October, 1982
Vol. 2, No. 10
Pages: 397-440
ISSN:0273-2866
Box 701
Ames, Iowa 50010

$5.00

Dairy and Food Sanitation

A Publication for Sanitarians and Fieldmen

- A Guide to Sampling
- Septics and Shigellosis Linked in Marion County
- How to Prevent Antibiotic Contamination of Milk and Meat

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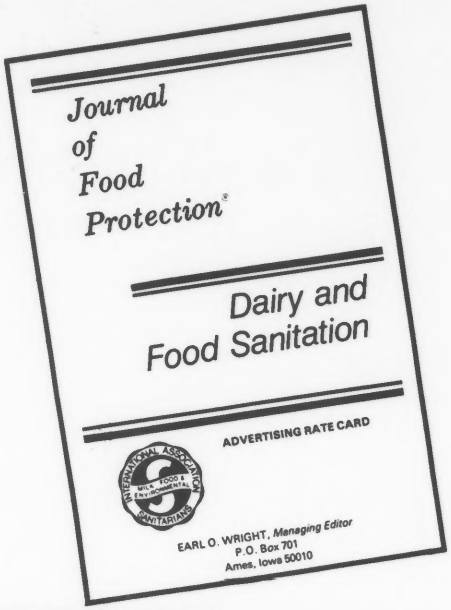

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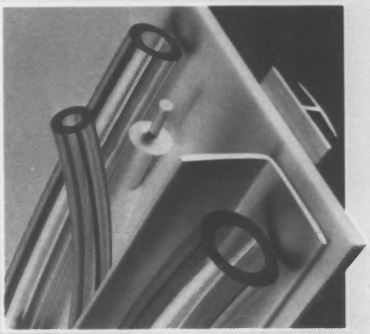

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Dairy and Food Sanitation is published monthly by the International Association of Milk, Food and Environmental Sanitarians, Inc, executive offices at PO Box 701, 413 Kellogg, Ames, IA 50010. Printed by Heuss Printing, Inc, 911 Second St, Ames, IA 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.
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Dairy and Food Sanitation

No. 10 **October, 1982**

Dairy and Food Sanitation, Vol. 2, No. 10, Pages 400 (October 1982)

Septics and Shigellosis Linked In Marion County

"Do failing private sewage disposal systems actually cause disease? A number of people in Marion County have reason to think so."

ROBERT MORSE

Four-year-old John Boulders,* went to live with his mother's boyfriend in a small trailer park served by a well and septic system. Foul smelling water from the kitchen faucet might have been dismissed as part of suburban living. When stomach cramps, vomiting, seizures and watery diarrhea set in and his temperature soared to 104°F, a stool specimen was taken. Tests showed the shigella bacillus, a "Bug" that eats up the intestinal walls. Several more children also became sick.

Sanitarians W. Phil Eley and Becky Brush checked the well, and found its pit next to the house, with water standing over the well casing. Three pathogens showed up in the tested well water. A suspected sink seepage pit was the likely culprit. The well pit was replaced with a pitless adapter and the whole system shock-treated with bleach, which solved the problem.

Three-year-old Sammy Adkins,* visited his grandmother in an unsewered area of northeast Indianapolis. The neighborhood septic systems either bled out to the yard, drained to the basement or discharged putrid waste into woods across the road. A sewage playground was at the doorstep of eight cottages and their small inhabitants! Sammy's grandma had city water, but the neighbors used a common well that was within a few feet of open sewage. When Sammy got nauseous, showed a fever and watery diarrhea, a stool specimen was checked, showing shigella. Sam's baby sister came down with the same symptoms soon afterwards.

Not every rendition of the septic tank blues is easily concluded. In this instance Marion County Sanitarians Joe Ketterman and Rhonda Young had to introduce the owner of the cottages, to Judge David Jester, of Environmental Court. Under court order, the owner was persuaded to extend a sanitary sewer and water main to his rentals.

The septic-shigella link is common to Communicable Disease Investigators like Judy Watt who ferreted out the information on these two cases. The 99 reported cases last year in Marion County represent only the tip of the iceberg. A large share never become statistics, says C. D. Nursing Coordinator Martha Bennington, because the symptoms are mild and no doctor is seen, or because the doctor takes no stool specimen or does not know it is his duty to report dysentery.

Some septic tank owners, even a few of the medical profession, profess ignorance of the sewage hazard.

* *Fictitious name.*

Reprinted from Hoosier Sanitarian, *newsletter of the Indiana Association of Sanitarians, Fall, 1981, issue.*

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Bactomatic, Inc.

Dairy and Food Sanitation, Vol. 2, No. 10, Pages 402-404 (October 1982)

How to Prevent Antibiotic Contamination of Milk and Meat

STANLEY E. WALLEN
Extension Food Scientist

DUANE N. RICE
Extension Veterinarian

FOSTER G. OWEN
Extension Dairyman

DENIS E. ERICKSON
Associate Professor

EUGENE J. VEBURG
Extension Assistant-Mastitis Control

PHILIP H. COLE
Extension Dairyman

DON J. KUBIK
Extension Dairyman

Antibiotic residues in milk and meat are illegal and costly - more than $50 million dollars on a national basis annually! Antibiotic contaminated milk and meat must be discarded for public health reasons. Antibiotics in milk also inhibit the growth of the bacteria required to produce cheese, yogurt and other cultured dairy products.

Sources of Residues

The primary source of antibiotic contamination of milk and meat is from cows treated for mastitis. These residues occur because treated animals or their milk are not withheld from market for the proper length of time after treatments. The recent development of rapid, highly sensitive tests has resulted in more frequent screening tests and possibly more frequent detection of antibiotics in milk and meat products. Refinements in assay techniques have increased by tenfold the sensitivity of tests for antibiotic residues in milk. The advent of these technologies is occurring at a time when antibiotic usage to prevent or cure mastitis is still higher than it should be.

Losses

Financial losses to farmers due to antibiotic contamination may be increasing because antibiotic-contaminated milk must be discarded, and antibiotic-contaminated animals must be withheld from market for an even longer period of time or otherwise condemned.

Because antibiotic contamination of milk is illegal, dairymen may be suspended from the market, suffer permanent loss of membership in a cooperative, have to pay increased charges for antibiotic testing or even be fined or jailed! Thus, avoiding antibiotic contamination of milk and meat is quite important.

Prevention

Drugs are not an acceptable substitute for good management. Disease prevention (particularly mastitis) is based on good sanitation and application of a complete herd health program, i.e., vaccination for common diseases and segregation of cows that are infected carriers. Good management practices will prevent stress leading to infections, disease spread among animals and reduce the need for antibiotics. An ounce of prevention is worth a pound of cure!

ANTIBIOTIC SUSCEPTIBILITY TEST AID IN SELECTING ANTIBIOTICS that are effective against mastitis-causing bacteria. However, a susceptibility test is not the only basis used for selecting drugs. Proper drug selection and treatment for a long enough time will result in more effective control of mastitis with reduced drug wastage and risk of antibiotic contamination of market milk. Under-treatment may be hazardous, as well as ineffective, as it can allow for development of resistant organisms.

The best chance for success in eliminating contamination is for dairymen to know how to treat cows and properly withhold contaminated milk from the supply of market milk.

Thus avoiding antibiotic contamination of milk and meat is vital. Information provided in the following 10 items should be helpful in avoiding these problems.

1) Do not use dry cow antibiotic preparations within four weeks prior to calving. Read the labels on each dry cow product used. Never use dry cow treatment on a cow in milk.
2) When veterinarians treat your cows with antibiotics, ask them the *CORRECT TIME FOR WITHHOLDING* milk before it will be saleable. Sources of antibiotics in milk in addition to those infused or injected may include:
   a) eye drops for pinkeye treatment;
   b) antibiotic wound ointments;

c) some teat dilators;
d) uterine boluses;
e) medicated feeds.

Note: Vaccine in semen that contains antiotics as preservatives are not a significant source of antibiotics in milk.

Even a properly labelled drug for food animals can produce residues beyond the withholding period, particularly when:

a) excessive dosages are given (i.e., if two tubes are used instead of one, or if dosage is excessive for the animal's size: (excessive doses may be required on occasion to save an animal's life);

b) abnormal drug application routes are used (i.e., injection of a drug intradermally when it should have been injected subcutaneously);

c) combinations of antibiotics are used for treatment; or

d) when drugs approved for one animal species are used in another.

Withholding times for intramuscular and intrauterine antibiotics generally are longer than for intramammary infusions. Uterine infusion is a good example of a treatment that is likely to lead to detectable antibiotic residue in milk when the new sensitive assay is used. Treatment of the uterus with tetracyclines in cows suffering from metritis (inflamed uterus) or retained placenta that formerly went undetected in milk, now can cause positive tests. For example, the new test procedure can now detect residues in milk caused by a 2.5 g dose of tetracycline in a normal uterus for 12 hours in most cows and 24 hours in some cows. A dose of 10 grams of tetracycline (a four-fold increase in the routine dosage) in a normal uterus results in detectable residue levels in milk for 48 hours.

Before shipping treated cows to slaughter, remember that withholding times following treatment are much longer for tissue residues than for milk. It may be as long as 60 days. Check labels and do not ship for slaughter until the recommended time has passed.

Veterinarians should be sure to label any drugs they dispense with the name of the drug, directions for use and instructions on withholding milk from market, as well as animals from slaughter.

3) Dairymen must *READ THE LABEL* for correct dosage requirements before treating their cows and should follow the recommended withholding times before shipping the milk or the animal. Federal laws require drug product labels to bear specific instructions on withholding periods and warnings against marketing milk or slaughter animals containing antibiotics. Even when these specific instructions are followed, certain cows may require longer than label warnings indicate to eliminate a drug due to level of milk production or age of the cow. Unfortunately, there are no simple guidelines for preventing contamination due to these circumstances. It is important to select needle size and injection sites carefully, if injections are necessary, because misuse can lead to tissue damage, reduced effectiveness, and/or illegal residues. It is always important to consult your veterinarian regarding choice of drug, dosage, administration and milk withholding intervals.

4) *HANDLE DRUGS PROPERLY*. Store drugs in a *CENTRAL LOCATION*. A refrigerator in a utility room is a good place to keep pharmaceuticals: consult label directions for appropriate storage conditions. Drugs should be stored so as not to cause contamination of milk utensils and equipment. Keep infusion tubes for dry cows separate from tubes used for lactating cows. *LIMIT ACCESS* to drugs to only competent and responsible people. Ideally, only *ONE PERSON* should administer antibiotics to the cows.

5) *MAINTAIN A WRITTEN PERMANENT HEALTH RECORD* for each animal treated in a folder or notebook. Be sure to:
   a) list the name or number of animal treated;
   b) date administered;
   c) earliest date sale of milk and/or slaughter allowed;
   d) person administering the drug;
   e) quarter(s) treated;
   f) type of drug used;
   g) dosage given;
   h) route (intravenous, intramuscular or intramammary); and
   i) amount of drug on hand.

   Breeding and freshening dates should also be recorded and reviewed for proper drying off and dry cow therapy. Refer to these records before selling cull cows. Blackboards, "health wheels" or "health calendars" often serve as good temporary places to record antibiotic treatments. *PERMANENT RECORDS, HOWEVER, ARE CONSIDERED THE MOST DESIRABLE*.

6) *MEDICATED FEED*. Antibiotic levels in hog and poultry feed may be significantly higher than those allowed for lactating cows. Therefore, do not use leftover hog or poultry feed for dairy cows or let cows have access to any feed intended for other livestock. Do not prepare feed for cows in a mixer that was previously used for preparing hog or poultry feed. Always be sure to clean out mixing bins and feeders carefully before preparing a feed for dairy cows.

   If feed containing antibiotics is used, do not overfeed. Follow label directions. The amount of antibiotic in feed is regulated by the government.

   Buy feeds from competent feed suppliers. Problems have been reported with feed containing antibiotics due to incorrect formulations at feed plants. Ideally, you should save a sample of all purchased feed to aid in finding the source should a residue problem arise. Otherwise, collect samples from any remaining feed delivered before the problem.

7) *LABEL TREATED COWS*. A wide variety of marking systems are available; bright colors are the easiest to observe:

a) plastic leg bands (some types are easier to remove than others);
b) hock markers;
c) tail markers;
d) color coded tags or chains;
e) "cow crayons;" and
f) computers.

Some do-it-yourself approaches include:
a) spray paint;
b) "sale barn tags;" and
c) magic markers.

Although twine and tape are often used to label cows, they may cause leg or tail lesions, therefore we cannot recommend them. One especially good way to identify animals is to mark both flanks or milking side with day of week and morning or afternoon milking when milk is safe to add to supply -- for instance, Wednesday/A.M. or Sunday/P.M. Regardless of what marking system is used, make sure all milkers know the meaning of the marks being used.

8) *AVOID CONTAMINATION OF MILKING EQUIPMENT*. This is necessary because a single medicine dropper of milk from a treated cow can cause detectable levels in other cows' milk passing through the same equipment. Furthermore, the law requires that cows capable of secreting antibiotics shall be milked last or in separate equipment. *THE MOST PRACTICAL FIRST CHOICE IS TO MILK TREATED COWS LAST*. After milking the last of the non-treated group, remove the milk inlet tube from the bulk tank and cap the tank. Put the milk inlet tube into a bucket and if desired, use a catch bucket or weigh jar in the milking parlor. This should prevent 100% of bulk tank antibiotic contamination. This procedure allows the cow to be milked into the pipeline rather than having to find a separate bucket milker for one or two cows. If treated cows can't be milked last, separate milking equipment should be used.

a) Bucket Milkers. If you routinely use a bucket milker, you should -- use a separate claw, milk hose and bucket to milk cows treated with antibiotics. If separate milking equipment is not practical, then very carefully rinse the claw, milk hose and bucket before milking a "clean" cow.

b) *Pipeline Milkers*. Use a separate claw and milk hose and milk into a bucket or milk trap. Consider a washing and sanitizing step between use on infected cows. The milk hose should be connected to a trap, not directly to the milk line.

c) *Weigh Jars*. Do not use weigh jars for collecting contaminated milk unless the contaminated cows are being milked last. Instead, use a separate claw and milk hose and milk into a bucket or trap. If it is not possible to use different equipment, then *very carefully* rinse the claw, milk and *weigh jar* before you milk the next cow.

Comment: It is important to milk out treated cows completely, as the more completely they are milked out, the faster an infused drug will clear.

9) *DISCARD CONTAMINATED MILK*. Milk from *ALL* four quarters of a treated cow must be discarded even if only one quarter has been treated. Antibiotic infused into one quarter of the udder will be absorbed by the blood stream and will be transferred to the other three quarters. You cannot dilute antibiotics beyond detectable levels by mixing in the bulk tank. By doing this, you may ruin a whole load of milk. Milk from one contaminated quarter can contaminate all of the milk produced by 1,000 cows.

Milk containing antibiotics can safely be fed to calves; however, do not feed milk from treated cows to calves that will be slaughter for human use within five days.

10) Because purchased animals may have been treated or given medicated feed, it is important to test their milk before adding it to the bulk tank. If there is any question about *ACCIDENTAL CONTAMINATION* of your bulk tank or about possible residues from a cow, check it out. Fieldmen for most cooperatives and milk plants are equipped to check for antibiotics in milk. Do-it-yourself antibiotic residue test kits are available.

Dairy and Food Sanitation, Vol. 2, No. 10, Pages 405-408 (October 1982)

HAROLD L. FAIG

Training Officer
State Training Branch
Division of Federal-State Relations
EDRD, FDA

ABSTRACT

The basis for scientific inspection and analysis lies in the research sample. Properly done, representative and random sampling techniques will insure subsequent studies are valid and meaningful. Specialized equipment for sampling includes record forms, sample cases, refrigerants and thermometers. Correct procedure involves identifying and collecting samples, recording product temperatures, maintaining those temperatures, protecting samples from damage and sealing samples to preserve their integrity. A sampling kit, as outlined, is helpful in collecting samples properly and safely.

Samples are a basic, integral part of scientific research and discovery. From a local doctor's office to a national research laboratory, the best use of samples comes from proper, and careful, sampling techniques.

A sample is simply part of anything that is submitted for inspection or analysis and represents the quality of the whole. The sample must be valid -- one selected from a group of material where each unit has an equal chance of being chosen for examination. This selection process is called randomization.

A sample must also be representative to insure results are accurate and objective. Representative samples are not only random, but contain a proportionate amount of each type of ingredient. In other words the sample must be identical to the gross material from which it was selected.

The basis for establishing the condition or analytical quality of the entire item or lot is based on the selection of a sample. In general, the larger the sample size the greater the integrity can be placed on the findings. However, the inspectional technique of submitting the entire item or lot -- while providing the soundest final results -- is not considered sampling and is by far the most expensive method.

Samples are used to establish data in the development of standards, product acceptance, quality or process control. Sampling is also a widely accepted method to obtain regulatory control, but must be based on sound practices to be meaningful.

One last use of sampling is in determining the causative agent or agents in foodborne illness outbreaks.

The collection, identification and shipment of samples is accomplished with specialized equipment.

Record forms contain the information necessary for the specific sampling and subsequent analysis. The integrity of the samples submitted can easily be diminished by poor and incomplete information.

Sample cases are insulated to insure temperature maintenance during the time of transit between sample site and the point of inspection or analysis. They are preferably tamper-proof.

Refrigerants differ according to the temperature levels they must maintain. Maintenance in the 32-40 degree fahrenheit range can be achieved by various methods. The commercially sealed refrigerants come in several forms and temperature ranges. Ice may be used effectively either in sealed waterproof containers or loose, if there is no chance of contaminating the sample.

Maintenance in the zero to subzero temperature range is generally accomplished by the use of dry ice.

Sample containers should be of suitable size, equipped with vaporproof closures, and capable of being sterilized.

A GUIDE TO SAMPLING

Sampling instruments include knives, spoons, scissors, forceps and wooden tongue blades. Dippers or sampling tubes are used for liquid samples. An electric drill with a one-inch auger may be used for frozen samples. All equipment should be sterilized in the laboratory and transported to the sample site in sterile equipment cases.

Sample thermometers in the approximate range of 0-220 degrees fahrenheit require graduation intervals not exceeding two degrees fahrenheit. Accuracy can be checked with the NBS thermometer or its equivalent.

Field sterilization equipment is occasionally necessary. Such equipment would include a propane torch.

Shipping cases, the last equipment needed for accurate sampling, protects the samples during commercial transit.

Which of the recommended sampling procedures for solid, semi-solid, viscous, and liquid samples is to be used must be determined by the collector at the time of sampling. A proper procedure may go as follows:

- Identify and collect only representative samples, then record product temperature at the time of sampling, where applicable.
- Maintain collected samples at the correct temperature. Non-perishable items and those normally at ambient temperature should be maintained as such. Perishable and normally refrigerated items should be held at 32-40 degrees fahrenheit, while samples which are normally frozen and other special samples should be held at zero degrees fahrenheit or below.
- Protect samples from contamination or damage after collection. Do not label certain plastic sample containers with a marking pen, for instance, as the ink may penetrate into the contents.
- Seal samples to insure their integrity, preferably in the presence of the owner. Then inform the owner as to the reason for the collection of samples and offer to provide him with a duplicate or split sample.
- Whenever possible, keep samples in your presence for delivery to the inspection or analysis site.

Samples should be submitted to the laboratory in their original unopened containers, whenever possible. More specifically, when sampling homogeneous bulk products or products in containers too large to be transported to the laboratory, mix the product, if possible, and transfer at least 100 grams of the sample to a sterile container under aseptic conditions.

Frozen products may be sampled with the aid of an electric drill and an auger. When chemical analysis is anticipated, a large sample (300-500 grams) should be collected.

With food composed of several parts or components such as cream pie with meringue topping, turkey and dressing, it is often helpful to sample the individual components to determine the bacterial contamination of each component. In these cases, each component should be sampled separately in such a manner as to avoid cross-contamination.

Samples serve vital functions in establishing data, developing standards, and in determining the cause of disease. Careful sampling techniques will insure valid, meaningful samples can be used to meet these important challenges.

SAMPLING KIT

The following items, assembled and prepared as specified, should be kept readily accessible for the investigation of foodborne disease outbreaks.

2. Jars, wide mouth, 6-16 oz. capacity, screw-cap, sterile, 6-8

each. Pre-sterilized plastic containers may be substituted.

3. Jars, wide mouth 32-oz. capacity, screw-cap, sterile, 1-2 each.
4. Knives, (butcher) wrapped, labeled, sterile, 1-2 each.
5. Spoons, (table) wrapped, labeled, sterile, 3-4 each.
6. Forceps or tongs, wrapped, labeled, sterile, 1-2 each.
7. Burner, LP, complete with fuel supply.
8. Swab-rinse materials, 12 each.
   a. Cotton swabs, sterile, non-absorbent cotton, twisted to approximately 3/16-in. diameter, by 3/4 in. length and individually wrapped.
   b. Vial or tubes, screw-capped, containing 5 ml of buffered rinse solution after sterilization.
9. Heavy wrapping paper or foil, folded and wrapped in an outer cover, and sterilized, is used to cover and protect large items such as a carcass of roasted turkey or a ham.
10. Water specimen bottles, sterile, 2-3 each. (A dechlorinating agent such as sodium thiosulfate should be added to bottles for samples having residual chlorine.)
11. Tape (pressure sensitive), plastic or masking.
12. Thermometer, 0° - 220°F (-20-110°C), calibrated for accuracy.
13. Marking pencil.
14. Paper towels, wrapped, sterile.
15. Sample case, insulated, complete with ample refrigeration to maintain samples at proper temperatures until delivered to the laboratory.

This comprehensive list of supplies will probably not be needed for each investigation, but such a kit ready for use should be conducive to carrying out a successful investigation.

NOTE: Periodic resterilization or replacement of sterile supplies is required to maintain the kit in ready condition.

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FORM D **Sample Collection Report**

DATE	CITY	SAMPLE NUMBER

Description of sample and source:

Identifying marks on seal (e.g., code or lot number)

Name of person from whom sample collected

Name and address of establishment where collected

Name of dealer, manufacturer, or processor, if known

Analysis requested (chemical, bacterial, etc.)

Method of sterilizing container:

Method of sterilizing utensils used to collect samples

Other suspected foods:

Method of shipping sample (air, rail, etc.)

INVESTIGATOR_____

Laboratory results:

Date of laboratory report

Laboratory investigator

Name and address of laboratory

Reproduced from Procedures for Investigating Foodborne Disease Outbreaks, published by International Association of Milk, Food and Environmental Sanitarians, Shelbyville, Indiana; p. 22, 1966.

Dairy and Food Sanitation, Vol. 2, No. 10, Pages 409-410 (October 1982)

FRUIT CONTENT OF BREAKFAST CEREALS

LESTER HANKIN, and J. GORDON HANNA

Connecticut Agricultural Experiment Station, New Haven, CT, Dairy Division, Connecticut Department of Agriculture, Hartfort, CT.

Manufacturers of breakfast cereal vigorously advertise how much fruit their product contains. Fruit is valuable, and manufacturers emphasize how rich their brand is in raisins, dates, or other fruit or nuts. This survey shows whether brands differ in percentage, by weight, of individual fruit and nuts. The sucrose and other sugars contributed by each component, i.e., grain, fruit, nuts, was also determined.

METHODS

Thirty-one samples of household-size packages of breakfast cereal containing fruit and nuts were purchased at retail stores by an inspector of the Connecticut Department of Consumer Protection.

Fruit and nuts were physically separated from the grain or flake portion of the product and weighed as obtained. The net weight, fill of container, and sugar content of the separated ingredients were determined by Official Methods. The sugar content includes sucrose as well as glucose and fructose. Where an ingredient could not be separated from the grain or flake portion of the cereal the sugar content of that ingredient was included together with the sugar content of the grain.

Adapted from Bulletin 804 of the Connecticut Agricultural Experiment Station. New Haven, CT. Copies available on request.

RESULTS AND DISCUSSION

Percentage of fruit: Twelve of the 31 breakfast cereals claimed raisins as the only fruit. Included were 8 raisin-bran cereals, which averaged 22% raisins, with a range of 17 to 26%. Three of the 4 non-bran cereals contained more than 20% raisins, but sample 6 had only 3.6%.

Eight other samples also contained a single fruit or nut: either bananas, peanuts, dates, apples, or almonds. In 4 of these however, the ingredient was too fine to be distinguishable and separable, and in one case, the fruit adhered too tightly to the grain flakes to be separated. Only one sample claimed a specific amount of fruit, 37% dates; only 33.4% was found, but some dates were ground with the grain portion and were not included in the measurement. This was the highest concentration of fruit found among all cereals.

The labels of 11 samples listed two or more fruits or nuts. All of these, except one, contained less than 10% of a single fruit or nut ingredient, and some contained less than 1%. Some of these samples contained over 10% total fruit; the highest with 21.6%. Again, some ingredients were not measurable since they could not be separated. Four cereals labeled as granola, contained 1 to 10% fruit and nuts.

Ingredients listed on labels must appear in the order of decreasing concentration. For some samples the listed order was not the same as found on analysis. One example was where pineapple was listed before papaya, yet the concentration of papaya was 10-fold greater than pineapple. Another example contained 3-fold more dates than almonds.

Sucrose and other sugars: The sugar content of the cereals includes sucrose, usually added during manufacture of the grain portion, and glucose and fructose naturally in fruit, nuts, and honey. Sugar content of the cereals averaged 21.7% with a range from 6 to 46%.

Nineteen of the cereals had more than 20% sugar. One sample was notably high in sugar with 45.9%. Four of the 19 had more than 30% sugar but 3 of the 4 may have derived a large portion of the sugar from honey.

The sugar content of the grain portion of the cereal, which includes any added sugar, ranged from 2 to 46%, averaging 16.2%. Nuts contributed little sugar to the total; the average for 10 samples was 0.4%. Fruit contributed considerably more sugar than nuts, the average for 24 samples being 6.9%. It is obvious that raisins in the various cereals differ considerably in their sugar content, perhaps because some were sugared.

If little sugar is contributed by the fruit and nuts and the amount of grain is high, sugar was likely added either as sucrose or honey. One example lists honey as an ingredient. Only about 5% of the sugar in this cereal was from almonds and dates, and 95% was from the grain portion. Another example is where fruit contributed about 8% sugar and the grain 92%. In both these examples the products probably contained added sugar. Similar conditions were observed in 4 other samples.

In one sample, on the other hand, raisins contributed 83% of the sugar and grain 17%. This product probably contained little added sugar. Similar examples were seen in 2 other samples.

The 12 cereals containing raisins as the only fruit or nuts had an average sugar content of 19.5% with a range from 10 to 27.6%. The 8 bran cereals with raisins averaged 18.8%. Granola cereals averaged 16.1% and those with at least 3 fruits or nuts average 18.6%.

Fill of container: Fill of container described how much food is present in relation to the capacity of the box or bag. The average fill was 77% and ranged from 56 to 93%. Four samples in opaque packages were below 60% fill, a level considered unsatisfactory.

Net weight: All samples correctly contained the net weight as stated on the label. The average was 103% of the weight claimed with a range from 99 to 107%.

SUMMARY

All except one of the 12 breakfast cereals claiming only raisins contained about 21% raisins. Eight raisin-bran cereals averaged 22% raisins. Samples containing 3 or more fruit or nut ingredients averaged a total of 14%, but the range was 10 to 22%. In some samples, ingredients were too finely ground or they adhered too tightly to the grain or flakes to be separated. The greatest amount of fruit in any sample was 33.4% dates.

Sugar content averaged 21.7%. Cereals with raisins as the only fruit averaged 19.5%. Fourteen cereals had 20 to 30% sugar, 4 had 30 to 40%, and one contained 46%. Nuts contributed little sugar to the total, whereas fruit contributed 6.9%.

Although the average fill of container was 77%, 4 samples were below 60% fill, an unsatisfactory level for food in opaque packages. Net weight claimed on the label of all samples was accurate.

ACKNOWLEDGMENTS

We thank J. Hayes and L. Hornig for the analyses and E. Hawley, Chief, Food Division, Connecticut Department of Consumer Protection, who arranged for collection of samples by Inspector F. Zullo.

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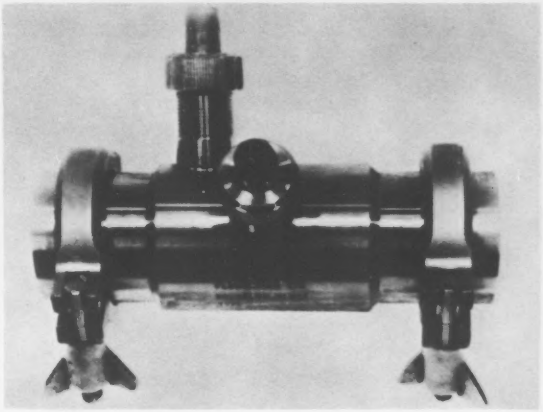
New Product News



•*A new hygienic Flowmeter* manufactured by Euromatic Machine & Oil Co., Ltd., is now available in the U.S. through Ebeltex, Inc., in Houston, Texas.

Designed especially for use in the dairy and processed food industries requiring rigorous hygenic standards, the S3 features simplicity of installation and maintenance and requires no special tools or skilled personnel. The major design factor is the use of a multi-module system of construction arranged to facilitate assembly, installation and cleaning in place.

The S3 consists of three main units, the body and two bearing supports magnetically held in position, eliminating the need for screws. The turbine rotor is contoured to guarantee maximum efficiency with each end machined to different diameters to fit the corresponding bearings. Thus, it is impossible to assemble or install the flowmeter incorrectly.

Also important to the food industry, the bearings are of stellite and remain unaffected by acids or saline. None of the usual circlip grooves, undercuts, shoulders, etc., often found in other flowmeters are present, eliminating bacterial growth-points.

If required, any model of S3 can be fitted with an air detection probe, which automatically sends back a signal to the readout unit when any air or gas is detected and the total count is electronically corrected.

Like all Euromatic Flowmeters, sophisticated electronics enables the S3 to produce greater accuracy at approximately one-half the operating speed of competitive units, contributing to longer bearing life and reliability. A variety of Euromatic Electronic Readout Units can be hooked up to the S3 to indicate flow-rate, flow-total, batch count, etc. Five models of the S3 are available covering flow ranges of 3 to 500/gal/min. with accuracy of 0.1%.

In addition to the S3 Hygienic Flowmeter, Euromatic is now introducing in the U.S. its line of Industrial Turbine and Insertion Flowmeters for liquid and gas applications and three systems of Doppler Flowmeters especially suitable for bulky or heavy fluids ranging from blood plasma to sewage to slurries. Eleven models of Euromatic Electronic Readout Units are also available.

For more information contact: Ebeltex, Inc., 5001 Bissonnet, P.O. Box 758, Bellaire, Texas 77401; 713-666-2350.

•*Right Hand Cleaner* is a new lotion handsoap, from Bonewitz Chemical Services, Inc., with a bacteriostatic agent that provides a powerful cleansing action without skin irritation. The honey-and-almond scented pink lotion lathers quickly and rinses easily in hard to soft water. A built-in emollient prevents skin roughness, even with frequent use. The product is authorized for use under the USDA inspection program.

Available for the hand cleaner is a new large capacity dispenser that's easily operated with one hand. Bonewitz Chemical Services, Inc., of Burlington, Iowa, is a major manufacturer of sanitation equipment and chemicals for food processing industries.

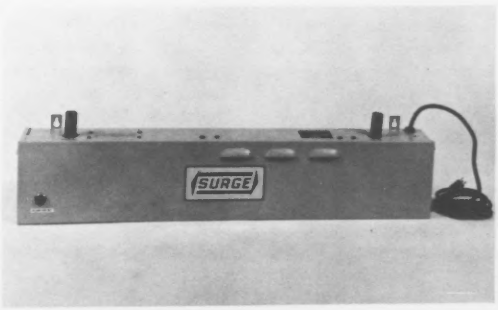
Information on Right Hand Cleaner and the new dispenser can be obtained by contacting: Bonewitz Chemical Services, Inc., P.O. Box 927, Burlington, Iowa 52601, 319-753-2881.

•*Now you can disinfect dairy or home water supplies without chemicals.* The Ultraviolet Sterilizer from Babson Bros. Co., builder of Surge dairy farm equipment, uses short-wave ultraviolet energy.

Short-wave ultraviolet energy in proper doses, has been proven in independent laboratory tests, to destroy up to 99.9 percent of all bacteria and is effective against virus, mold and algae.

The UV Sterilizer does not alter the taste, color, odor or pH of the water and is economical to operate. It will purify 6,000 gallons of water for the cost of one kilowatt per hour -- about a penny per day.

For more information, contact your local Surge dealer or write to: Babson Bros. Co., 2100 S. York Road, Oak Brook, IL 60521.



•*A high production tramp metal detector system* that allows food purveyors to safeguard their products from metal contamination is available from Barkley & Dexter Laboratories, Inc. of Fitchburg, Massachusetts.

The Barkley & Dexter Metalcheck System 30 tramp metal detector is highly sensitive to all ferrous, non-ferrous, and stainless steel metals that might accidentally enter food products before or during processing. Readily separating contaminated product from the good, the conveyorized system typically detects a metal sphere as small as .050'' Dia. (lead buckshot for example) in a 30''W × 2''H aperture.

Designed for high production applications with conveyor speeds from 10' to 200'/min., the Barkley & Dexter Metalcheck System 30 is constructed of stainless steel with solid state elctronics, operates reliably in the process environment (typically damp, 40°F), and withstands hot water washdowns. Units are now in service with many food purveyors, including suppliers to McDonald's, Burger King, and Howard Johnson.

The Barkley & Dexter Metalcheck System 30 tramp metal detector is quoted according to configuration. Literature is available on request.

For more information contact: Barkley & Dexter Laboratories, Inc., Frank McGinn, Vice President Marketing, 50 Frankfort Street, Fitchburg, MA 01420, 617-343-3716.

•*A six-page, full color Bulletin ST-981*, provides complete specifications for all Walker stainless steel silo-type storage tanks.

Tank capacities range from 4,000 to 60,000 gallons. The silo tanks may be installed inside, outside, through-wall or through-roof, with the lower portion of the tank in the room.

The Walker bulletin shows tank cutaway and all construction and insulation features, including safety ladder, refrigerated coldwall detail, standard and special control alcoves, and agitation options.

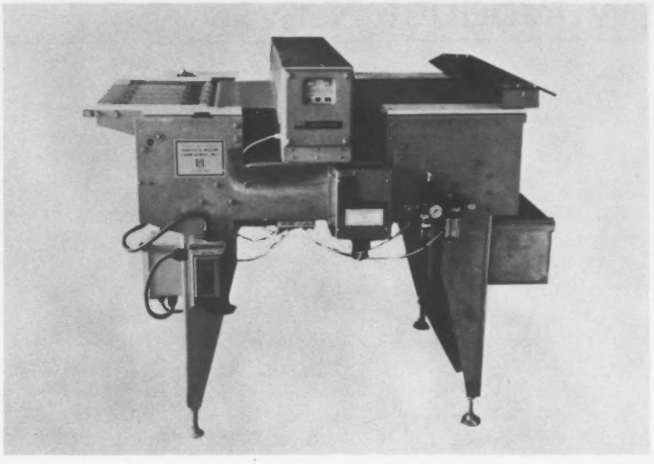
For your free stainless steel silo-type storage tank Bulletin ST-981, contact: Walker Stainless Equipment Co., Holding Tank Division, Elroy, Wisconsin 53929. 608-562-3151 (New Lisbon, Wisconsin headquarters).

•*Gaulin has announced that their new Micro-Gap™ Homogenizing Valve* is now available for field-retrofitting to certian Gaulin homogenizer models.

The high-efficiency Micro-Gap Valve enables processing of milk and other dairy products at up to 50% lower operating pressures and serves to dramatically reduce machine drive-end loading and energy requirements.

The Micro-Gap Valve assembly, supplied as standard on all Gaulin Model 803/804 Homogenizers, can now be easily field-installed to all existing Gaulin MC Model Homogenizers which were factory-equipped with Hydraulic Valve Actuation (HVA) controls. Gaulin states that, at this time, other homogenizer models cannot be retrofitted with the advanced-design valve.

For more information contact: Allen A. Andrews, Manager, Marketing Communications, Gaulin Corporation, Garden Street, Everett, MA 617-387-9300.



•*A free brochure* is available from DON GILBERT INDUSTRIES describing a 15 minute audio/visual on Industrial Insectecology. The film shows how insects are attracted to an industrial plant, how they get inside, and it tells you how to eliminate the problem.

The audio/visual is based on the Gilbert booklet, INDUSTRIAL INSECTECOLOGY. Several leading universities as well as over 400 government environmental and health departments use this audio/visual and/or booklet as part of their training curricula.

For more information contact: Dave Gilbert, Don Gilbert Industries, P.O. Box 2188, Jonesboro, AR 72401. Toll free 800-643-0400.

•*A new, twelve-page industrial and laboratory microwave heating products catalog* has been published by Cober Electronics, Inc., Stamford, Connecticut.

Divided into five sections, Catalog MWA-6-82 covers microwave power sources, instrumentation and metering, 2450 MHz waveguide components, 915 MHz waveguide components, and laboratory systems. Illustrations and descriptive text are provided for each product, and options and basic specifications are also listed. Cober microwave heating products may be used with Cober industrial microwave systems or their equivalents.

For a free copy, write: MWA-6-82, Cober Electronics, Inc., 102 Hamilton Avenue, P.O. Box 10032, Stamford, CT 06902.

•*Now there is a more meaningful FICA-Flying Insect Control Analysis*. And it's offered by Don Gilbert Industries to help industrial plants determine if they have a "hidden insect problem".

A noted entomologist working for a major food processing plant placed a Gilbert 606 light trap in an area he thought was free of insects. Four hours later he found over 100 dead insects in the catch tray.

Gilbert's FICA is an ideal way to discover possible insect problems in food processing plants, beverage plants, meat processing plants, dairy plants, hospitals, poultry processing plants, and others.

For more information contact: Dave Gilbert, Don Gilbert Industries, P.O. Box 2188, Jonesboro, AR 72401. Toll free 800-643-0400.

•*''ON-SITE'' Chlorine generator* produces sodium hypochlorite at 10¢/gallon.

Aquachlor, Inc. offers a New Patented "on-site" Chlorine generation system, designed to provide food processors with exact quantities and concentration of chlorine, as required by their sanitation needs.

The Aquachlor system eliminates the need of transportation, handling and storing of chlorine. The inventory is stored in the form of salt or fresh, ready-to-use liquid chlorine.

This automatic system requires salt, water and electricity to generate sodium hypochlorite on a continuous but measured basis. Depending on model, the unit can produce 8.4 lbs, 5.6 lbs or 2.4 lbs of sodium hypochlorite per day.

Applications include; dairies, meat processors, poultry processors, egg processors, seafood plants, bottling plants, canneries, bakeries, H & R sanitation, etc....

Further information on the AQUACHLOR System is available from: Forum International Corp., P.O. Box 825, Sandy, Utah 84091.

•*LaMotte Chemical's new Model DA-DS Direct-Reading Dissolved Solids Meter* is designed for on-site measurement of Total Dissolved Solids (TDS) levels in natural or treated waters. The battery-powered meter features a dual scale for simultaneous read-out in milligrams per liter (mg/L) TDS and micromhos/cm. Conductivity. Easy-to-operate and highly accurate, the Model DA-DS may be used by quality control engineers or non-technical maintenance personnel to check TDS levels in process waters, treatment baths, boiler and cooling waters, irrigation waters, drinking water supplies, waste water effluents, and other aqueous solutions.

The Model DA-DS is furnished with a remote probe on a 30" lead. The probe is simply dipped into the water sample to be tested, and the probe's carbon elements never foul or need replatinizing. The solid-state electronics and impact-resistant plastic housing of the Model DA-DS provide maximum durability for years of reliable operation. The meter is furnished in a foam-lined, compact carrying case and may be operated without removal from the case or as an independent, handheld unit.

The Model DA-DS Direct-Reading Dissolved Solids Meter offers laboratory precision in a rugged field instrument. For more information contact: LaMotte Chemical Products Company, P.O. Box 329, Chestertown, Maryland 21620, 301-778-3100.

•*Racal Airstream, Inc.*, announces the publication of a new sales leaflet describing the company's complete line of powered air purifying personal protection systems, the Powered Air Purifying Products sheet. The systems provide portable, wearable combinations of Airstream head, eye, face and respiratory protection for a variety of applications, including industry and agriculture.

The two-page, two-color sheet features photos and text on Airstream Helmet and Crown Systems. Dust, mists, and, in some versions, fumes, are filtered by the filtration systems which is incorporated in the helmet, or in the airflow module worn at the waist. Clean air passes over the top of the wearer's head and down over his face as a cooling, pleasant airstream.

The safety helmet of Airstream Helmet Systems guards against head injuries. The powered air purifying Crown System offers Airstream high efficiency protection without the hardhat. The clear, hinged faceshield protects worker's eyes and faces in both Helmet and Crown Systems.

For copies of the new Powered Air Purifying Products sheet, contact: Racal Airstream, Inc., 7309A Grove Road, Frederick, Maryland 21701, 301-695-8200.

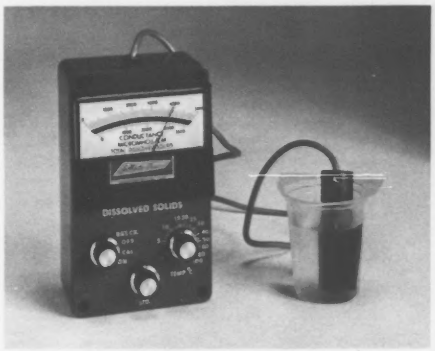
•*A complete line of air doors*, specially designed for use over cooler and freezer room doors to prevent the escape of cold air, is now offered for immediate delivery from Mars Air Doors. By providing an invisible curtain of high velocity air across the door opening, Mars Air Doors effectively seal sub-zero temperature areas, process rooms, laboratories and food preparation centers. Mars Air Doors cut costs by reducing the loss of cold air in refrigerated spaces and preventing the entrance of warm, moist air, thus lessening the frequency of expensive defrosting and maintenance due to overloading and break down of refrigeration systems.

A recent major survey conducted by the Refrigerated Research Foundation and the University of Illinois proved that air doors can reduce the rate of heat and moisture flow through an open refrigeration door up to 80%.

The Mars Air Doors are effective on openings up to fourteen feet high and are available in sizes and increments to fit any normal or special opening. They can be mounted easily with no remodeling or special tools needed. To provide precision adjustments, the Mars Air Doors are engineered with air velocity and directional controls.

In addition to energy savings, the Mars Air Doors are also used as an effective barrier to dust, dirt and flying insects wherever food and beverages are processed and/or served. Meeting NSF standard 37 and USDA requirements, the Mars Air Doors are ideal for installation in cold storage plants, canneries, meat packing and frozen food plants, dairies and all similar food processing applications.

For more information contact: Mars Air Doors, 114 Sheldon St., El Segundo, Ca. 90245, 213-772-3321.



•*Representative and correct sampling* is an essential requirement to obtain valid results in laboratory testing.

Tests to determine safety, quality, content and compliance with official requirements are of little or no value if the sampling is done without care. Sampling is done with care if you have available different and appropriate sampling devices for different products and if the personnel involved in sampling are well trained.

PBI's years of experiences in servicing applied microbiology, agriculture, education and industry give the Company excellent insight into the needs of laboratories and associations involved in extensive testing programs. Combined with the knowledge of several highly qualified health inspectors and chemists, who acted as consultants, a complete set of simple, practical, economical and useful sampling devices have been produced and these are presented in this booklet.

The scope and the aim of this 42 page booklet is to supply technicians in the food, feed, dairy, agricultural, pharmaceutical, cosmetic and chemical fields with a wide range of effective apparatus to improve their sampling methods.

The booklet is now available from "PBI INTERNATIONAL",Via Novara 89, 20153 Milan, Italy.

•*A line of ceiling and floor-mounted hangers* has been introduced by L. C. Thomsen & Sons, Inc. Made of 304 stainless, the hangers will accommodate pipes from 1-1/2" through 4" in diameter.

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Annual Meeting

INTERNATIONAL ASSOCIATION OF MILK,
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Abstracts of Papers Presented at the Sixty-Ninth Annual Meeting of IAMFES

Louisville, Kentucky, August 22-25, 1982

Abstracts of most papers given at the 69th Annual Meeting of IAMFES appear on this and the following pages. The complete text of many of these papers will appear in future issues of the *Journal of Food Protection* or *Dairy and Food Sanitation*.

CONTRIBUTED PAPERS

Microbiology of Shawarma and Possible Foodborne Hazards. M. Ayaz, F. Othman, T. Bahareth and A. Al-Sogair. *Food Science and Nutrition Section, Regional Agriculture and Water Research Center, Ministry of Agriculture and Water, P.O. Box 17285, Riyadh, Saudi Arabia.*

Shawarma is a popular meat sandwich served in various fast-food restaurants in Middle East Countries. Various public health authorities have expressed great concern about the microbiological quality of shawarma and its possible foodborne illness hazards. A total of 98 shawarma (cooked meat) samples were aseptically collected from various restaurants in Riyadh, Saudi Arabia. These samples were examined by standard procedures for determination of the aerobic plate count (APC), and counts of *Clostridium perfringens, Staphylococcus aureus*, coliforms, and detection of salmonellae and shigellae. The APC count ranged from 10^1 to 10^7/g, with 77.5% of the samples having more than 10^4/g. The counts for *C. perfringens, S. aureus* and coliforms ranged from <10 to 10^3, <10 to 10^3 and <10 to 10^6/g, respectively. Eleven percent of the shawarma samples were positive for salmonellae. No shigella was isolated from any of the samples. Results of this investigation indicate that foodborne pathogens could survive the cooking process of shawarma and may constitute potential public health hazards.

Microflora of Raw Milk for Cheese Manufacture. Edward B. Aylward, Joseph O'Leary and Bruce E. Langlois. *University of Kentucky, College of Agriculture, 413 Agricultural Sciences South, Lexington, Kentucky 40546.*

Psychrotrophic microorganisms are ubiquitous in dairy environments. The spoilage microflora of refrigerated raw milk consists mainly of proteolytic or lipolytic psychrotrophic microorganisms. The proteolytic enzymes of psychrotrophic bacteria can destroy as much as 14% of the protein available in milk for cheese manufacture. Action of these enzymes on casein makes control of psychrotrophs particularly important in raw milk for cheese manufacture. Proteolytic gram-negative microorganisms often account for more than half of the psychrotrophic flora of raw milks. The psychrotrophic population associated with a detectable change in milk protein has been reported to range from 6.0000 to 7.3010 ($\log_{10}$ CFU/ml). In this study, raw milk samples were collected from milk storage silos of cheese factories manufacturing stirred curd and Cheddar cheeses. Psychrotrophic isolates were collected and identified. Mean bacterial counts of raw milk samples were as follows: total bacterial count 6.9907 ($\log_{10}$ CFU/ml), psychrotrophic bacterial count 7.0623, coliform count 5.3588, proteolytic bacterial count 4.5721, and lipolytic bacterial count 4.8779. The bacterial counts ranged as follows: total, 5.8976 to 7.8633; psychrotrophic, 5.9731 to 7.9494; coliform, 4.1761 to 7.2553; proteolytic, 2.9031 to 6.0000; and lipolytic 3.2788 to 6.5441. Cheese yield data was also obtained during the course of this study.

Recovery of *Campylobacter jejuni/coli* from Inoculated Foods by Selected Enrichment. Michael P. Doyle. *The Food Research Institute, University of Wisconsin-Madison, 1925 Willow Drive, Madison, Wisconsin 53706.*

A direct enrichment procedure was developed to selectively recover small numbers of *Campylobacter jejuni, C. coli* and nalidixic acid-resistant thermophilic *Campylobacter* from foods. The procedure includes an enrichment medium comprised of Brucella broth, 7% lysed horse blood, 0.3% sodium succinate, 0.01% cysteine hydrochloride, vancomycin (15 μg/ml), trimethoprim (5 μg/ml), polymyxin B (20 IU/ml) and cycloheximide (50 μg/ml) that is inoculated with 10 or 25 g of food and is incubated with agitation under microaerophilic conditions at 42°C for 16-18 h. Following incubation the medium is plated directly onto Campy-BAP agar plates, and resulting colonies that resemble *Campylobacter* are identified by conventional tests. Foods evaluated included raw milk, hamburger and chicken skin which had aerobic plate counts of 10^5-10^9 bacteria per gram. The procedure was effective in recovering as few as 0.1 cell of *Campylobacter* per gram of food. Of the 50 isolates of *Campylobacter* evaluated, all were recovered from raw milk and hamburger at the 1-4 cells/g level and 41 and 40 isolates were recovered from the hamburger and milk, respectively, at the 0.1-0.4 cell/g level. The enrichment was least effective for recovering campylobacters from chicken skin as 7 and 26 of 50 isolates were not recovered at the 1-4 and 0.1-0.4 cell/g levels, respectively. This new procedure is more rapid, direct and/or effective than other enrichment or direct plating procedures for recovering small numbers of campylobacters from foods.

Milky Spoilage and Reduced Shelf Life of Commercially Prepared Hot Dog Wieners. F. A. Draughon and N. G. Nisbett. *Department of Food Technology and Science, The University of Tennessee, P.O. Box 1071, Knoxville, Tennessee 37901-1071.*

Commercially prepared wieners often have shelf lives of 30 to 60 d. A type of spoilage termed "milky spoilage" due to white discoloration of the wiener and an accumulation of milky-colored liquid in the package was reported by a commercial producer in hot dog wieners held 30 d or less at 4°C. Experiments were undertaken to determine the major type(s) of bacteria associated with the spoilage problem, and to isolate the steps in production of the wieners which were contributing the spoilage microorganisms. Samples were taken for microbiological analysis from the meat emulsion, cooling brine, peeler and packaging equipment. Total counts were made and microorganisms were identified. The emulsion brine had less than 10 bacteria per ml. Before the smokehouse, the meat emulsion (10^6 bacteria/g) had a large variety of bacteria which included *Streptococcus* (42%), *Lactobacillus* (27%), *Cornyebacterium* (2%), *Enterobacteriaceae, Acinetobacter, Pediococcus* and *Micrococcus*. The cooling brine included all the above and yeast (14%). Counts were reduced to 10^3 per gram after smokehouse treatment (pH = 6.3) and included *Streptococcus* (50%), *Lactobacillus* and *Pediococcus*. Counts from the peelers were 10^6 per cm^2, and were also predominantly lactic in character. Shelf-life was increased to 60+ d without milky spoilage by strict sanitation of equipment including peelers and by moving product promptly from the processing line to refrigerated storage.

Survival of some Starter Bacteria Used in Hard Cheese Manufacture in the Presence of Hydrogen Peroxide. S. M. El-Gendy, H. Abdel-Galil, T. Nassib and N. El-Hoda Hanafy. *Dairy Department, Faculty of Agriculture, Assiut University, Assiut, Egypt.*

Hydrogen peroxide (H_2O_2) at concentrations of 0.01, 0.02, 0.03 and 0.04% was used to study its effect on activity of *Streptococcus lactis, S. thermophilus, Lactobacillus bulgaricus, L. helveticus* and *Propionibacterium shermanii* (which is used as a starter in the manufacture of Swiss cheese and other cheese types). *S. lactis, S. thermophilus* and *L. bulgaricus* in a ratio of 0.1, 0.2 and 0.4% were still tolerant to H_2O_2 at a concentration as high as 0.02%. While *L. helveticus* was tolerant to 0.02% H_2O_2, only a small percentage survived. *P. shermanii* was not affected in litmus milk tubes containing 0.01 and 0.02% H_2O_2 during the incubation period even when it was present in small numbers.

Use of a Micro-Computer for Improving Foodservice Sanitation Programs in Small Communities. Homer C. Emery. *Alamo Heights City Engineers Office, Alamo Heights, Texas (mailing address: 665-B Infantry Post, Fort Sam Houston, TX 78234).*

Numerous administrative problems are faced by the small community in managing an effective food sanitation program. This paper reports the experience of a small urban community (Alamo Heights, Texas, population 7,000) in using a micro-computer to improve the administration of its foodservice sanitation program. A Radio Shack TRS-80 Model III computer has been successfully used by Alamo Heights for maintaining an establishment profile listing, creating an historical inspection file, maintaining manager training data and generating formal inspection reports. Unable to use large sophisticated data processing systems such as FDA's SPIF (Sanitation Programs Information Formulator), smaller communities can improve their present programs with microcomputers. The most useful feature of the unit being used in Alamo Heights is the ability to generate formal inspection reports in letter format. This has been accomplished with a simple word processing program that enables a tailored inspection report to be written and typed within 2-3 min. The formal report explains major problems noted, public health reasons for compliance and recommendations for corrective actions. The micro-computer has also been used in other environmental health programs, including a water sampling program and day care center inspections and training.

Impact of a Certification Training Program on Managerial Attitudes Toward Foodservice Sanitation. Homer C. Emery and Florence P. Emery. *U.S. Army, Academy of Health Science, 665-B Infantry Post; Fort Sam Houston, Texas 78234.*

Evaluations of certification training programs have previously been reported in the literature. Most evaluations reported have focused on the knowledge of foodservice sanitation of training participants. An important training aspect that has somewhat been neglected is the impact that such training programs has had on managerial attitudes toward food sanitation. Managerial attitudes can be a critical factor in implementation of an effective foodservice sanitation program. This paper reports a study that was conducted to evaluate the impact that certification training programs have on managerial attitudes toward foodservice sanitation. An error-choice test instrument was designed to collect data concerning attitudes toward personal hygiene, foodhandling procedures, equipment maintenance and cleaning, personnel training, foodservice safety, and public health officials. Results indicate that certification programs can influence managerial attitudes. Instructional systems design techniques (ISD) improved training outcomes. It was also noted that an individual's knowledge of foodservice sanitation did not highly correlate to possitive attitudes toward foodservice sanitation. It was found that instructional design was a major factor in developing positive managerial attitudes.

Training: Creative Ways To Make It Work For You. Robert B. Gravani. *Department of Food Science, 8A Stocking Hall, Cornell University, Ithaca, New York 14853.*

Training and continuing education programs, seminars and lectures are all part of our daily quest for knowledge. With the increase in the number of these programs, it is important that practical, meaningful and worthwhile sessions be planned. If properly organized and implemented, cooperative programs that involve the food industry, regulatory agencies and the academic community can achieve success beyond all expectations. Training programs such as the following can maximize time, manpower and operating budgets: industry training sessions, self inspection programs, employee certification, total quality control assurance programs, consumer hot lines, merit awards, newsletters and frequent violators training programs. Innovative teaching techniques using slides, video tapes, interactive video, management games and situational problems are all ways to make these programs practical and informative. Demonstrations and case studies of these new approaches of training will be featured.

Incidence of *Yersinia enterocolitica* in Fluid Milk in New York State. Robert B. Gravani and Patricia G. Stewart. *Department of Food Science, 8A Stocking Hall, Cornell University, Ithaca, New York 14853.*

Forty-eight pasteurized milk samples collected from processing plants in New York State were analyzed for the presence of *Yersinia enterocolitica*. The samples were enriched in Butterfield's phosphate buffer and then in both selenite cysteine broth and modified Rappaport broth. Samples from these enrichment broths were treated with and without KOH and streaked onto four types of selective media. The media included MacConkey with Tween 80, desoxycholate citrate, bismuth sulfite and lysine-sucrose-urea agars. Colonies showing characteristics of *Yersinia* were grown on triple-sugar-iron agar and then on urea agar. Tentative identification of *Y. enterocolitica* was made using the API Analytab system. Four pasteurized milk samples were positive for *Y. enterocolitica*.

Obtaining Approval For Use of A Dairy Food Plant Wastewater Pretreatment By-Product In Animal Feeds - A Case Study. D. R. Landes, W. A. Bough and D. G. Rollins. *Special Products, Inc., P.O. Box 1837 S.S.S., Springfield, Missouri 65805.*

Special Products, Inc. (SPI) is in the business of food manufacturing plant waste-water pretreatment, resource recovery and by-product use. Resource recovery and by-product use have been simplified to some extent because we are dealing with a waste-water not contaminated with industrial or domestic waste. In addition, the waste-water treatment process used does not use chemicals that will prohibit use of the by-products produced in animal feeds. With this base to work from, SPI thoroughly defined the dairy foods manufacturing and waste-water pretreatment processes and potential feed safety problems were isolated and investigated. Included in these investigations were: (*a*) determination of pesticide residues, cleaning and sanitizing agents, and heavy metals that could possibly be concentrated in the by-product; (*b*) determination of the microbiological safety of the product and (*c*) determination of the nutritional value of the product. By presentation of the information obtained from these investigations, SPI was able to obtain an informal opinion of acceptability from the FDA and a listing in the official publication of the Association of American Feed Control Officials for its dairy foods by-product collected from dairy food plant waste-water pretreatment systems.

Effect of Mastitis on Cheese Yield, Milk Production, Milk Composition and Starter Culture Activity. B. E. Leavitt, J. O'Leary, R. J. Harmon and C. L. Hicks. *Food Science Program, Department of Animal Science, University of Kentucky, Lexington, Kentucky 40546.*

In this study, the relationships of bovine mastitis to cheese yield, milk production, milk composition and inhibition of starter culture activity were examined. Individual milk samples were collected from 10 infected Holstein and Jersey cows, as determined by bacteriological examination, for a period of 3 d. Milk was analyzed for somatic cell count, pH, milk solids, milkfat, total protein, casein, whey protein and milk production. A total of 132 vats of cheese were produced using a direct acid set technique which allowed simultaneous processing of four vats (7 kg each) of milk. Cheese yield, fat loss in whey and inhibition of starter culture activity were determined for individual cows. The cows were then treated to resolve the infection and the aforementioned determinations repeated to serve as controls. Resolution of mastitis resulted in decreased somatic cell counts from 2.9×10^5/ml to 2.0×10^5/ml. Increased cheese yield (+4.5%) was accompanied by increased milk solids (+3.5%), milkfat (+10.3%), total protein (+5.7%) and casein (+4.9%); milk production was decreased after treatment but this decrease was probably due to the later stage of lactation. These results support evidence from an earlier experiment in which infusion with *Escherichia coli* endotoxin had similar effects on milk and cheese properties.

Survey of Fresh Market Turkey for *Campylobacter jejuni*. Joseph Lovett, Jan M. Hunt and David W. Francis. *Division of Microbiology, Food and Drug Administration, 1090 Tusculum Ave., Cincinnati, Ohio 45226.*

We have previously reported the incidence of *Campylobacter jejuni* in fresh whole market chicken to be approximately 50%. This was the result of culturing washings of whole carcasses in a selective medium. This same procedure was used to examine fresh turkey parts during the period of November, 1980 to January, 1981. Turkey parts, representing the products of two national distributors and one local distributor, were purchased from six local supermarkets. Fifty-three samples consisting of cutlets, breasts, drumsticks, giblets, necks-backs, thighs and wings were washed in 250 ml of nutrient broth and the washings centrifuged for 25 min at 16,300 × *g*. The supernatant fluid was discarded and the pellet resuspended in brucella broth containing vancomycin, trimethoprim and polymyxin B. This enrichment culture was incubated for 48 h at 37°C under an atmosphere of 5% O_2, 10% CO_2 and 85% N. At 24 and 48 h, 5 ml of culture was filtered through a 0.65-μm filter, and the filtrate streaked onto Skirrow's agar. Plates were incubated for 48 h at 37°C under modified atmosphere before typical colonies were picked for verification by physical and biochemical means. Only one sample of 53 was confirmed as positive for *C. jejuni*. This is surprising since previous investigators frequently found turkey cecal contents positive for the organism.

Inactivation of Spoilage Organisms by N^{α}-Palmotyl-L-Lysyl-L-Lysine Ethyl Ester Dihydrochloride. J. B. Lutey, P. C. Vasavada and T. Richardson. *Animal and Food Science Department, University Wisconsin-River Falls, River Falls, Wisconsin 54022 and Food Science Department, University Wisconsin, Madison, Wisconsin 53076.*

The effect of an antimicrobial acyldipeptide N^{α}-palmotyl-L-lysyl-L-lysine ethyl ester dihydrochloride (R-1) on growth of several spoilage organisms was studied. Preliminary experiments using disc assay procedures indicated that as little as 5 μg of R-1/ml inhibited cultures of *Escherichia coli, Enterobacter aerogenes, Alcaligenes viscolactis, Pseudomonas fluorescens, Pseudomonas fragi* and *Bacillus subtilis*. R-1 concentrations of 10 and 20 μg/ml gave larger zones of inhibition. The antibacterial activity was further tested by growing the cultures in nutrient broth containing 20 μg/ml R-1. The results indicated 10- to 10,000-fold reductions in counts after 24 h of incubation at 32°C (21°C for *Pseudomonas* spp.). R-1 was most effective against *A. visocolactis* and *E. coli* and least effective against *B. subtilis*. When cream or milk solids were added to the test medium, no substantial inactivation of cultures was noticed. This was appar-

ently due to binding of R-1 with cream and milk solids, thereby limiting its antibacterial effect in situ. Thus there seemed to be a limited potential of R-1 in controlling spoilage bacteria in dairy products such as cottage cheese.

Effect of Preservatives and Selective Agents on Heat Injured *Bacillus cereus* Spores. Andrea Maka and Russell S. Flowers. *Silliker Laboratories, Chicago Heights, Illinois and I.I.T., Chicago, Illinois.*

Bacillus cereus spores were injured by heat treatment at 90 and 95°C. Injury was manifested as an increased sensitivity to salt. The effect of food preservatives (diacetate; benzoate; propionate; methyl-, ethyl-, and propyl-paraben; BHA; BHT; sorbate and nitrite) and selective agents (lauryl sulfate and polymyxin) on injured spores was examined by incorporating these agents into Tryptone Glucose Yeast Extract Agar (TGY) at concentrations which did not affect uninjured spores. Enumeration of uninjured spores in the presence of the preservatives and selective agents was similar to that on TGY. Recovery of injured spores was reduced by concentrations of lauryl sulfate and polymyxin, which did not affect recovery of uninjured spores. The effect of the preservatives varied with strain of *B. cereus*. However, with few exceptions, the recovery of heat-injured spores in the presence of the preservatives was similar to that on TGY. Recovery of the less heat-resistant strains was somewhat reduced by the parabens (pH 7.0) and diacetate (pH 5.7).

Survival of *Salmonella* in Egg Liquor. R. W. A. W. Mulder and M. C. van der Hulst. *Spelderholt Institute for Poultry Research, 7361 DA Beekbergen, The Netherlands.*

Eggs and egg-products are often contaminated with *Salmonella*. Egg liquor also may become contaminated, but due to the presence of the alcohol, a decontamination effect occurs. In the literature no data are available on the effect of the alcohol percentage of egg liquor on survival of salmonellae. In this study, two *Salmonella* strains, *heidelberg* and *worthington*, were inoculated in two concentrations, 1,000 and 100,000 cells per gram, into freshly prepared egg liquor. The alcohol percentages ranged from 0 to 18% by volume. The products were stored at +22°C. After 74 d of storage no colony forming unit of *Salmonella* was found in the product containing 3.5% alcohol to which 100,000 cfu's per gram had been added. The 14% alcohol product proved *Salmonella*-negative after 18 d of storage. Five days after preparation of the egg liquor containing 18% alcohol no *Salmonella*-cfu could be detected in this product.

Decontamination of Sludge from Poultry Slaughter Houses Obtained by Flocculation and Flotation. R. W. A. W. Mulder, N. M. Bolder, M. C. van der Hulst and J. L. Werler. *Spelderholt Institute for Poultry Research, 7361 DA Beekbergen, The Netherlands.*

Flocculation of waste-water followed by flotation of the sludge is practiced by 7 Dutch poultry slaughterhouses. As the final product is rich in protein and fat, it is suitable as in ingredient of animal diets. The sludge also harbors many spoilage and pathogenic bacteria and viruses. Before the product can be incorporated in animal diets, data on the microbiological quality and on the effect of several decontamination treatments on the microflora should be known. To determine the lethality of heat and radiation processes this research was carried out. Experiments were performed with thermal-death-time pouches to calculate the optimal time-temperature relation, i.e. time-radiation dose relation, to obtain sound products from the point of view of public health.

Nitrate Reduction by *Paracoccus denitrifican* Isolated from Cured Meat. Paul Muneta and R. Jasman. *Food Research Center, University of Idaho, Moscow, Idaho 83843.*

A bacterium isolated from corned beef and tentatively identified as *Paracoccus denitrificans* was tested for its nitrate reducing ability at 30 and 10°C under aerobic, anaerobic and still cultures in a synthetic medium containing 1.000 g of KNO_3/L. At 30°C under all culture conditions, maximum NO_2^-N (12.2-12.6 mg/100 ml) was found after 1 d of incubation. The NO_2^-N remained at high levels over the 9 d of the experiment. Under aerobic conditions, a high of 73×10^7 bacteria/ml was found at day 1, but decreased by 500 by day 3. In still cultures, the bacteria count was 0 by day 6. The anaerobic count was 14×10^7 at day 1 and essentially 0 by day 3. The culture grown at 10°C under aerobic conditions produced <0.1 mg of NO_2^-N/100 ml and the bacteria count remained at 11×10^9/ml over 22 d. At day 3, the NO_3^- decreased by 60% with no change in the NO_2^-N. Under anaerobic conditions the NO_2^-N reached similar levels as the aerobic, 30°C culture. The bacteria died slowly after day 3 and 1-2 colonies/ml were observed after 22 d. The still cultures exhibited behavior similar to both aerobic and anaerobic cultures. High nitrite was present after 3 d, but bacteria counts of ca. 60×10^6/ml were found after 22 d. The bacteria numbers can be explained as an interaction between NO_2^-N content and pH.

Nitrite Degradation and Stabilization in Frozen and Aqueous Solutions. Paul Muneta, R. Jasman and L. Butler. *Food Research Center, University of Idaho, Moscow, Idaho 83843.*

Problems with the instability of nitrite in the frozen state in microbial or food extracts were examined. Nitrite solutions containing 14.0-15.0 ppm NO_2N at pH 5.7, 6.2 and 6.8 were treated in the following ways: (*a*) 1 ml of chloroform/100 ml (*b*) KOH to pH 11.0 and (*c*) untreated controls. Samples were frozen at −20°C and the KOH- and chloroform-treated samples were stored at 4-5°C in a refrigerator. Nitrite with or without chloroform lost up to 55% of the original NO_2N after 15 d of frozen storage. The lower the pH, the greater the loss of nitrite. A pH of 6.8 resulted in a loss of 13% of the original NO_2N after 8 d of frozen storage. Some of the lost NO_2N was converted to NO_3N during the frozen storage. The nitrite solutions adjusted to pH 11.0 did not change in concentration. Nitrite solutions treated with chloroform or KOH to pH 11.0 and stored at 4-5°C in a liquid state exhibited no change in nitrite content.

Isolation of Salmonellae from Lymph Nodes, Spleens and Feces of Animals Slaughtered at the Riyadh Public Abattoir. Nassim H. Nabbut and Habeeb M. Al-Nakhli. *Animal Production and Health Section, Regional Agriculture and Water Research Center, Ministry of Agriculture and Water, P.O. Box 17285, Riyadh, Saudi Arabia.*

During the period July, 1980 to June, 1981, 618 samples consisting of mesenteric lymph nodes, spleens and feces, collected from 280 animals slaughtered at Riyadh Public Abattoir, were examined for salmonellae. Salmonellae were recovered from 14.65% of 307 lymph node samples, 4.68% of 192 fecal samples ples and from 0.84% of 119 spleen samples. The most common serotype was *Salmonella typhimurium* followed by *S. bovis-morbificans, S. newport, S. reading* and *S. braenderup*. Other less common serotypes were also encountered. Lymph nodes and feces from slaughtered animals may be a source for the contamination of the red meat and other edible parts of the carcass with salmonellae.

Factors Contributing to Foodborne Disease in Canada. Ewen C. D. Todd. *Bureau of Microbial Hazards, Health Protection Branch, Health and Welfare Canada, Tunney's Pasture, Ottawa, Ontario, K1A 0L2, Canada.*

Collection of foodborne disease data over the years has accumulated information not only on etiological agents, foods implicated, and places of mishandling, but also on factors that contribute to incidents. The main ones recorded for Canada for the years 1973 to 1977 are similar to those for the United States, 1973-76 (Bryan, 1978, J. Food Prot. 41, 816) and England and Wales, 1970-79 (Roberts, 1982, Comm. Dis. Rep. 82/02, Public Health Laboratory Service), i.e., factors affecting microbial growth, those affecting microbial and parasitic survival and those affecting microbial contamination. The single most important factor was inadequate cooling of food, which was associated with 33% of incidents (47% in the United States and 72% in England and Wales). The main reasons for inadequate cooling were food left at room temperature, refrigerator at higher than accepted temperatures, food left in cars and food stored in bulk quantities. Faulty processing (27%) was the next most important factor; this included many diverse problems, such as insufficient heating, corrosion of can linings, extraneous matter in cans, improper rinsing of containers and fermentation problems. Other factors included post-process leakage, infected workers and contaminated raw ingredients. Knowledge of these factors help develop programs to prevent future outbreak situations.

INVITED PAPERS

Microwave Cooking: An Overview. Ruth E. Baldwin. *University of Missouri-Columbia, Columbia, Missouri 65211.*

Microwave ovens can be expected to continue to be used as a method of heating and reheating foods, and versatility will improve as needs become evident. Microwaves cause heating when polar materials absorb them, but confer no special qualities on the food. Lethal effects on microorganism and trichinae are due to heat. Speed and evenness of heating is influenced by composition and mass of food as well as features of the appliance. Although there is variability depending on these factors, microwave ovens have considerable potential for energy saving. Foods cooked by microwaves are as nutritious and in some instances more nutritious than those cooked conventionally. Safety to the users of microwave ovens is assured by strict Government regulations.

Antibiotic Detection Programs. Sidney E. Barnard. *The Pennsylvania State University, 9 Borland Laboratory, University Park, Pennsylvania 16802.*

A variety of testing and penalty programs are used by the dairy industry to assure Americans that milk and dairy products which they consume are free of antibiotics and growth inhibitors. Examples of testing and penalty programs as used by state regulatory agencies, cooperatives and milk processors are outlined. The *Bacillus stearothermophilus* disc assay is used to test raw and processed milk for regulatory purposes. However, the Charm and Delvo tests are commonly used for screening samples from truck loads. Dairy farmers are encouraged to have their own Delvo or other test to check milk from treated cows. A list of preventive measures is provided. At least three groups are working on quick tests which may be used on farms. The dairy industry is spending more than $20 million each year to collect and test samples and discard milk from treated cows. As a result, the reputation of the dairy industry is protected. Milk and dairy products available to consumers are free of antibiotics and growth inhibitors.

Epidemiology of Milkborne Diseases in the United States. Frank L. Bryan. *Center for Professional Development and Training, Centers for Disease Control, Atlanta, Georgia 30333.*

Following the almost universal practice of pasteurization of milk in the United States, milkborne diseases became extremely rare. In other countries, where such practices are uncommon, however, raw milk is an important vehicle of foodborne disease. As eating habits change and public health preventive action becomes lax, milkborne outbreaks of salmonellosis and campylobacteriosis are becoming more prevalent in the U.S. A review of secular trends of milkborne disease is followed by a discussion of outbreaks caused by raw and certified raw milk and milk products that have occurred in the United States and other countries in the last decade.

Role of pH in Application of Cleaners and Sanitizers. James V. Chambers and Frederick J. Babel. *Department of Animal Sciences, Smith Hall, Purdue University, West Lafayette, Indiana 47907.*

The phenomena of food contact surface soiling and microbial attachment involve physiochemical interactions which can be greatly influenced by the pH of the aqueous environment. Likewise, the essential cleaning and sanitizing of the food contact surface depends on these same phenomena. This paper focuses on the basic mechanisms influenced by pH which are essential to removal of soil materials from contact surfaces and subsequent sanitizing efforts. Specifically, the factors of ionic concentration, association- dissociation constants (pKa), surface interactions involving hydrophilic and hydrophobic behavior and oxidation reactions are discussed.

Impact of Reductions in State Regulatory Budgets and FDA Contract Monies. William Y. Cobb. *Food and Drug Administration, Office of the Executive Director of Regional Operations, Rockville, Maryland.*

Effect of current budgetary restraints on eight state regulatory programs will be investigated. They include: (*a*) personnel, (*b*) changes in laws and regulations and (*c*) program priorities. Recent federal rescissions will be discussed with emphasis on the restructuring of FDA contract activities with state regulatory agencies.

Safety Aspects of Feeding Animal Waste to Dairy Cattle. J. P. Fontenot. *Department of Animal Science, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.*

Animal wastes have nutritional value, especially for ruminants. It appears that poultry wastes have the highest nutritional value, followed by swine waste and cattle waste. The nutritional value of cattle waste will be higher from animals fed high concentrate rations than from those fed high roughage rations. The level of waste fed will depend somewhat on price of the waste relative to the price of other ingredients and the level of production of the cattle. The waste can be rendered free of pathogenic organisms by heat treatment or a combination of chemical and heat treatment. Deep stacking and ensiling appear to be effective also in diminishing the risk of pathogens. The only documented harmful effect on animal health from feeding of animal waste has been copper toxicity in sheep fed broiler litter containing high levels of copper. It does not appear that this would be a problem in cattle which are not as sensitive to high copper levels. Wastes from animals not fed medicinal drugs can be fed safely to any kind of animal, including producing dairy cows. Wastes from animals fed medicinal drugs should not be fed to dairy cows in production and should be withdrawn from the rations of meat animals 15 d before slaughter.

Major Concepts in Institutional Feeding. Richard W. Gillespie. *U.S. Food and Drug Administration, EDRO, DFSR, State Training Branch, Federal Building, Room 8002, 550 Main Street, Cincinnati, Ohio 45202.*

Food safety is essential in promoting and maintaining the health of those in the institution, especially the very old and very young, as they are particularly prone to foodborne disease. The economic loss is likewise devastating; a well-documented outbreak is discussed. General principles of foodborne disease control are discussed as well as the types of tray assembly and a new system of distribution of food for mass feeding operations.

Viruses in Foods. Edward P. Larkin. *Virology Branch, Division of Microbiology, BF, FDA, 1090 Tusculum Ave., Cincinnati, Ohio 45226.*

Viruses require living cells for their growth. Unlike bacteria, they do not increase in numbers in foods, and, when detected, are usually present in small numbers. All human and animal viruses are pathogens and only a few viruses are required for infection. The enteric viruses (polioviruses, coxsackieviruses, echoviruses and reoviruses) have been detected as food contaminants more frequently than other viruses because of the availability of sensitive and relatively economical techniques. However, viruses such as rotaviruses, parvoviruses and hepatitis A virus have public health significance of equal or greater importance, but because of deficiences in cell culture systems they are difficult to propogate. Virus infections are not affected by antibiotics and other chemotherapeutic agents, but respond to the immune mechanisms of the infected human. Therefore, only immunization and sanitary practices limit the spread of viruses. Fortunately, thermal processes eliminate most viruses. Only parvoviruses and possibly hepatitis A virus are considerd to be heat-resistant, but temperatures >85°C will inactivate these viruses. Therefore, virus contamination is restricted to improperly cooked, cross-contaminated or raw foods.

Sanitary and Microbial Aspects of Frozen Food Manufacture In An Energy Conscious World. Thomas Maier. *Banquet Foods Corporation, One Banquet Place, P.O. Box 70, Ballwin, Missouri 63011.*

The chain of manufacture to consumer useage of frozen foods is energy intensive. Temperature requirements of frozen products for compliance to desireable quality attributes, including shelf-life, vary from product to product. Effect of regulatory agency rules and regulations on energy use and product safety and a cost comparison of various freezing systems applicable to frozen foods are discussed. Sanitation requirements to effect proper microbiological environment of production facilities are discussed with regard to ease of procedures and cost. Regulatory agency requirements and control, present and future, form the basis for planning of plant sanitation. An in-depth review of typical frozen food sanitation and microbiological procedures is presented. The importance of understanding chemistry and physical action of sanitation procedures may determine success or failure of individual frozen food items.

Role of Continuing Education for the Sanitarian. David Z. McSwane. *School of Public and Environmental Affairs, Indiana University, 801 West Michigan Street, Indianapolis, Indiana 46223.*

To cope with the decade of the 1980s and beyond the practicing sanitarian must be prepared for shifts in technology, regulation and enforcement strategy, and the overall economy. Those professionals concerned with environmental hazard control and public health should make possible effort to ensure they are competent to adequately function within their respective work arenas. The need for continued competency education among practicing sanitarians has never been greater. Yet, it is very important that the sanitarian chooses educational programs that are worthwhile and pertinent to his current activities practiced in the field. Factors such as the variety of training modes available, the high cost and inaccessibility of training programs, as well as the general lack of information concerning available training programs make selecting worthwhile training programs a difficult and sometimes frustrating task. These issues and others are examined to illustrate the importance of continuing education as a mechanism for maintaining competency and to assist the sanitarian in selecting continuing education programs which are suited to his needs.

Maximizing Efficiences in the Food System. Nancy J. Moon. *Food Science Department, University of Georgia, Experiment, Georgia 30212.*

The food production and processing system is inherently inefficient because of biological and technological factors. Each of the steps in food production, sunlight energy to plant food energy to animal food energy, is examined. The maximum value of energy flow is obtained if plants rather than animals are consumed. Wastage at each stage in the process can be converted to some useful byproduct using currently available technologies. Alternatives are examined. Recent advances in reducing the environmental impact of liquid and solid food processing wastes are included along with the probability of success. Technologies which result in increased overall efficiencies in the food system are emphasized. Offering the greatest potential are those that stress processing changes to harvest a useable food product (ultrafiltration). Other alternatives

such as composting and landfill are the least attractive from a food use point of view.

Some Aspects of Food Regulation in the 80s. John H. Nelson. *Kraft, Inc., Kraft Court, Glenview, Illinois 60025.*

Consumers continue to have high expectations for quality foods. Inflation and economic stagnation have sharpened competitive pressures and have resulted in regulatory retrenchment. Safety and wholesomeness of the food supply and protection against economic cheating remain high regulatory priorities. There appears to be significant opportunity for deregulation or reregulation of food nomenclature and providing the consumer with product information. Present food standards should be evaluated to maintain consumer protection, enhance consumer understanding and reduce present impediments to technology and new food product development. Alternatives for delivery of consumer information via the label and other means of communications should be sought.

Attachment and Entrapment of Microorganisms on Food and Food Contact Surfaces. T. S. Schwach and E. A. Zottola. *Department of Food Science and Nutrition, University of Minnesota, 1334 Eckles Avenue, St. Paul, Minnesota 55108.*

Microorganisms which remain on a surface, either by their own attachment mechanisms or by entrapment on the surface may account for numerous microbial contamination problems. Organisms present on one surface can transfer and attach to a contacting surface, even if the contacting surface is inert, such as stainless steel, glass or gold foil. Scanning Electron Microscopy (SEM) has been used to visualize the organism and surface interactions. Many microorganisms produce distinct attachment fimbriae which serve to firmly anchor cells to the surface. These fimbriae are easily seen using SEM. Using Transmission Electron Microscopy (TEM), it has been demonstrated that these fimbriae are made up of acidic mucopolysaccharide substances. The fimbriae of three microorganisms, *Pseudomonas fragi, bacillus cereus,* and *Salmonella montivideo,* and native beef microflora were examined and found to be of similar composition. Several new techniques and procedures were developed to study attachment of these microorganisms on food and food contact surfaces.

Sodium Labeling - A Public Health Nutrition Perspective. Emily H. Skaar. *Department of Human Nutrition and Foods, Wallace Hall, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.*

Mounting evidence of a causal relationship which varies widely from individual to individual between high dietary sodium intake and hypertension has prompted strong support for required sodium labeling. The Food and Drug Administration in 1979 announced its intention to make such labeling mandatory. Before enactment of this policy, however, the new commissioner of the agency proposed in 1981 a revised strategy of voluntary sodium labeling. Behind both policy proposals is a strong concern for individuals who because of existing hypertension (or other reasons) have been placed on a low sodium diet as well as the larger (still unclear) question of the effect of high sodium intake on the hypertension susceptibility of the public at large. However the goal of sodium labeling is achieved, it is suggested that consumer education ought to accompany any such efforts to make the public aware not only of sodium content per se, but also of the many nutritional tradeoffs of individuals diet selection. Moreover, extensive new research is needed to clarify for consumers the precise potential for danger of continued high sodium intake.

Handling of Frozen Foods. Hugh W. Symons. *American Frozen Food Institute, 1700 Old Meadow Road, McLean, Virginia 22102.*

Preservation of high quality on exit from the freezer is achieved, in an economical and energy-efficient manner, by paying adequate attention to: (*a*) packaging integrity (protection from moisture and protection from physical abuse), (*b*) storage temperature (adequately cold (-15°C to -22°F for some products), bulk storage temepratures and reasonably uniform temperature of 0°F (-18°C) during distribution transport, warehousing, display for sale and in-home storage) and (*c*) inventory rotation (in-house system on pallets and unit loads, rotation aid on outer shipping cases and in-home storage and thawing instructions on individual packets). Cryptic codes are needed for precise identification if market withdrawal is required and to follow up consumer comments.

Food Allergy. S. L. Taylor. *Food Research Institute, University of Wisconsin, Madison, Wisconsin 53706.*

Food allergy is often loosely defined as any unpleasant, abnormal or heightened response of an individual to a food or food component, particularly those adverse reactions which affect only a small, abnormal subset of consumers. However, food allergy should be limited to those adverse reactions that are immunologically mediated. Two types of allergic reactions are known to occur with foods. Type I allergic reactions are mediated by allergen-specific IgE and symptoms occur immediately following ingestion of the food. Type IV allergic reactions are mediated by tissue-bound lymphocytes and symptoms occur on a delayed basis. Accurate epidemiological data on incidence of allergic reactions to food among the American populace do not exist. Peanuts, soybeans, cows' milk, eggs, tree nuts, fish and shrimp are among the most allergenic foods in the American diet. The diagnosis of food allergies will be discussed with emphasis on improved techniques and reagents. Elimination diets are the usual method for control of food allergies. It may be possible to devise processing techniques that will destroy the allergenicity of certain foods. Peanut allergy will be discussed as a model.

Future of the National Dairy Herd Improvement Association (NDHIA). E. C. Troutman. *Division of Regulatory Services, University of Kentucky, Lexington, Kentucky 40546-0064.*

The National Dairy Records Program is growing 5-6% per year with 41% of the nation's dairy cattle enrolled as of January 1, 1981. The fastest growing new records program is the AM-PM plan, totaling 700,000 cows. This is an "official" program when a monitoring device is installed at the farm to record the starting and ending times of milking. The program has much potential. New optional services such as electronic somatic cell counting, protein testing, SNF testing, feed and soil testing, etc. are growing rapidly and creating interest in dairymen to join a dairy records program. On-farm computer terminals and adoption of new

electronic technology are slowly coming on to the scene and could change operation of the DHIA program. DHIAs are becoming better organized and are hiring their own management personnel. There are now 3,000 persons in laboratories, field operations, and computer management systems. This trend is changing the role of the county agents, extension specialists, state and local boards and other dairy leaders involved in the dairy records program. Some states with small dairy cow populations may elect to join another state or states to obtain the optional services and an optimum program at a minimum cost. National DHIA has initiated a "Quality Certification" program setting standards of quality and accuracy in central testing laboratories, field operations, and processing centers. NDHIA delegates have been asked to endorse plans for total commitment to improve DHIA service, stability, accuracy and integrity.

Industry Support of Research and Extension. John M. White. *Department of Dairy Science, Virginia Polytechnic Institute, Blacksburg, Virginia 24061.*

The Virginia Setaside Program is a dairymen-funded, self-help program designed to supplement and enhance effective research, extension and instructional programs in Dairy Science at Virginia Tech. It was initiated in 1972 by the Board of Directors of the Virginia State Dairymen's Association (VSDA) and the Boards of individual marketing coops. Over 90% of the dairy farmers in Virginia participate. The actual contribution for each dairyman is $1.40 per $1,000 worth of milk sold (.14%). These funds are budgeted as follows: (*a*) 26% for VSDA dues, (*b*) 8% to an emergency fund, (*c*) 5% for dairy scholarships and other student support and (*d*) 61% for dairy research and extension support at Virginia Tech. Use of these funds is monitored by a 12-person Dairy Science Advisory Board and the Board of VSDA. In 1980-81, over $200,000 were contributed to the Department of Dairy Science. These funds are used as start-up monies for new programs, to help underwrite extension programs, to purchase equipment, to pay salaries for additional laboratory technicians, computer programmers, and graduate research assistantships, and other activities.

Nominations for '83 Awards Now Due

Awards nominations are due for the 1983 IAMFES Awards. The success of the IAMFES Awards Program depends on organizations which generously and regularly fund the program, but also on you, for nominating persons you know who are worthy of the awards.

Contact William Arledge, Dairymen Inc., 10140 Linn Station Road, Louisville,KY 40223 with information on your nominees. Present Executive Board members are not eligible for the 1983 awards.

The awards are as follows:

*Sanitarian's Award. This year the $1000 award will be presented to a municipal or local sanitarian who has made outstanding professional contributions during the past seven years.

*Harold Barnum Award. This $500 award will go to an industry representative in 1983. It is presented to a person who has shown outstanding service to food safety and sanitation.

*Educator Award. This $1000 award will be presented to an educator. It is presented to a person who has shown outstanding service to food safety and sanitation.

*Citation Award. This award will be presented to an IAMFES member who has given outstanding service to the Association in helping fulfill its objectives.

*Shogren Award. This award will go to the affiliate organization with the best state or regional program.

*Honorary Life Membership. This is presented to a member who has shown long and outstanding service to IAMFES.

IAMFES Secretary-Treasurer Nominations Due

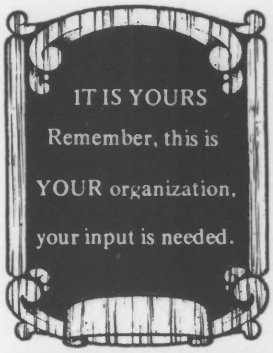
Nominations are open for the IAMFES Secretary-Treasurer. This year a regulatory representative will be elected.

Send a biographical sketch and photograph of your nominee to the Nominating Committee as soon as possible, but no later than November 8, 1982.

Send the information to: Robert L. Winslow, Nominating Committee, IAMFES, Safeway Stores, Inc. 4th & Jackson Street, Oakland, CA 94660.

NOTE: In the August issue of Dairy and Food Sanitation, Harold Bengsch was inadvertently omitted from the list of IAMFES Award Winners for the past 20 years. Harold Bengsch was the recipient of the 1977 Sanitarians Award. Dairy and Food Sanitation regrets the error.

AFFILIATE NEWSLETTER . . .



This page has been devoted to YOU, the IAMFES affiliates. Your input is needed on whether you feel this page should be a regular feature to serve as a communication source between the state and international office. Please respond.

James Francis of St. Paul Health Department, receives the Achievement Award.

The Minnesota Sanitarians Association Inc., Annual Meeting was held September 16 & 17, 1982 with 127 members in attendance. The banquet was held at the Olympia Brewing Company, Rathskellar Room.

Orlowe Osten and Harold Johnson, retirees from the Minnesota Department of Agriculture, received the Honorary Life Membership. James Francis of the St. Paul Health Department received the Achievement Award for exceptional service to the Association. Omer Majerus, manager of the Universal Milking Machine Division, was elected president. Charles schneider of the Minnesota Department of Health was elected vice president. Roy Ginn of Dairy Quality Control Institute, Inc. was elected secretary treasurer for the comming year.

The Sanitarians Conference held at the Earle Brone Center at the University of Minnesota was a success. Approximately 180 fieldmen and sanitarians attended.

Roy E. Ginn
Secretary Treasurer
Minnesota Sanitarians Association

ALL IAMFES members received the contest letter (below) in the mail recently.

We'll keep you posted on the contest throughout the next few months.

If you have any questions, just contact the **IAMFES** office.

Good Luck!

Dear IAMFES Member:

Together we can keep IAMFES, your professional association growing even stronger.

Throughout the years through your promotion of IAMFES, the association membership/subscriptions continually increases.

NOW through July 1, 1983, you as a member will receive the following awards for your part in membership enrollment. ,

•$300.00 for affiliate groups who increase their membership by 25 members (affiliate and international membership) student membership would not be applicable.

•$100.00 for any IAMFES member who enrolls 10 new members (or 25 student members).

•$25.00 for any member who enrolls a new Sustaining Member.

•$ FREE registration including the banquet at the annual meeting August 7-11, 1982 in St. Louis, MO., for an IAMFES member who enrolls 5 new members.

REMEMBER, you have until July 1, 1983. Simply have the new members jot your name on their membership/subscription form so that you receive credit.

It's easy and best of all it's "rewarding."

News and Events

Coleman joins Minnesota Dept. of Agriculture

William W. Coleman, II, administrative chairman of the food industry and technology division of the University of Minnesota, Waseca, has joined the Minnesota Department of Agriculture as director of the Dairy Industries Division, Commissioner Mark Seetin announced.

Coleman will fill the key regulatory position for Minnesota's $3 billion dairy industry, vacated earlier this year by the retirement of Orlowe M. Osten, who had earned national recognition during his 33 years of service in the state agency.

The new director of the Dairy Industries Division brings 22 years of professional experience in the dairy industry and academic food science community to the position. A Pennsylvania native, he has a master's degree in food science from Penn State University.

Prior to his past five years on the University of Minnesota Waseca, faculty, Coleman spent 10 years as an instructor in food science and manager of the creamery at Penn State University. His first seven years after graduating from Penn State were spent as production manager for the Berkey Milk Company, a grade A dairy products manufacturer in Somerset, Pennsylvania.

Nomination Open for 1983 Harold Macy Award

The Minnesota Section of the Institute of Food Technologists is seeking candidates for the 1983 Harold Macy Food Science and Technology Award.

The award, which was established in 1981, is given annually for an outstanding example of food technology transfer or cooperation between scientists or technologists in any two of the following settings: academic, government, and private industry. The purpose of the award is to advance the profession and practice of food technology and to honor Harold Macy, Dean Emeritus of the University of Minnesota and a founding member of IFT. Awardees will be invited to address the Minnesota Section of the IFT. The award consists of a $500 honorarium and travel expenses.

The 1982 recipient of the award was Dr. E. M. Foster, Director of the Food Research Institute, Madison, Wisconsin.

Nominations for the award should be made on an appropriate form and are due by December 15, 1982. Nomination forms are available from Dr. J. M. Jones, Chairperson, Macy Award Committee, College of St. Catherine, 2004 Randolph Ave., P.O. 4121, St. Paul, Minnesota 55105.

American Association of Cereal Chemists Appointments

Dr. David R. Lineback and Dr. Richard R. Hahn have been elected president-elect and director, respectively, of the American Association of Cereal Chemists for the 1982-1983 term.

Lineback is professor and head of the Department of Food Science, North Carolina State University, Raleigh. He currently serves the AACC as chairman of the Alsberg-Schoch Award Committee and chairman of the Education Advisory Committee. He has served as national program chairman (1980); member of the Long Range Planning Committee (1978-1980); associate editor of CEREAL CHEMISTRY (1970-1974); and program chairman (1972) and chairman (1973) of the Carbohydrate Division. He is the author or coauthor of more than 40 scientific publications on enzymes, carbohydrates, and food science. Dr. Lineback has a PhD in organic chemistry from The Ohio State University, Columbus.

Hahn will replace John Halverson on the board, whose term as director expires this year. He is currently vice-president of research, development, and quality assurance for A. E. Staley Manufacturing Co., Decatur, IL. In his 20-year service to AACC, Hahn has held all offices of the Central States Section and also has served the Association as vice-chairman and chairman of the Carbohydrate Division; associate editor of CEREAL CHEMISTRY; and member of the Lone Star Section, Protein Division, and technical committees. He joined A. E. Staley in 1967 and held the positions of group leader and director of food ingredient development before his his appointment to vice-president in 1976. Hahn has a PhD in chemistry from Kansas State University, Manhattan.

The American Association of Cereal Chemists is a scientific society of more than 3000 members internationally. It was founded in 1915 to establish standardized methods of analysis in cereal laboratories and to encourage research within the cereal processing industries.

DFISA Conference Highlights

"The Next Five Years in the Food Industry" was the subject of a DFISA marketing conference held at the O'Hare/Kennedy Holiday Inn outside of Chicago on October 13, 1982.

Designed as a look into the near future of the food processing industry, the conference featured key executives from major food and dairy processing chains including Dean Foods, Dairymen, Inc., and the Southland Corporation.

Attendance consisted of top corporate management, marketing executives and product development specialists from many of the top dairy and food supplier organizations in the country. The conference provided food industry suppliers with valuable information to assist them in positioning themselves towards the markets of the future and in anticipating the future needs of food processors. The program included an in-depth analysis of long-term trends in the food industry, specific information on the five-year plans of various processor chains, and an assessment of the opportunities available for suppliers.

The four major areas of food processor operations — ingredients, processing, packaging and distribution and transportation — was discussed at length by specialists from the food industry, in order to inform supplier companies of their future needs.

Testing and Certification Offered

A new service area which offers testing and certification against governmental regulations and specifications, and nationally recognized consensus standards other than National Sanitation Foundation (NSF) standards has been announced by Tom S. Gable, Executive Vice President of the Ann Arbor, Michigan based Foundation.

"Many products, systems, and services which affect public health and environmental quality are not covered by NSF standards but *are* addressed by other national voluntary consensus standards or governmental regulations," states Gable. "It is the intent of our Certification Services program to test and evaluate these products, systems or services. Those found in compliance with the various criteria will earn the right to display the NSF Certified mark and appear in an annual registry."

A new booklet entitled "Facts about Certification Services" describes the new service and covers such topics as The Scope of Certification Services, Participation in Certification Services, and Certification Procedures. Also included is a list of Standards, Regulations and Specifications in the NSF Certification Program.

NSF has been highly respected as a neutral third party for evaluation and testing since its founding in 1944. This non-profit organization is best known for its public and environmental health standards, testing, and listing programs for food equipment, plastic piping system components, wastewater treatment devices and many other types of products.

For a free copy of the new booklet contact: Certification Services, National Sanitation Foundation, P.O. Box 1468, Ann Arbor, MI 48106. 313-769-8010.

Quality Control Management Seminar

A new concept in quality control management has been developed and is being taught by the experts at Quality Circle Institute who, with their previous experience as corporate level quality managers, have applied it worldwide. A major U.S. corporation defined world class quality as a quantum improvement. Company-Wide Quality Control aims at achieving this attainable 10:0 improvement by creating hands-on learning situations for the executive, manager and supervisor who actually control product quality.

Learn about this proven-effective employee-participation quality control technique at a two-day high-level executive seminar by Bob Tate, a widely known authority on this subject. Get hands-on knowledge, and learn how to conduct your own evaluation of just how good your quality is through this seminar. Your quality control department can't meet your quality standards alone. It can't inspect quality in. It takes you — a high level executive with a working knowledge of quality control to provide the required leadership. If your organization competes with the Japanese or other organizations that try to emulate their approach to quality, it is important to realize that only about 5% of U.S. managers are trained in quality management while nearly 100% of Japanese managers have this training.

Quality control and Quality Circles are naturally closely related. This seminar on quality control has been researched and developed by the Quality Circle Institute staff of experts to fill a real need. The Institute is the largest and most active consulting, training, and publishing organization in the Quality Circle field in the Western World.

Courses are scheduled for Cleveland on November 15 & 16 and for Chicago on November 17 & 18. Call or write to register now: Quality Circle Institute, 1425 Vista Way, Airport Industrial Park, P.O. Box Q, Red Bluff, CA 96080 916-527-6970.

Broiler and Turkey Production Up

Broiler and turkey production and consumption have risen significantly since 1966, while the various red meat supplies have been showing diverse trends because of their longer production cycles.

"It must be remembered that the production cycle changes, and thus, the availability of the meat is the major factor affecting per capita consumption," says Dr. Edward Uvacek, Jr., economist in livestock marketing with the Texas Agricultural Extension Service, Texas A&M University System.

Uvacek explains that the demand for the product then influences the price paid for that quantity of meat.

"It is interesting to note that while chicken consumption rose an average of 2.2% per year from 1966 to 1976, beef also increased at exactly the same rate," he announces. "However, the total red meat and poultry consumption in 1981 was still 2% below the 1976 level."

Per capita poultry consumption increased from 44 pounds in 1966 to 63 pounds in 1981. In contrast, beef consumption increased from 104 pounds in 1966 to 128 pounds in 1976, when larger supplies of beef were available and then fell to 104 pounds in 1981 because of reduced production. Pork consumption varied from 66 pounds in 1966 to 79 pounds in 1971, dropped to 55 pounds in 1975 and was at 70 pounds in 1981.

Projections for the 1982 calendar year indicate a slightly lower beef production, close to 9 percent less pork and about 1 percent more poultry, Uvacek states. Total red meat and poultry production should be down about three and one-half percent, he adds.

National Frozen Food Convention Award Winners

Every year at the National Frozen Food Convention, select retail and foodservice companies are honored by the industry for their outstanding frozen food programs.

The Supermarket Merchandiser Awards recognize recipients for outstanding merchandising of frozens and superior management of their frozen food departments. The Foodservice Innovator Awards recognize recipients for their creative, innovative use of frozens and their displays of corporate understanding concerning that use.

Denny's Inc., La Mirada, California, and W. R. Grace Company/Restaurant Group have been selected to receive the 1982 Foodservice Innovator Awards. Sloan's, New York, New York, and Kroger-Southland Division, Nashville, Tennessee, have been selected to receive the 1982 Supermarket Merchandiser Awards.

The 1982 National Frozen Food Convention, sponsored by the American Frozen Food Institute and the National Frozen Food Association, is being held Nov. 7-10 in New Orleans, Louisiana.

Representatives from each of the award-winning companies will be presented the awards on Sunday, Nov. 7, at the Convention's Grand Awards Banquet. At the Breakfast General Session on Tuesday, Nov. 9, each of the recipients will present an overview of the philosophies and strategies that led them to excellence.

International Dairy Federation Offers New Documents and Standards

The International Dairy Federation has published new documents and standards, which are now available:

Document #144-Consumption statistics for milk and milk products 1980 including summary 1966-1980, $13.60.

Document #145-Taxonomic features and identification of Lactobacillus bulgaricus and Streptococcus thermophilus, $9.00.

Document #146-The World market for cheese, $24.20.

Document #147-Dairy ingredients in food products, $36.80.

Document #148-Catalogue of teaching aids used in dairy training (audiovisual aids, books and brochures), $20.60.

Standard E106-Caseins and Caseinates Determination of Lactose Content- Photometric Method, No Charge.

Standard E107-Caseins and Caseinates Determination of Scorched Particles Content, No Charge.

Standard E108-Milk Determination of Freezing Point-Thermistor Cryoscope Method, No Charge.

Sustaining members receive these documents at no charge. Others may order them at the individual prices or may subscribe for all the publications at an annual charge of $60.00. Send orders to Mr. Harold Wainess, Secretary, USNAC, 464 Central Avenue, Room 24, Northfield, IL 60093.

New Line of Mastitis Prevention Products

Alcide Company, Westport, CT., is currently conducting an extensive series of tests for their new line of Mastitis Prevention Products.

Among the products planned for distribution are a Teat Dip, Bedding Spray and Intramammary Infusion.

According to the National Mastitis Council, Mastitis is the single largest cause of financial loss for the dairy industry, amounting to over one and one-half billion dollars per year.

This debilitating condition is responsible for drastic reductions in milk output, and in the more severe cases, necessitates premature culling of cows. According to a company spokesman, it will be possible to substantially reduce these costly losses with the aid of the Alcide Mastitis Prevention Program.

The Alcide Company anticipates the availability of its Mastitis Prevention products by the Winter of 1982.

For more information contact Alcide Company, 203-227-1223.

Dairy Price Support Cuts

A significant drop in the support and farm price of milk received by dairy farmers has been authorized in the wake of budget legislation signed into law Sept. 8, by President Reagan, according to University of Wisconsin-Extension dairy economist Truman Graf.

This could eventually mean as much as a $5,000 drop in annual gross income for a typical dairy farmer, Graf says.

"The dairy industry will have to adjust to lower prices in the foreseeable future than would have occurred under previous policies," Graf says.

The authorized date for activation of the dairy plan was Oct. 1, Graf says.

The fall in prices results from the enactment of compromise budget legislation approved Aug. 18 by Congress. The plan is designed to cut dairy price support costs to the federal government about $4.2 billion by October 1985.

Graf outlines the new law:

— The final version of the 1982 dairy law freezes price support levels at $13.10 per hundredweight (cwt.) from the first of next month until Oct. 1, 1984.

— An increase in the price support level will be allowed for the fiscal year beginnig Oct. 1, 1984. This increase will be pegged to the level of parity on Oct. 1, 1983, at the $13.10 per cwt. price.

— If projected Commodity Credit Corporation purchases exceed five billion pounds of milk equivalent per year by Oct. 1, 1982, all farmers will be "penalized" 50 cents per cwt. on their sales to processors. A second 50 cent per cwt. penalty goes into effect if projected annual government purchases are more than 7.5 billion pounds of milk equivalent per year by April 1, 1983.

— Individual farmers would be eligible for a refund of the second 50-cent penalty if they reduce their annual production by the same percentage as the government's projected surplus. No refund will be offered on the first penalty.

This means that if the average dairy farmer producing 500,000 pounds of milk annually does not cut production and fall within the parameters of the law, his annual gross income will be cut by $2,500 due to the 50-cent penalty. Another $2,500 slash in income could occur if production is still not lowered, and the second penalty is imposed, Graf says.

But, Graf points out, the President's signature doesn't bring an end to the controversy swirling around the nation's dairy pricing policies. "There is question of how much if any the new law will reduce milk supplies," Graf says.

Even as the ink on the 1982 bill dries, industry and government leaders are contemplating new changes in the price support program, Graf reports.

"The law that was just signed is a compromise, almost a split right down the middle between the House and Senate versions. It lacks unified support from any single group," he says.

Critics have already started pointing out flaws in the new program, even though the law just went into effect.

"Valid or not, this criticism is already leading to a call for new legislation," Graf reports.

The economist summarizes the major arguments against the new law. Critics say:

— The plan is too expensive for farmers. The reduction in price comes at a time when input costs, as estimated by the United States Department of Agriculture, have risen $2.39 per cwt. over the 1979-1981 period. This reflects a 23 percent increase.

— The second 50-cent penalty will not be a large enough incentive for individual farmers to cut production. The reduction may actually act as a short-run incentive to increase production as some farmers scramble to cover costs.

— Farm prices will be reduced but product prices will remain the same. This means that the value of a dairy's inventory will not change. Thus, farmers are treated unequally, and there is no price incentive for increased consumption.

— Revenues from penalties against the farmers go to the government general fund rather than to a "self help" fund to deal with milk surpluses. There would be no direct benefit in terms of solving the milk surplus problem through export subsidies to increase exports or other programs to redress the supply/demand imbalance.

The existing surplus situation weighs heavy on moves to amend the bill.

Last year the USDA purchased 27 percent of American cheese commercial sales, 40 percent of butter sales, and 187 percent of non-fat dry milk sales. Milk production for fiscal 1982 is expected to be two percent higher than last year, Graf says.

U.S. Department of Agriculture projections put government purchases at 12.5 billion pounds of milk equivalent in fiscal 1983. This is over 10 percent of production, Graf says.

"Proposed legislation is likely to follow the 1982 Act with respect to combining self help and price reduction when surpluses exist. However, greater incentives to reduce production will likely be stressed," says Graf.

Highlights of the Institute of Food Technologists Meeting

The 1982 annual meeting of the Institute of Food Technologists was held June 25, with a record number of exhibit booths and technical papers presented. More than 8500 members and guests attended, to inspect the new offerings of 550 exhibit booths (up from 538 last year), and to hear more than 500 technical papers and symposia speakers.

Dr. Owen R. Fennema, professor in the Department of Food Science at the University of Wisconsin, was named president of the society. He took office July 1.

Dr. Fennema received his B.S. in agriculture from Kansas State University. He then moved to the University of Wisconsin for graduate studies, and received his M.S. in dairy technology and his PhD in food science and biochemistry.

After three years in the research department of The Pillsbury Company, Dr. Fennema joined the faculty at the University of Wisconsin in the Department of Food Science. He chaired the department from 1977 to 1981.

His research interests at the University of Wisconsin have been in the area of low temperature preservation of food and biological matter; aqueous clathrates — their characteristics and applications in biological systems; characteristics of water and ice; and reaction kinetics in frozen systems.

Dr. Fennema has been active in IFT since 1956. He received the society's Cruess Award for excellence in teaching in 1978, and was elected a Fellow of the Institute in 1980.

Dr. Gilbert A. Leveille, director, Nutrition and Health Sciences, General Foods Corp., was named president-elect. He will assume the presidency July 1, 1983.

Dr. Leveille received his undergraduate degree from the University of Massachusetts and his M.S. and PhD degrees from Rutgers University.

After receiving the doctorate, he served as a biochemist at the U.S. Army Medical Research and Nutrition Laboratory in Denver for five years. He then joined the faculty of the Department of Animal Science, University of Illinois, as professor of Nutritional Biochemistry. In 1971, he was appointed professor and chairman of the Department of Food Science and Human Nutrition at Michigan State University. He has held his present position at General Foods since 1980.

The Institute also presented its full roster of Achievement Awards for 1982. Recipients were as follows:

Dr. Clinton O. Chichester, vice president, Nutrition Foundation, and professor of food science at The University of Rhode Island, was named recipient of the 1982 Nicholas Appert award. The award is presented annually "To honor a person for pre-eminence in and contributions to the field of food technology." It consists of a bronze medal furnished by the Chicago Section of IFT and a $1000 honorarium.

Dr. John C. Ayres, professor of food science at the University of Georgia, was named recipient of the 1982 Babcock-Hart Award. The annual award honors an individual for his contributions to food technology which have improved public health through more nutritious food. It is sponsored by the Nutrition Foundation Inc. and administered by IFT, and consists of an engraved plaque and a $1000 honorarium.

Dr. R. Paul Singh, associate professor of food engineering, University of California-Davis, was named recipient of the 1982 Samuel Cate Prescott Award. The award honors a research scientist 35 years of age or younger for outstanding ability in some area of food science and technology. It consists of a $1000 honorarium and a plaque.

Dr. John J. Powers, Wm. Terrell distinguished professor of food science at the University of Georgia, was presented with the 1982 Wm. V. Cruess award. It honors a person who has achieved excellence in teaching food science and technology, and consists of a bronze medal donated by the Northern California Section of IFT and a $1000 honorarium.

Dr. Frederick J. Francis, professor of food science at the University of Massachusetts, was presented with IFT's 1982 International Award. The award is made annually to an IFT member who has made outstanding efforts to promote the international exchange of ideas and understanding in the field of food technology. It consists of an inscribed sliver salver furnished by the Austrialian Institute of Food Science and Technology and an honorarium of $1000.

The Department of Microbiology and the School of Pharmacy at Oregon State University, and Galloway West Div., Borden Inc., Fond du Lac, Wisc., were named winners of the Food Technology Industrial Achievement Award. The award is presented annually to "Recognize and honor an outstanding food process or application which represents a significant advance in the application of food technology to food production, which has been successfully applied in actual commercial operation." The award, a bronze plaque, is presented to each organization.

The product involved is "Phase 4" Bulk Starter Media for producing fermented food products such as cheese, sausage, pickles and sauerkraut. It represents a new concept in bulk starter media, in that it incorporates built-in control of acidity levels, to prevent damage to microorganisms during their growth and culturing process.

Use of Phase 4 Starter Media leads to greater amounts of cheese per batch and reduced costs for culture. The

time required to produce the cheese is also reduced substantially, leading to more cost savings for manufacturers of non-aged varieties of cheese.

The key-note speech at the IFT annual meeting was also the 1982 W. O. Atwater Memorial Lecture, sponsored by the U.S. Department of Agriculture's Agricultural Research Service. Dr. Edwin M. Foster, Director of the University of Wisconsin's Food Research Institute, delivered the lecture, entitled "Is There a Food Safety Crisis?"

The Atwater award consists of a medal and a $1000 honorarium, and commemorates the life and work of Wilbur Atwater, a 19th Century U.S.D.A. scientist who established the science of modern human nutrition in the United States. The award, established in 1967, gives special recognition to individuals who have made outstanding contributions to a field of science broadly related to human nutrition, or advanced public understanding of the role of science in meeting world food needs.

The Institute of Food Technologists is a non-profit scientific society devoted to the discovery and application of new and existing knowledge to improving the world's food supply. Its 20,000 members are active in academic, industrial and government organizations.

Wales Introduces Pure Protein Powder

A nutritious 97% pure protein powder from Wales is said to be 99% digestible and have a long shelf-life; it is obtained from cheese whey by an ion exchange process.

BIPRO DAIRY ALBUMEN contains about 3% minerals and no cholesterol, fats, sugars, preservatives or coloring matter. Its natural qualities are claimed to make it highly beneficial to convalescents, the young, the aged, athletes, people on low-fat or low-carbohydrate diets and those allergic to eggs.

The unflavored powder can enhance other flavors. It is the same type of protein as that which makes up nearly 70% of the protein of human milk, comprising lactalbumen, serum albumen, lactoglobulin and immunoglobulin. It is substantially free of fat and lactose, has a low ash content and is undenatured.

Among the 18 amino acids in the product, eight are essential because they cannot be made by the body. The powder can be used as a "building block" in diet formulations and is suitable for medical diets — especially for patients with kidney and metabolical disorders. Other features are 94% biological value, 93% net protein utilization and 3.2% protein efficiency.

As an egg white substitute, it is said to be equal to egg albumen in whipping properties, volume and stability, and has similar gelling characteristics. It can easily be incorporated into foods (even those with a low pH), produces and maintains foams and sets with moderate heat. It will bind sugars, fats, starches and water and has easily digested essential proteins.

These egg-like properties mean that the powder can be widely used in confectionery (giving it a longer shelf life), baking and meat processing. It can be used to enrich, thicken, bind and coat foods for frying and for glazing and sealing.

Whipping properties can be used to lighten food texture, and it can emulsify mixtures — especially those made of water and fat.

Functional properties have been used to develop recipes for egg custards, pancakes and batters, creamed cakes, pastry creams, meringues, cookies, souffles, cheesecakes, angel food cake, icings and toppings, drinks and in frosting fruits.

Added to hamburgers the powder produces a slightly wetter mix but, after forming and cooking, the flavor of the meat is claimed to be better. Texture, flavor and nutritional value of soups can also be improved.

The process for making the powder involves passing the whey liquor (at pH 4.5) through an ultrafiltration unit to an ion exchanger where the protein is adsorbed (at pH 3.0) and the residual non-protein material discharged. The protein is finally desorbed into clear water (at pH 8 to pH 9), concentrated by ultrafiltration and spray dried. The key to the process is the control of pH which is achieved by adding caustic soda to the liquid in the reactor.

Inquiries from potential U.S. customers, agents, distributors or licensees are welcomed by the company or may be sent to British Information Services, 845 Third Avenue, New York, NY, 10022, 212-752-8400.

Economical Mold Preventer

Delvocid®, which prevents growth of molds and yeasts on food products, has been approved for use on cheese by the U.S. Food and Drug Administration and was approved by the Canadian Department of National Health and Welfare in April, 1982. This announcement was made by GB Fermentation Industries Inc., the U.S. subsidiary of Gist-Brocades nv, Delft, Netherlands, one of the world's largest producers of enzymes and other fermentation products.

Delvocid (natamycin, also known as pimaricin) is significantly less costly for application than other preservatives used to prevent growth of mold and yeast

on cheese, according to Leonard P. Smith, Vice President Sales, GB Fermentation Industries Inc. Delvocid has the unique properties of being tasteless, odorless, colorless and does not retard normal ripening processes.

Smith said, "The United States and Canada thus join more than 20 countries around the world who have approved the use of Delvocid as a food preservative since its introduction in 1963. While its primary use is for the prevention of surface molds and yeasts on cheese of all types, several countries have also approved it in sausage and soft drinks."

In addition to economy, key benefits of Delvocid to the cheese producer are its high efficacy, flexibility and it does not alter the natural properties of the cheese.

.Unlike other preservatives, Smith said, Delvocid stays on the surface instead of penetrating the cheese. Because Delvocid is tasteless and orderless, these factors further insure that Delvocid will not affect the organoleptic properties of the cheese. Further, Delvocid is very active against virtually all molds and yeasts but not against bacteria vital to the ripening of cheese and sausage.

Delvocid can be used in a dip or spray aqueous solution. The method used depends on which type of application is most economical and efficient for the individual cheese producer or best suited to a particular variety of cheese. Minimal application will protect the cheese for at least three weeks and additional treatment affords cheese much longer periods of protection.

Delvocid products need no special handling or warehousing.

Smith said that the cost of application is approximately 80% of the cost of the preservatives most commonly used today.

For further information, contact Len Smith, GB Fermentation Industries Inc., 5550 77 Center Dr., Charlotte, NC 28224, or Peter Harrison, 2055 Bishop St., Montreal, Quebec, Canada H3G2E8.

Packaged Fermentation Systems

FERMENTEC Corporation is a biotechnology company which develops, engineers and installs commercial systems to recycle, by fermentation, the waste materials of food manufacturers and turn them into valuable products. This growing, dynamic company is the first to market such systems and is at the forefront of technology in its field.

The proprietary processes developed by FERMENTEC make it possible to use low cost (waste) feedstocks for fermentation and to ferment them more efficiently. The company produces and sells these packaged fermentation systems to selected segments of the food, dairy and beverage industries. Its fermentation designs include batch, continuous and cyclic batch processes.

Since its formation in April, 1981, the company has successfully developed, produced and sold a FERMENTEC CYBA™ System for producing ethanol from soft drink bottling wastes. This initial system, which is operating at the Hygeia Coca-Cola Bottling Company, Pensacola, Florida, is a cyclic batch alcohol system which converts high sugar wastes into a high-proof hydrous fuel ethanol that can be used in the bottler's vehicle fleet.

At Hygeia, the System has reduced overall Biological Oxygen Demand (BOD) by more than 80% and has allowed the company to discharge its wastes directly into the municipal sewage system. This has resulted in substantial cost savings for waste treatment and fuel.

The FERMENTEC CYBA™ System also has application to other types of food processing operations, such as fruit and fruit drink, candy and confectionery, bakery, snack foods, etc.

For more information write or phone: 301 Saratoga Avenue, Los Gatos, California 95030, 408-395-2221.

JFP Abstracts

Abstracts of papers in the October Journal of Food Protection
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Mutagenicity of Tenebrionid Flour Beetle Secretions Using *Drosophila melanogaster* Sex-Linked Recessive Lethal Test, Robert A. Wirtz and John T. Fruin, Toxicology Group, Letterman Army Institute of Research, Presidio of San Francisco, California 94129

J. Food Prot. 45:1084-1086

The *Tribolium* spp. beetles are the most common tenebrionids infesting flour and other stored foods. 2-Ethyl-1,4-benzoquinone (EBQ) and 2-methyl-1,4-benzoquinone (MBQ) are the major secretory products of these insects. Benzoquinones are highly reactive compounds which have been reported to be acutely toxic and carcinogenic to laboratory animals. Using the *Drosophila melanogaster* sex-linked recessive lethal test, we examined the mutagenicity of EBQ and MBQ. Feeding concentrations of 1 mM EBQ and 2 mM MBQ in 1% sucrose resulted in 72-h mortalities of 25% for EBQ and 39% for MBQ in adult Canton-S male flies. A comparable mortality rate for negative control insects fed 1% sucrose was 2.5%, while positive control flies fed 1 mM ethyl methanesulfonate (EMS) in 1% sucrose resulted in a 2.3% mortality rate. Mutation rates resulting from these exposure levels are as follows: negative control, 0.03%; positive control, 16.05%; 1 mM EBQ, 0.16%; and 2 mM MBQ, 0.13%. The mutation rates for flies fed EBQ and MBQ were significantly higher ($p<0.005$ for EBQ and $p<0.016$ for MBQ) than those of concurrently tested negative control insects when analyzed by both the Fisher's exact and Kastenbaum-Bowman tests. These results show EBQ and MBQ to be mutagenic when tested using the sex-linked recessive lethal *Drosophila melanogaster* system. Analysis of brood mutation rates indicate that both EBQ and MBQ act as indirect mutagens. The presence of benzoquinone-secreting *Tribolium* spp. flour beetles in food products could represent a toxicologic hazard to the consumer. Presently no distinction is made between benzoquinone-secreting insects and other arthropods infesting stored products when establishing rejection standards for infested foods.

Evaluation of a Membrane Filter Test Kit for Monitoring Bacterial Counts in Cannery Cooling Waters, C. R. Rey, G. A. Halaby, E. V. Lovgren and T. A. Wright, Stokely-Van Camp, Inc., Central Laboratories, 6815 East 34th Street, Indianapolis, Indiana 46226

J. Food Prot. 45:1087-1090

Performance of the Millipore SPC Sampler was compared with the Standard Plate count method for routine checks of bacterial counts in cannery cooling waters. Methods were tested with cooling waters from a hydrostatic retort. Recovery of viable bacteria was very low when the Millipore samples were incubated for 24 h, but incubation for 48 or 72 h consistently yielded higher counts with the Millipore than with the standard method. Duplication of counts between analysts was approximately equal with both methods. Replication of bacterial counts within samples was more erratic and skips were more frequent with the Millipore than with the standard method. Procedures to control replications and skips are discussed. The Millipore procedure is a convenient alternative to the Standard Plate Count for routine quality audit of cannery cooling waters.

Behavior of Salmonellae During Manufacture and Ripening of Manchego Cheese, Margarita Medina, Pilar Gaya and M. Nuñez, Departamento de Bioquímica y Microbiología, Insituto Nacional de Investigaciones Agrarias, Apartado 8111, Madrid-D.P.35, Spain

J. Food Prot. 45:1091-1095

Six *Salmonella* strains were inoculated into 12 vats (2 vats/strain) of pasteurized sheep milk at a level of 10^4 cells/ml, and Manchego cheese was manufactured by usual procedures, with 1% of a *Streptococcus lactis* culture as starter. Growth of *Salmonella* occurred during the first 6-9 h, with mean increases in log counts of 1.67, 1.49 and 1.71 respectively for *Salmonella enteritidis, S. typhi* and *S. typhimurium;* data inversely correlated to pH decrease. Mean numbers of *Salmonella* declined during the first week by 4.43, 1.18 and 3.97 log cycles for the three serotypes, respectively, with a significant correlation between decreases in pH and in *Salmonella* log counts. *Salmonella* survived for 4 weeks in 9 vats, for 6 weeks in 3 vats and was absent from all lots of 8-week Manchego cheese. Brilliant green agar yielded the highest productivity among five selective agars used for the enumeration of *Salmonella* by direct-plating procedures, while enrichment in selenite cystine broth followed by streaking to bismuth sulfite agar gave the highest *Salmonella* recovery of all eight broth-agar combinations tested.

Production of Enterotoxin by a *Staphylococcus aureus* Strain that Produces Three Identifiable Enterotoxins, Alba Lucia Noleto and Merlin S. Bergdoll, Instituto de Microbiologia, Universidade Federal do Rio de Janeiro, Bloco 1, Cidade Universitaria, ZC32-Gb, Brazil, and the Food Research Institute, University of Wisconsin-Madison, 1925 Willow Drive, Madison, Wisconsin 53706

J. Food Prot. 45:1096-1097

Growth and enterotoxin production by *Staphylococcus aureus* strain FRI-996, producer of enterotoxins A, B and D, were determined over a 24-h period. All of the enterotoxins were detectable, when the count was around 10^7 colony forming units per ml, at the 1 ng/ml level for enterotoxins B and D and at the 4 ng/ml level for enterotoxin A.

Microflora and Flavor of Wild Rice Fermented Under Different Conditions, John H. Meilinger, Elmer H. Marth, Robert C. Lindsay and Daryl B. Lund, Department of Food Science, University of Wisconsin-Madison, Madison, Wisconsin 53706

J. Food Prot. 45:1098-1107

Changes in number and types of microorganisms in fermenting wild rice were studied. The effect of various microorganisms on keeping quality of wild rice during fermentation and on flavor of wild rice was also determined. Addition of microbial cultures and/or nutrient solutions did not increase the storage life of fermenting wild rice held at 21 or 5°C. Refrigeration of rice greatly increased the effective keeping time of the unprocessed grain. Periodic addition of a 0.1% (w/v) $(NH_4)_2SO_4$ solution apparently decreased the acceptable storage life of refrigerated (5°C) rice. Although unprocessed rice could not be kept beyond 10-14 d at 21°C without obvious changes in organoleptic quality, rice stored at 5°C remained acceptable for 7 weeks. Steaming wild rice for 15 min before fermentation generally caused a marked reduction in microbial load during the first few days of storage. Rice inoculated with *Streptomyces* sp. in a circulating nutrient medium to produce an "earthy" flavor was rapidly spoiled by microorganisms indigenous to rice. Cultures of *Pseudomonas perolens* and *Pseudomonas taetrolens* inoculated into rice stored at 5°C gave only mild methoxylated-pyrazine (green-earthy) flavors to resulting processed rice. In most treatments, bacteria and molds generally increased during the first week of fermentation, maintained a rather constant number for most of the remainder of the fermentation, and often decreased near the end of storage. Gram-negative, rod-shaped bacteria were the microorganisms most commonly isolated from fermenting wild rice. Many psychrotrophic bacteria were isolated from refrigerated (5°C) rice. Low-temperature storage greatly increased the keeping quality of rice, but unacceptable organoleptic changes eventually occurred at this temperature. Many bacteria isolated from wild rice were facultatively anaerobic *Enterobacteriaceae*. Although rice contained large populations of various types of microorganisms, the potentially hazardous *Bacillus cereus* and *Pseudomonas aeruginosa* were not found.

Effect of BHA, BHT and Potassium Sorbate on Growth of *Staphylococcus aureus* in a Model System and Process Cheese, J. L. Parada, J. Chirife and R. C. Magrini, Departamento de Química Biológica and Departamento de Industrias, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, (1428) Buenos Aires, Argentina

J. Food Prot. 45:1108-1111

The effect of added potassium sorbate (0.25%), BHA or BHT (100 or 200 ppm) on growth of *Staphylococcus aureus* in synthetic media having water activity and pH adjusted to values found in process cheese was studied. Potassium sorbate (0.25%) had no significant effect on growth of *S. aureus* in this model system at pH 6.0 and 30°C. BHA and BHT (100 and 200 ppm) showed some growth inhibition of *S. aureus* in a model system. However, both antioxidants were ineffective in preventing (or delaying) growth of various strains of *S. aureus* in inoculated cheese spread ($a_w = 0.976$, pH 6.0) incubated at 30°C.

Inhibition and Inactivation of *Staphylococcus aureus* in a Sorbate/Modified Atmosphere Combination System, P. H. Elliott, R. I. Tomlins and R. J. H. Gray, Department of Food Science and Human Nutrition, University of Delaware, Newark, Delaware 19711

J. Food Prot. 45:1112-1116

The combined effect of potassium sorbate, atmosphere composition and medium pH on viability of *Staphylococcus aureus* FDA S-6 was studied. Trypticase Soy Agar (TSA) containing 0.0, 0.5, 1.5 or 2.5% potassium sorbate was adjusted to pH 6.5, 6.0 or 5.5. *S. aureus* was exposed as a surface culture on the TSA and incubation was in a 100, 60 or 20% CO_2 atmosphere; vacuum or air control. Modest inactivation of *S. aureus* was achieved in the absence of potassium sorbate at pH 5.5, when exposure was in a 100% CO_2 atmosphere. In the presence of potassium sorbate, all atmospheres were inhibitory, with increased inactivation occurring at higher concentrations of sorbate and lower pH. Synergistic antimicrobial activity was optimal at pH 5.5 in the 1.5% sorbate/100% CO_2 treatment.

Inhibition of *Clostridium botulinum* 62A by Saturated n-Aliphatic Acids, n-Alkyl Formates, Acetates, Propionates and Butyrates, M. Dymicky and H. Trenchard, Eastern Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture, Philadelphia, Pennsylvania 19118

J. Food Prot. 45:1117-1119

Saturated aliphatic acids (C_1 to C_{20}) and n-alkyl formate, acetate, propionate and butyrate esters (C_1 to C_{20}) were evaluated to determine the minimum inhibitory concentrations (MIC) necessary to inhibit the growth of *Clostridium botulinum* 62A in a bacteriological medium. The C_1 to C_7 and C_{16} to C_{20} acids and esters were relatively inactive (MIC > 200 μg/ml). The C_8 to C_{15} acids exhibited some antibotulinal acitivity (MIC = 100 μg/ml), whereas C_8 to C_{15} esters were substantially more inhibitory. The n-alkyl formates, acetates and propionates having C_{13} to C_{14} groups gave the highest inhibition, with MIC's of 3.1, 6.3 and 6.3 μg/ml, respectively. The maximum inhibition for the butyrates (MIC = 12.4 μg/ml) was associated with C_{11} to C_{12} alkyl groups. A mathematical relationship between activity and alkyl group chain length was derived.

Growth Response of an Osmotolerant Sorbate-Resistant Yeast, *Saccharomyces rouxii,* at Differernt Sucrose and Sorbate Levels, Stephanie Bills, L. Restaino, and Lawrence M. Lenovich, Hershey Foods Corporation, 1025 Reese Avenue, Hershey, Pennsylvania 17033

J. Food Prot. 45:1120-1124

Effects of preconditioning *Saccharomyces rouxii* to various sucrose and sorbate concentrations were investigated. Cells were preconditioned to 0 and 60% (wt/vol) sucrose without and with 0.1% (wt/vol) sorbate by a series of four transfers in potato dextrose broth (PDB). The preconditioned cells were inoculated in growth medium containing 0, 30, or 60% (wt/vol) sucrose with 0. 0.05, or 0.1% (wt/vol) sorbate and in chocolate syrup without and with 0.1% (wt/vol) sorbate. Preconditioning of *S. rouxii* cells to 0 and 60% sucrose offered no advantage for growth in a medium containing 0, 30 or 60% sucrose. When *S. rouxii* cells were preconditioned in 0.1% sorbate, an increased resistance to sorbate occurred. *S. rouxii* cells preconditioned in 60% sucrose/0.1% sorbate were more sensitive to sorbate than cells preconditioned in 0% sucrose/0.1% sorbate. Regardless of the sucrose level, *S. rouxii* cells, preconditioned in 0.1% sorbate showed an increased resistance to sorbate when inoculated into the growth medium and the chocolate syrup.

Relationships of Bulk Tank Somatic Cell Counts to Prevalence of Intramammary Infection and to Indices of Herd Production, R. J. Eberhart, L. J. Hutchinson and S. B. Spencer, Departments of Veterinary Science and of Dairy and Animal Science, The Pennsylvania State University, University Park, Pennsylvania 16802

J. Food Prot. 45:1125-1128

Linear regressions and correlations between bulk tank somatic cell counts and (*a*) prevalence of intrammary infection (n = 80), (*b*) test day average daily milk and fat production per cow (n = 85), and (*c*) rolling herd average milk and fat production per cow (n = 83) were determined. The correlation coefficient between bulk tank somatic cell count and prevalence of infection was + .77 and the coefficient of determination was .59; prevalence of infection was thus the major determinant of bulk tank somatic cell count. Highly significant negative correlations were found between bulk tank somatic cell counts and indices of herd production.

Mutagenic Potential of Chemicals Associated with Tenebrionid Flour Beetle Secretions as Determined by the Ames Assay, Leonard J. Sauers, John T. Fruin and Linda S. Guthertz, Toxicology Group, Division of Research Support, Letterman Army Institute of Research, Presidio of San Francisco, California 94129

J. Food Prot. 45:1129-1130

Infestation of flour and other stored products by the tenebrionid (flour beetles) has been proven a health hazard to the public. Secretions from these insects have been found to be harmful toxicologically. These secretions also possess characteristics typical of mutagens. Therefore the mutagenic potential of 2-methyl-1, 4-benzoquinone (MBQ), 2-ethyl-1, 4 benzoquinone (EBQ) and 1-pentadecene (P-dec) was assessed by using the Ames Salmonella/Mammalian Microsome Mutagenicity Assay, a screening test for detection of mutagens. Tester strains TA 98, TA 100, TA 1535, TA 1537, and TA 1538 were exposed to doses of 10^{-1} mg/plate to 3.2×10^{-5} mg of MBQ/plate, 10^{-2} mg/plate to 3.2×10^{-6} mg of EBQ/plate and 1 mg/plate to 3.2×10^{-4} mg of P-dec/plate. No evidence of mutagenic potential was observed at the levels tested.

Persistence of Polioviruses in Shellstock and Shucked Oysters Stored at Refrigeration Temperature, John T. Tierney, Robert Sullivan, James T. Peeler and Edward P. Larkin, Virology Branch, Division of Microbiology, Food and Drug Administration, Cincinnati, Ohio 45226

J. Food Prot. 45:1135-1137

Poliovirus persistence was monitored in shellstock and shucked oysters stored at 5°C. The oysters either bioaccumulated viruses from seawater contaminated with feces-associated or cell-culture-grown viruses or they were innoculated with a needle and syringe. The viruses were detected in the oysters for > 28 d, the longest estimated time period between harvest and consumption of fresh oysters. These results indicate that if oysters are contaminated when harvested, they will probably be contaminated when purchased for processing in the home or food establishment.

Effect of Acids and Sorbate Combinations on the Growth of Four Osmophilic Yeasts, Lawrence Restaino, Lawrence M. Lenovich and Stephanie Bills, Hershey Foods Corporation, Hershey, Pennsylvania 17033

J. Food Prot. 45:1138-1142

The effects of hydrochloric, citric, lactic, phosphoric and malic acids in combination with potassium sorbate on the growth of *Saccharomyces bailii, Saccharomyces acidifaciens (Saccharomyces bailii* var. *osmophilus), Saccharomyces rouxii* and *Saccharomyces bisporus* were evaluated. Double strength potato dextrose broth supplemented with 58% (wt/vol) sucrose, 14% (wt/vol) glucose, and 0.2% agar acidulated to a pH of 5.0 to a final a_w of 0.88 to 0.89 was used as the growth medium. In general, at 0.05% potassium sorbate, *S. rouxii* and *S. bisporus* were more resistant than *S. bailii* and *S. acidifaciens* to the antimycotic agent independent of the acid used to acidulate the growth medium, whereas 0.1% potassium sorbate inhibited the growth of the four yeast strains. At 0.05% potassium sorbate, growth occurred (1 log number yeast cells/ml) for *S. acidifaciens* in the lactic acid/sorbate combination after 36 h of incubation, whereas a bacteriostatic relationship existed for the other acids employed. Citric acid potentiated the antimicrobial effectiveness of 0.05% potassium sorbate at pH 5.0 against the growth of *S. rouxii* and *S. bisporus* by either delaying the lag phase or reducing the growth rate.

Increased Free Fatty Acid Concentrations in Mastitic Milk, Roar Gudding, National Veterinary Institute, P.O. Box 8156 Dep., Oslo 1, Norway

J. Food Prot. 45:1143-1144

The concentration of free fatty acids in milk was positively correlated with California Mastitis Test scores and with somatic cell counts from the Fossomatic cell counter. Milk from cows with infectious mastitis had greater concentrations of free fatty acids than milk from cows with nonspecific mastitis. Lipolysis was greatest in milk from quarters with *Staphylococcus aureus* mastitis.

Principles and Practices of Modern Meat Technology, C. L. Kastner, Department of Animal Sciences and Industry, Kansas State University, Manhattan, Kansas 66506

J. Food Prot. 45:1145-1148

Technological advances offer considerable potential for the meat industry, and many of these advances may directly influence the microbiological characteristics of meat and meat products. Current and potential industry practices are summarized in light of their impact on not only the microbiological and sensory qualitites of meat and meat products, but also processing efficiencies. Microbiological implications of various technologies are emphasized in an effort to indicate some criticial control points that should be understood if the industry is to realize the full potential of those technologies.

Microbiological Aspects of Poultry and Poultry Products - An Update, F. E. Cunningham, Department of Animal Sciences, Kansas State University, Manhattan, Kansas 66506

J. Food Prot. 45:1149-1164

This update summarizes recent research related to incidence and control of microorganisms contaminating poultry and poultry products. Several reports are cited on numbers and kinds of bacteria likely to be present on poultry carcasses. Discussion includes both pathogenic and spoilage organisms. Studies on lesser known pathogenic bacteria are included. Numerous techniques are described that could disinfect the poultry carcass and extend the shelf life of products. Some of these techniques are not used commercially, but some of the methods discussed could show considerable promise. Further-processed poultry items have been studied less than the refrigerated, ready-to-cook carcass; however, several studies deal with the problems of microbial contamination of cooked, canned, dried or frozen products.

Role of Government in Research on Meat Microbiology, A. W. Kotula, Meat Science Research Laboratory, U.S. Department of Agriculture, Beltsville, Maryland 20705

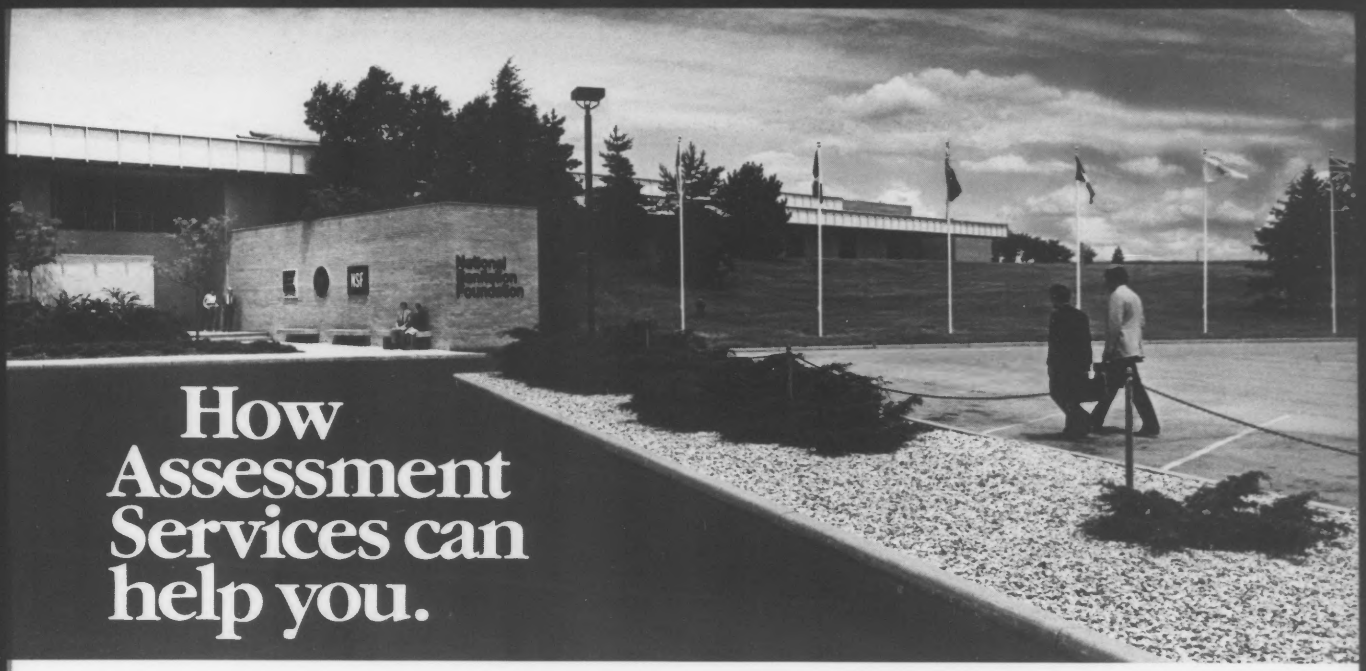
J. Food Prot. 45:1165-1168

This paper does not present new scientific data but rather is an attempt to explain the role of the government microbiologist in meat research. His involvement usually centers on filling actual and potential voids in the data collection process. He serves in a trilateral cooperative effort with academia and industry to provide data on developing technology, meat safety, method development and improved microbiological quality of meat. Examples of research in each of these areas are presented. Some of the examples are used to describe research which was of questionable value because though published, the research data have not yet had any measurable impact on the industry, the consumer, other scientists or the action agencies. Some ideas, presented for improving the effectiveness of the government meat microbiologist, include (*a*) developing and publicizing lists of research needs, (*b*) timely sharing of research findings, (*c*) minimizing repeated duplication of research, (*d*) prior clearing of protocols with end users of the research findings, and (*e*) adequate planning before the research is initiated. Possibly the most important concept presented is that the end product is not publication of the data in a peer scientific journal, but rather that the research is of adequate value so once published it is used by the meat industry, the action agencies or other scientists.

Microbial Control of Meat - A Retailer's Approach, Robert L. Winslow, Food Technology Division, Safeway Stores, Incorporated, Fourth and Jackson Streets, Oakland, California 94660

J. Food Prot. 45:1169-1172

Fresh meats and poultry contain bacteria at the time the retailer receives them from the supplier. To protect customers from foodborne illness, control product loss and improve shelf life, the retailer strives to minimize further contamination and growth of these bacteria. With no bactericidal processing of the meats approved for use by the retailer, microbial control is achieved through the control of (*a*) market cleanliness and sanitation, (*b*) temperature and (*c*) product movement and rotation by concerned market employees. These bacterial control techniques are not new to the non-technically trained butcher or meat cutter who has been thoroughly schooled in the adage that to control meat losses you must "(*a*) keep it clean, (*b*) keep it cold and (*c*) keep it moving." The effectiveness of the retailer's meat microbial control program is largely dependent upon the thoroughness of each individual market employee's adherence to details of these principles.

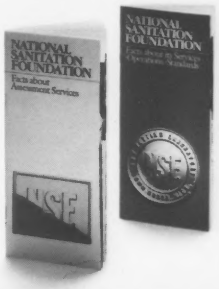


How Assessment Services can help you.

At the National Sanitation Foundation, the Assessment Services group evaluates products, systems, and services not covered by our Listing and Certification Services. We undertake special testing, research, demonstration projects, and studies for industry, service companies, government, and individuals with health and environmental concerns. The objectivity and integrity associated with NSF make Assessment Services unique. We provide specialized physical, chemical, and microbiological testing, including field testing by trained professionals. It could be just the help you need! Some examples:

Disposable containers

Microbiological testing and plant inspection services are provided to 10 manufacturers of disposable containers through the Single Service Institute. The routine testing required by state regulatory authorities and voluntary plant inspections are carried out in accordance with US Food and Drug Administration standards.



Find Out What Assessment Services Can Do For You!

Write or Phone for Free Information:

- Assessment Services Brochure
- NSF Facts Brochure

Water Disinfection Systems

A study of cruise vessel drinking water disinfection systems was performed for the Centers for Disease Control to assist them in protecting passengers' health.

Water Treatment

Under a contract with the US Environmental Protection Agency, we are studying the costs, maintenance requirements, and effectiveness of various small central systems and point-of-use units to reduce fluoride levels in drinking water.

Hazardous Wastes

In another project, the solidified product from a hazardous waste chemical treatment and solidification process was rigorously tested for leaching of hazardous or toxic constituents. Test results were provided to the state regulatory agency reviewing the process.

Wastewater Treatment

Under contract with manufacturers, new products have been tested and evaluated for their effects on various onsite wastewater treatment systems.

Please contact Assessment Services for more information, or to discuss your needs in detail. Inquiries from anywhere in the world are welcome.

National Sanitation Foundation

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

SURGE BACKFLUSH. THE DEADLY SHOWER FOR BACTERIA.

ECONOMICAL. Studies indicate that the average dairyman can lose over $100 per cow each year to mastitis. Think what that could cost you... every year. The Surge Backflush System offers control over spreading mastitis at the most vulnerable point in a milking operation... the milking unit itself.

THOROUGH. Surge's five stage cleaning and sanitizing process just doesn't give mastitis much of a chance. After the cow is milked out, the milking unit is switched to the backflush position. A water rinse then removes residual milk and the unit is flushed with iodine. Contact time kills bacteria. This is followed by a clear water rinse removing any remaining iodine and a final blast of air removes left over water.

FAST AND AUTOMATIC. The entire system takes just a shade over 60 seconds and it all takes place automatically. Fresh and ready for the next cow.

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