada T6G 2M8

J. Food Prot. 46:943-946

Germicidal hand wash agents and two barrier creams for use on hands were compared to determine their ability to reduce the number of microorganisms released from finger tips. Use of the barrier creams resulted in a significant decrease in the number of microorganisms released, equivalent to the reduction achieved when effective germicidal agents were used, such as 4% chlorhexidine gluconate or iodophor containing 0.75% available iodine. The persistence of the effect of barrier creams on the skin was also studied, and it was found that an initial increase in number of microorganisms released occurred after rinsing with water or washing with non-germicidal soap. Sequential rinsing of hands with tap water, after treatment with the barrier creams or with the effective germicidal agents, gave similar results. Barrier creams can perform a useful adjunct role in hygienic hand disinfection. In this study, they were equivalent to effective hand germicides.

Effect of Heat on Biuret-Positive Water-Extractable Porcine Muscle Proteins, Carl E. Davis and John B. Anderson, Meat Quality Research Unit, Richard B. Russell Agricultural Research Center, Agricultural Research Service, United States Department of Agriculture, P.O. Box 5677, Athens, Georgia 30613

J. Food Prot. 46:947-949

Ground pork longissimus was heated in glass tubes in a controlled temperature bath at 2 (control), 20, 40, 45, 50, 55, 60, 62.5, 65, 67.5, 70, 75, or 80°C for 15 min after the sample reached the desired temperature, removed and chilled (2°C) immediately. Treated samples were homogenized with deionized water at a ratio of 1:3.3 (w/v) muscle to water. The resulting water-extractable proteins were determined by the biuret method. Eight ml of clear extract from each treatment was reheated for 15 min at 70°C, removed, and chilled (2°C) immediately. Coagulated proteins were removed by filtration (0.45 µm). Soluble protein was used as an index of heat denaturation. Water-extractable biuret-positive protein losses were 5.7% from 2 to 45°C, 69.7% from 50 to 67.5°C and 4.3% from 70 to 80°C. Reheating each treatment extract to 70°C yielded 20.2% baseline biuret-positive soluble materials. The ratios of soluble proteins at each treatment temperature with the baseline critical value of 70°C were 5.1, 5.1, and 4.9 from 2 to 45°C; 4.5, 3.9, 2.7, 2.2, 1.5, and 1.2 from 50 to 67.5°C and 1.1, 1.0, and 1.0 from 70 to 80°C. This indicates that coagulation of water-extractable biuret-positive compounds is nearly constant at about 70°C. These results suggest that a ratio of water-extractable biuret-positive proteins from heat treated porcine muscle may be useful in determining the temperature to which pork has been heat processed.

Effect of Process- and Storage-Times and Temperatures on Concentrations of Volatile Materials in Ultra-High-Temperature Steam Infusion Processed Milk, R. Bassette and I. J. Jeon, Department of Animal Sciences and Industry, Kansas State University, Manhattan, Kansas 66506

J. Food Prot. 46:950-953

Effect of various processing times and temperatures on the composition and subsequent changes in concentration of volatile compounds in UHT milk during storage was investigated. Milk samples were sterilized in a DASI Free Falling Film steam infusion system utilizing the combinations of 138, 146, and 154°C for 1.5, 3.4 and 9.0 s. After processing, aseptically collected samples were stored at refrigeration (2-5°C) and room (25°C) temperature for analysis at monthly intervals. Gas chromatographic analysis showed that processing times and temperatures used had little effect on initial concentrations of most volatile compounds in UHT milk. However, changes in their concentrations during storage appeared to be related to processing temperatures and temperature of storage. Acetaldehyde and n-pentanal increased more rapidly in the milk sterilized at 154°C/3.4 s than 146°C/3.4 s, whereas n-hexanal concentrations were lower in milk sterilized at 154°C/3.4 s. In addition, changes in concentrations of volatile compounds during storage at room temperature occurred primarily in aliphatic aldehydes. Increases in acetaldehyde, n-pentanal, and n-hexanal were closely related to the rapid decrease in product acceptability that was mainly due to increase in the intensity of stale flavor. Relatively little change occurred in the concentration of these aldehydes in milk stored at refrigeration temperature.

Effects of Electrical Stimulation and Conditioning Periods upon Pre-Rigor Beef Samples Cooked with a Microwave Oven, E. E. Ray, B. W. Berry, L. J. Loucks, E. A. Leighton, and B. J. Gardner, Department of Animal and Range Sciences, New Mexico State University, Las Cruces, New Mexico 88003

J. Food Prot. 46:954-956

Thirty beef carcasses were used to evaluate the effects of electrical stimulation and conditioning periods and microwave cooking upon sensory and shear properties of pre-rigor semitendinosus muscle samples. The intact muscle was removed from the right side within 45 min post-exsanguination and was electrically (ES) stimulated [100 impulses (1 s on and 1 s off, A.C., 110V, <5 amps)], while the remaining paired muscle served as the control (NS). After electrical stimulation, the muscle was cross-sectioned into three portions. A 2.54-cm thick sample was removed from the central portions of the ES and NS muscles and cooked immediately in a microwave oven to an internal temperature of 66°C. The remaining two similar sized portions were conditioned at 13°C for 2 h or 4 h before cooking. Three cores (1.27 cm) were removed from each sample parallel to the muscle fiber, and all cores were sheared twice. Samples from the conditioning periods were frozen, thawed, reheated and evaluated for palatability traits by a 10-member trained panel. Results indicate higher sensory panel ratings ($P < .05$) for tenderness, connective tissue and flavor intensity and lower shear force (WBS and Instron) values and longer sarcomeres from ES. With the conditioning periods used, microwave cooking was too rapid for pre-rigor muscle, as exemplified by the high shear values (6.4 and 7.8 kg/1.27 cm for ES and NS, respectively) which indicates a very tough sample of meat. Cooking yield was highest for muscle samples cooked immediately after slaughter. Roasts conditioned for 4 h before cooking had higher ($P < .05$) juiciness and flavor intensity scores than roasts held for 2 h, regardless of stimulation treatments.

Comparison of Enrichment and Plating Media for Recovery of Virulent Strains of *Yersinia enterocolitica* from Inoculated Beef Stew, D. A. Schiemann, Department of Microbiology, Montana State University, Bozeman, Montana 59717

J. Food Prot. 46:957-964

Five plating agar media were evaluated for their ability to recover pure cultures of virulent strains of *Yersinia enterocolitica* serotypes O:3, O:8 and O:5,27. Cellobiose-arginine-lysine and bismuth sulfite agars were unproductive at 32°C but gave quantitative recovery with 48 h of incubation at 22°C. Adjustment of the pH of bismuth sulfite agar to 7.4 made the medium inhibitory. MacConkey, DHL and cefsulodin-irgasan-novobiocin agars gave quantitative recovery with 24 h of incubation at 32°C. Four preenrichment media incubated at four different temperatures, three selective enrichment media incubated at 22°C, and the five plating media were evaluated for their ability to recover *Y. enterocolitica* from beef stew seeded with a background of ten other gram-negative bacteria. None of the plating media was superior for recovery; however, cefsulodin-irgasan-novobiocin agar showed the highest confirmation rate for presumptive colonies. Buffered-sorbitol-bile broth was inferior to richer media such as trypticase soy broth for preenrichment. Of the three selective enrichment media examined, only bile-oxalate-sorbose broth was found useful, especially for strains of serotype O:8 which could be recovered after 1 d of preenrichment and 3 d of selective enrichment at 22°C. Strains of serotypes O:8 and O:3 were recovered when two cells with 10^7 cells of ten other gram-negative bacteria were added to 10 g of beef stew following preenrichment in trypticase soy broth at 2°C for 7 d and selective enrichment in

bile oxalate-sorbose broth at 22°C for 3 to 5 d. Strains of serotype O:5,27 were more difficult to recover even with longer enrichment times. These studies indicated that the most comprehensive enrichment system for recovery of *Y. enterocolitica* from foods is preenrichment in trypticase soy broth at 22°C for 1 d and 2 to 4°C for 4 to 7 d followed by selective enrichment in bile-oxalate-sorbose broth at 22°C for 3 to 5 d and isolation on cefsulodin-irgasan-novobiocin agar.

Ochratoxins A and B, Xanthomegnin, Viomellein and ViOXanthin Production by Isolates of *Aspergillus ochraceus* from Green Coffee Beans, Michael E. Stack, Philip B. Mislivec, Turgut Denizel, Regina Gibson and Albert E. Pohland, Division of Chemistry and Physics and Division of Microbiology, Food and Drug Administration, Washington, D.C. 20204

J. Food Prot. 46:965-968

Isolates from *Aspergillus ochraceus* obtained from green coffee beans were cultured on rice and water. After 20 d of growth the cultures were extracted with chloroform and the extracts were analyzed by high performance liquid chromatography for ochratoxin A (OA), ochratoxin B (OB), xanthomegnin (X), viomellein (V) and viOXanthin (VX). Forty-three percent of the isolates produced OA at an average level of 397 µg of toxin/g rice, 17% produced OB at an average level of 312 µg/g, and 84% produced X, V, and VX at an average level of 281, 417 and 386 µg/g, respectively. The highest levels of toxin production were OA, 2088 µg/g; OB, 3375 µg/g; X, 1562 µg/g; V, 2514 µg/g; and VX, 2054 µg/g. VX has not previously been reported as an *A. ochraceus* metabolite.

Incidence of Toxigenic and Other Molds in Green Coffee Beans, Philip B. Mislivec, Verneal R. Bruce, and Regina Gibson, Division of Microbiology, Food and Drug Administration, Washington, D.C. 20204

J. Food Prot. 46:969-973

The mold flora of 944 green coffee bean samples from 31 coffee-producing countries was determined before and after surface disinfection with 5% NaOCl. Molds were detected on 99.1% of 47,200 beans not surface-disinfected and in 47.9% of 47,200 disinfected beans. Although the percentage of differences in occurrence of mold before disinfection was minimal (93.4 to 100%) on a country-by-country basis, after disinfection the beans from Asiatic and African countries showed more internal invasion (80.5%) than those from Central and South America (49.4%). *Aspergillus* spp., which dominated the mold flora of 944 samples before and after disinfection, included the toxigenic *A. ochraceus*, *A. flavus* and *A. versicolor* as well as *A. niger*, *A. tamarii*, *A. wentii* and species of the *A. glaucus* group. The genus *Penicillium*, including the toxigenic *P. cyclopium*, *P. citrinum* and *P. expansum*, was detected regularly, although its occurrence was substantially lower than that of the aspergilli, especially after surface disinfection. The rare detection of *Alternaria* and *Fusarium* indicated that toxigenic species of these genera do not readily invade green coffee beans. *A. flavus* and *A. tamarii* were prevalent in Central and South American beans, whereas other aspergilli were prevalent in Asiatic and African beans. The penicillia were prevalent in Central and South American beans.

Microbiological Quality of Breaded Shrimp During Processing, A. P. Duran, B. A. Wentz, J. M. Lanier, F. D. McClure, A. H. Schwab, A. Swartzentruber, R. J. Barnard and R. B. Read, Jr., Minneapolis Center for Microbiological Investigations, Minneapolis, Minnesota 55401 and Division of Microbiology and Division of Mathematics, Food and Drug Administration, Washington, D.C. 20204

J. Food Prot. 46:974-977

Duplicate samples of shrimp or breading materials were collected four times a day for two consecutive days at 12 locations along the processing lines of 33 shrimp-breading firms in the United States during 63 inspections. All firms were using good manufacturing practices. For stock shrimp, the geometric mean aerobic plate count at 35°C incubation (APC 35) was reduced from 2.1×10^6 to 3.3×10^5 colony-forming units (CFU)/g for the frozen finished product. At 35°C, an APC 35 of $\leq 10^6$ CFU/g was found for 78% of the finished samples. At 30°C incubation, the mean APC was reduced from 7.8×10^6 CFU/g for the stock shrimp to 7.6×10^5 CFU/g for the finished product. Coliform mean counts were virtually static (64 to 83/g) up to the batter-breading steps; however, these counts reached 148 to 160/g at the first batter-breading step and remained constant until the breaded shrimp were frozen. Mean *Escherichia coli* and *Staphylococcus aureus* counts were ≤ 3 and $\leq 10/g$, respectively, for all 12 in-line sampling locations. *Salmonella* organisms were found in one of 118 finished product samples tested for this pathogen.

Microbiological Quality of Fresh Blue Crabmeat, Clams and Oysters, B. A. Wentz, A. P. Duran, A. Swartzentruber, A. H. Schwab and R. B. Read, Jr., Division of Microbiology, Food and Drug Administration, Washington, D.C. 20204 and Minneapolis Center for Microbiological Investigations, Minneapolis, Minnesota 55401

J. Food Prot. 46:978-981

The microbiological quality of fresh blue crabmeat, soft- and hardshell clams and shucked Eastern oysters was determined at the retail (crabmeat, oysters) and wholesale (clams) levels. Geometric means of aerobic plate counts incubated at 35°C were: blue crabmeat 140,000 colony-forming units (CFU)/g, hardshell clams, 950 CFU/g, softshell clams 680 CFU/g and shucked Eastern oysters 390,000 CFU/g. Coliform geometric means ranged from 3.6/100 g for hardshell clams to 21/g for blue crabmeat. Means for fecal coliforms or *Escherichia coli* ranged from $<3/100$ g for clams to 27/100 g for oysters. The mean *Staphylococcus aureus* count in blue crabmeat was 10/g.

Effect of Air Movement During Fermentation on Certain Properties of Natural Flora and Starter Culture-Fermented Sausage, William E. Townsend, LeRoy C. Blankenship, Ruel L. Wilson and James E. Thomson, United States Department of Agriculture, Agricultural Research Service, Richard B. Russell Agricultural Research Center, P.O. Box 5677, Athens, Georgia 30613

J. Food Prot. 46:982-986

Effects of air movement (0, 5, 20 and 35 changes/min) during fermentation on certain chemical, physical and microbiological properties of a fermented and cooked summer sausage were determined. Four batches of summer sausage were prepared. Half of each batch was fermented by natural flora and the other half by

a *Pediococcus cerevisiae* starter culture. Sausages were fermented in chambers at 38°C with 94% RH, and samples were taken at 0, 6, 12, 18 and 24 h during fermentation. Samples were also taken after heat processing and overnight chilling. Air movement during fermentation had no significant effect on pH, lactic acid content, cured color development or proximate composition regardless of method of fermentation. Removal of sausage casing was very difficult for all natural flora sausage chubs that were fermented at 5, 20 and 35 air changes/min; however, ease of casing removal improved somewhat at 18 and 24 h of fermentation for sausages made with natural flora and fermented at 0 air change/min. Regardless of air movement treatment, removal of casing from sausages made with starter culture was poor at 6 h of fermentation, but was much improved at 12 h of fermentation and thereafter. Microbial growth was fastest and highest among the natural flora sausage fermented without air flow. An undesirable surface film which developed on the natural flora sausage fermented without air flow consisted of gram negative rods and gram positive cocci.

Effect of Carbon Dioxide, Nitrogen and Hydrogen Gases on Germination of *Clostridium botulinum* Spores, P. M. Foegeding and F. F. Busta, Department of Food Science and Nutrition, University of Minnesota, St. Paul, Minnesota 55108

J. Food Prot. 46:987-989

Germination of spores of *Clostridium botulinum* strains 62A, 213B and 12885A was monitored in modified peptone yeast extract broth flushed with CO₂, N₂, CO₂ + H₂ and N₂ + H₂. Carbon dioxide enhanced germination of spores of each of the strains. Hydrogen gas in combination with CO₂ or N₂ did not substantially alter germination compared to germination in CO₂ or N₂ alone, even though the oxidation-reduction potential of the system was lower in the systems flushed with H₂.

Distribution of Soluble Filth in Shrimp During Processing, Gunnar Finne and Roy Martin, Seafood Technology Section, Department of Animal Science, Texas A&M University, College Station, Texas 77843 and National Fisheries Institute, 1101 Connecticut Avenue, Washington, D.C. 20036

J. Food Prot. 46:990-993

The objective of this research was to evaluate the distribution of soluble filth in shrimp during different stages of processing. Flies, fed a radioactive glucose isotope, were added to five pounds of headless shell-on shrimp tails (green-headless) and also to five pounds of peeled and deveined shrimp tails. The shrimp were blast frozen as five pound blocks, glazed with distilled water and stored for 10 d at -26°C. After thawing, washing, and rinsing, 44.4% of the total radioactivity from the added flies remained on the green-headless shrimp. Reconditioning of the peeled and deveined shrimp through thawing and multiple washings resulted in 18.2% retention of total activity. Even though cooking caused an additional 8.2% loss of activity, the cooked shrimp still had 10% of the original radioactivity associated with it.

Lipolytic Activity During Storage of Human Milk: Stability of the Bile Salt-Stimulated Lipase, C. W. Dill, C. T. Chen, E. S. Alford, R. L. Edwards, R. L. Richter and C. Garza, Department of Animal Science, Texas A&M University, College Station, Texas 77843 and Department of Pediatrics, Baylor College of Medicine, Houston, Texas 77030

J. Food Prot. 46:994-996

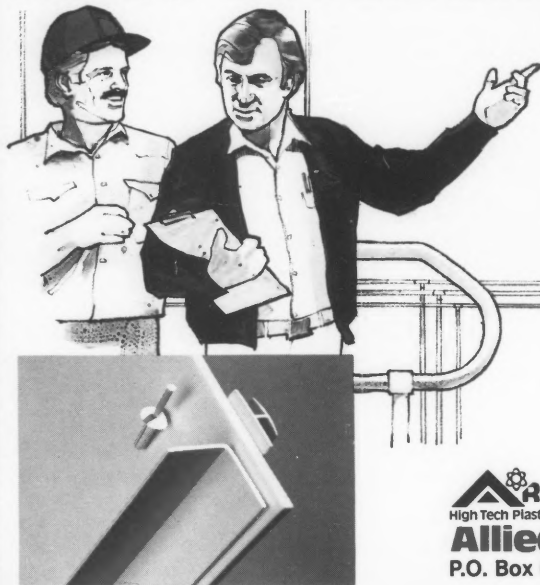
Bile salt-stimulated lipase activity was monitored in fresh human milk and skim milk during refrigerated (4°C) and frozen (-20°C) storage, and in the lyophilized milks stored at -20°C and at room temperature. Following a sharp initial drop to approximately 77% of the original lipase activity, lipase was relatively stable in frozen or freeze-dried milks during 180 d of storage at -20°C. Activity losses were greatest ($P < .05$) in freeze-dried whole milks and skim milks stored at room temperature, approximating a 30% loss during 30 d of storage. Lipase activity was stable during refrigerated (4°C) storage of whole milk for 1 week.

Use of Starter Cultures in Meat, James L. Smith, Samuel A. Palumbo, Eastern Regional Research Center, Philadelphia, Pennsylvania 19188

J. Food Prot. 46:997-1006

Use of starter cultures in meat products is reviewed, with emphasis on the types of microorganisms employed for production of various products, and the effect of starter cultures on food safety. Desirable starter culture characteristics are identified, and the effect of fermentation on the nutritive quality of meats is considered. Food safety aspects of starter culture use discussed include the effects on survival of viruses, trichinae, and pathogenic bacteria, and on the control of mycotoxin, nitrosamine, and presor amine contamination.

Vizcoclean® Paneling Systems Meet Government Standards ...and Yours!



As you inspect more dairies and livestock confinement areas built with Vizcoclean Paneling Systems, you'll see why it's so popular.

- Sanitary walls and ceilings satisfy FDA/3A/USDA standards
- Durable, non-cracking plastic
- No backup boards to rot or harbor mold and bacteria
- Snug joints prevent dirt buildup between panels
- Smooth, non-porous surfaces accept hot water, high-pressure flushing

Vizcoclean is a superior product that makes your inspection job easier. You'll appreciate its high standards.

Learn more about Vizcoclean Paneling Systems.

Write for literature today!



Allied Resinous Products, Inc.
P.O. Box 620 • Conneaut, Ohio 44030 • Tele: (216) 599-8175

TRANSFLOW® THE AUTHENTIC BLUE STRIPE® TUBING MAKES YOUR JOB EASIER

Guidelines, forms, thermometers, levels—they're all part of inspecting a dairy. Yet, there's more to it. An experienced eye and commitment are what make you the professional. And Norton parallels that experience, commitment and professionalism with the tubing that helps dairies meet sanitation codes.

Transflow Tubing. It's the milk tubing with the blue stripe; the stripe that symbolizes consistent quality.

Transflow Tubing is considered the standard for milking machines, portable transfer systems, dumping stations, clean-in-place units and milk transporters.

When the time comes to purchase milk tubing, consider the advantages of Transflow raw milk tubing.

Transflow Tubing is crystal clear. This clarity allows immediate visual inspection of your milk transporting lines. There is never any question about the tubing's cleanliness.

Transflow Tubing has a smooth, nonporous inner surface that resists

the build-up of bacteria-forming butterfat, milk stones and milk soil.

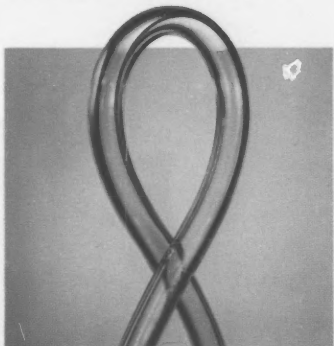
Transflow Tubing's flexibility makes it easy to handle and easy to install.

Transflow Tubing can be quickly and easily cleaned without harm using most commercially available cleaners or sanitizers.

Transflow Tubing is available in a range of Standard Milk, Tank Truck and Vacuum sizes. And, Transflow fully complies with all FDA and 3-A Sanitary Standards.

For literature and more information, write Norton Performance Plastics, P.O. Box 350, Akron, Ohio 44309, or call: 216-673-5860.

NORTON



The dairyman who takes advantage of the MQA expert today may have an advantage over you tomorrow.

In the dairy business, more than most, survival and success come from working smart. And that means calling up every resource you've got.

The Surge MQA man is one such resource.

He's a graduate of the most intensive advanced-training

program in the business. The Surge Master of Quality Assurance course.

He has taken apart and put together about everything that has anything to do with milk or milking. Not just Surge equipment, but whatever equipment you're using. More than keeping small problems from becoming big ones, he can help you make working equipment work better.

And when it comes to sanitation, he knows your business from the groundwater up. So he can tell you on the spot exactly which cleaners, acids, detergents and sanitizers will work best with your water supply.

The way we look at it, the Surge MQA man has earned his Masters in the dairy business. As the business gets more and more competitive in the years to come, he could come in mighty handy in helping you—or your neighbor—get ahead.



We can
make your
cows worth
more.

SURGE

