BOOK REVIEW


This book, originally printed in 1938, is designed to serve as a text for use of college students in a first course in dairying. In the revised edition, the material is discussed under the three main headings of dairy cattle, dairy products and dairy farming. Needed new information dealing with the selection of individual dairy cattle, maintaining a profitable herd, a cropping system for dairy farms, prevention and care of diseases affecting dairy cattle, nutrition deficiencies, dairy farm buildings (including equipment) and plans for acquiring a dairy farm have been added by the author. In the appendices new material has been added, including a list and history of the dairy organizations and up-to-date score cards on dairy products and dairy cattle. The tables dealing with nutrition of dairy cows have been shortened with some elimination and other tables covering growth of dairy cattle have been added. At the end of each chapter there are questions on the important points covered. The book is well organized, illustrated and indexed. C. Y. Cannon

ANIMAL DISEASES

W. D. POUNDEN, SECTION EDITOR


Aureomycin was used for treatment of 91 quarters with chronic staphylococcal infections. Except for 1 animal, all of the animals treated were from 2 herds. Diagnosis of the infection was made by isolation and identification of the causative organism. Of 70 quarters infected with *S. aureus* treated with 1 200-mg. dose of aureomycin hydrochloride, 34.3% were considered freed of the organisms. *S. aureus* was eliminated in 68.5% of 35 quarters by the administration of 2 injections of aureomycin. The drug had little or no effect on 2 cases of *E. coli* infection or 12 cases of chronic streptococcal mastitis. The aureomycin was incorporated in an ointment base and dispensed in collapsible tubes. The drug was injected from these tubes directly in the teat canal after the regular milking period. The conclusions were that aureomycin is of definite value in the treatment of chronic bovine staphylococcal mastitis. B. B. Morgan


The bactericidal action of subtilin and bacitracin was tested against several strains each of *Str. agalactiae*, *Str. uberis* and hemolytic staphylococci on blood agar plates. *Str. agalactiae* was the most resistant to these antibiotics. A combination of bacitracin and penicillin was more effective than either one alone in preventing growth of these 3 groups of organisms. The *in vitro* tests indicated that these antibiotics should be effective against such organisms in mastitis cases. Infusions of subtilin, bacitracin and penicillin-bacitracin combination both in single and double doses were made into udders of cows known to be infected. Improvement in appearance of milk and clinical condition followed, and the udder tolerated the substances without noticeable disturbance of milk production. No significant permanent elimination of infection occurred, however, so these antibiotics were judged to be no better than others now generally available.

E. W. Swanson


Examination of the gross and microscopic changes produced by mastitis infection in 18 udders from herds in which complete ante-mortem history and examination were available and 7...
Nineteen of 43 quarters with no clinical history of udders without antemortem information was made. Typical cases were described in detail. Nineteen of 43 quarters with no clinical history of mastitis were eliminating streptococci, and 13 of these showed varying areas of focal mastitis. More detailed examination may have revealed similar conditions in the remaining 6. Of 24 mastitis were eliminating streptococci, and 13 of those found in streptococcic mastitis. Palpation was found to be a poor method of diagnosing fibrosis. Firm areas in the gland were most often interstitial edema and retained secretions. Atrophy and fibrosis were most often found together. The inflammatory foci were characterized by a blocking of the small ducts with fibrin, leucocytes and organisms with a consequent distension of the alveoli with secretion and edema in the interstitial tissues. Following stasis of secretion, large numbers of organisms developed in the milk areas and the epithelium was destroyed. The principal site of the inflammatory changes was the ventral portion of the gland. Long standing cases had extensive areas of atrophy and fibrosis with a thickening and roughening of the large duct and cistern walls. These changes were readily detectable by gross inspection of the dissected gland. The indications were that inflammation was caused by and accompanied in infection and aided the progress of infection by hindering the normal milk flow. A difference in susceptibility of cows is postulated on the basis of the wide variation in pathological changes which were poorly correlated with the duration of infection.

E. W. Swanson


Presence of Br. abortus infection was detected by inoculation of guinea pigs and by cultural means in several groups of naturally and artificially infected cows over periods of 2 yr. Bacteremia was compared in unvaccinated, strain 19-vaccinated and strain 45/20-vaccinated cows. It was lowest in strain 19-vaccinated and highest in strain 45/20-vaccinated. Peak bacteremia was reached at 2 wk. Highest levels of bacteremia were accompanied by high abortion rate and high persistence of the infection. Groups of 24 naturally-infected and 38 artificially-infected cows were followed for successive pregnancies up to the 9th. Eight animals in each group ceased shedding Br. abortus. Recoveries of Br. abortus from uterine material, colostrum and blood and the number of abortions revealed no detectable difference between the course of natural and artificially produced infections. One group of 18 cows was artificially infected with a virulent strain of Br. abortus. The distribution of the organism was followed therein for 2 pregnancies, followed by autopsy of 15 cows and examination of the lymph glands for Br. abortus. Udder infection occurred in 17 of these cows and persisted in 16. The supramammary lymph gland was the commonest site of infection. Genital infection was erratic but was most persistent in a repeat-breeder cow. Br. abortus was found in 1 cow for 97 wk. and in another for 101 wk. Br. abortus was not found in spleens, livers, kidneys, ovaries, vaginas, bile, urine or mesenteric or iliocecal lymph glands from this group of cows.

E. W. Swanson


The ring test, conducted by mixing 1 drop of stained Br. abortus antigen with 1 ml. of milk and noting after about 1 hr. the amount of the dye in the cream layer and skim milk layers, has been widely used in Denmark in a brucellosis control program. The application of the test in Minn. herds under an area control plan was investigated in 9 counties. Since most of the herds marketed cream, an adaptation of the test for cream samples was developed. Most of the tests were taken before the country-wide blood tests. The blood and ring tests agreed in 96.2% of 8,469 herds. The ring test was 68% efficient in locating infected herds; however, 65% of the infected herds not located did not have an infected cow in production so the ring test was 88% efficient for infected herds in which the infected animals were producing. False positives from the ring test were attributed to contamination of the milk weighing vat, frozen milk and imperfect technique. The test is proposed as a helpful adjunct to the blood test on the area control plan.

E. W. Swanson


The authors tested placental tissue of 33 serologically positive cows and found that 13 (39%) contained C. burnetii. Some placental tissues were infectious for guinea pigs after diluting as high as 1–100,000,000. They also found that C. burnetii was encountered more often during first parturitions than in subsequent ones.

A survey made in 1949 showed that 93 anthrax outbreaks were reported from 16 states with a loss of 773 animals. The outbreaks were sporadic and occurred primarily in cattle. Of the 93 outbreaks, 56 occurred in California, Louisiana and Texas. During the 5-yr. period from 1945–1949, 597 outbreaks involving 7,909 livestock in 32 states were reported. Abattoirs under Federal meat inspection during this 5-yr. period condemned 38 cattle for anthrax. Twenty cases of anthrax occurred in man, 15 in agricultural workers and 5 in veterinarians. The conclusions were that anthrax was assumed to be free of tuberculosis, 1.8% gave positive reactions at the neck site, and 11.8% gave positive reactions at the neck site. The sensitivity of Johne's disease-infected cattle to tuberculin persisted for many months.

E. W. Swanson


A brief chronological review of the literature on bovine endometritis is given. The dates of the periodicals consulted ranged from 1843 to 1947. The paper is divided into several sections: (a) first controversial period: 1900–1924, (b) rise of “Nielsonism”: 1925–1935, (c) discovery of reproductive hormones: 1935 onward, (d) bacteriological aspects and (e) clinical research methods.

B. B. Morgan


Intradermal injections of johnin and tuberculin were made at 6-mo. intervals from 1940–1944 in a herd of 4,400 cattle. A summary of the Johne's disease-positive cattle showed that reactions to johnin from the candal fold site were not as sensitive as from a previously unused neck site, being 9.5 and 77.6%, respectively. Reading at 48 hr. gave about 50% more positive responses than reading at 72 hr. Although the herd was presumed to be free of tuberculosis, 1.8% gave positive reactions to tuberculin at the candal fold site and 9.5% to johnin from the candal fold site. Also see abs. no. 482.


This preliminary report covers a number of trials in which the Alfa process of continuous buttermaking is compared with conventional churning (in wooden churns) by using divided lots of the same cream under controlled conditions in an Australian butter factory. The average score of the freshly made butter was practically the same for both processes, but occasionally tallowy flavors would develop in the Alfa butter due to Cu contamination from accessory equipment. The microbiological quality of the Alfa butter was superior to that of the churned butter, as shown by consistently lower total counts and almost complete absence of yeast and coliform contamination. The moisture in the Alfa butter was better dispersed than in the churned butter. Moisture distribution and other physical properties of the Alfa butter could be controlled by adjustment of the brine temperatures in the transmutator unit. The Alfa butter was shiny in appearance and had better spreadability at low temperature than churned butter. It also showed greater tendency to oil off when standing at 86°F. for 3 hr.

Composition control in the Alfa process is accomplished by the continuous addition of salt and water (or skim milk); under good conditions water and salt contents could be adjusted within ±0.10% of the desired figure. The Alfa process shows an advantage in overrun of 1.1% (based on fat loss and composition), but a cost study indicated that its manufacturing cost was 0.3–0.4¢/lb. than that of churned butter. However, this finding was distorted by the fact that the Alfa unit was not operated at full capacity.

The Alfa process as applied in this study is suitable only for sweet cream, since neutralized cream would cause excessive sludge deposition in the separator and interfere with the composition control. Other aspects of practicability and operation of the equipment are discussed.

V. H. Nielsen

471. Comparison of several methods for determining the butterfat content of sour cream. C. B.
Sour cream was tested by the Babcock, Mojonnier and Roese-Gottlieb methods. Samples were obtained from vat pasteurizers after homogenization and standardization had been completed. The Babcock procedure used 30%, 18 g., sealed, long-necked, 0.2% graduated bottles, into which 18 g. of sample were weighed. Fourteen to 17 ml. of sulfuric acid were added in 3 portions, after which 5–10 ml. of water at 60 °C. were added. Centrifuging and reading of the tempered samples were according to the recommended Babcock testing procedure for cream. An average of the results obtained for 106 trials showed the Babcock procedure to be 0.30% below the Mojonnier method and 0.09% lower than the Roese-Gottlieb method. The Roese-Gottlieb method averaged 0.21% lower than the Mojonnier method.

J. A. Meiser, Jr.

CHEESE

A. C. DAHLBERG, SECTION EDITOR


Two widely separated outbreaks of bacterial spoilage of process cheese food were investigated. The defective packages were badly swelled, contained gas holes and possessed a very obnoxious, putrefactive odor. Non-fat dry milk solids were used in the blends and the defect became apparent in samples held at 100 °F. for 1–4 d. or in retail stores at summer temperatures in 1–2 wk.

An organism corresponding closely to Clostridium sporogenes was found to be responsible and was present in half the samples of non-fat dry milk solids used in the cheese food blends. Experimental batches made up with varying amounts of non-fat dry milk solids, with 2% casein digest and with 1-yr.-old cheese developed the defect when inoculated with the organism and incubated 5 d. at 98 °F.

O. R. Irvine


Heated and stored dried whole milk powders showed a marked loss of amino nitrogen, as determined by the Van Slyke volumetric method, when compared with fresh powder. No such loss was observed when the formol titration was used. Titration curves (from pH 6.0-11.0) of the powders suggested a mechanism for the protein-sugar condensation. The heating of synthetic mixtures of amino acids and lactose resulted in intense browning, accompanied by a loss of amino nitrogen when a large excess of lactose was employed (1:13), but no loss occurred when equal parts of sugar and amino acid were present.

O. R. Irvine


Details are given of the reconstituting process by which non-fat dry milk solids, butter and water are combined to make a 4.2% fat milk. Sixty-five lb. of water, 6.25 lb. of powder and 3.25 lb. of butter are mixed at 100-112 °F., after which the batch is pasteurized at 145 °F. for 30 min. It then is homogenized, cooled and packaged in paraffined containers. Introduction of the product resulted in a lowering of the price of milk from 85-30¢/qt. in this Yukon community.

O. R. Irvine

476. Special milk powders for manufacture of milk chocolate. H. A. Hollender (Abstract of a thesis for Doctor of Philosophy degree at the...
This thesis treats the subject of milk lipolysis and its effect on "milk" flavor of milk chocolate. Milk powders were prepared under varying temperatures and time treatment relationships with percentages of sugar from 0-10%. Powders then were incorporated into an experimental milk chocolate formula, heated and ground in a mortar to a plastic mass containing no visible particles of sugar or milk powders. Relation of free fatty acid to "milk" flavor was observed at 15 intervals. "Milk" flavor has a definite relationship to free fatty acids. Milk chocolate having the most desirable flavor has the highest free fatty acid content and the lowest pH. The lipase activity of the raw whole milk powders is accelerated by increased temperature of storage. This phenomena is not observed in milk chocolate containing milk powders prepared from properly forewarmed milk. Milk powders prepared with sugar seem to be conducive to best "milk" flavor. Tables are given to substantiate results. 

T. A. Eggers


A study was made of the keeping quality of Escudero's milk mixture (cereal water, milk, lactose, cream) used for feeding children. This mixture, when submitted to summer room temperatures (25 ° C.), became unacceptable within 24 hr. because of its high bacterial content. Increasing the acidity to 3.5% by the addition of lactic acid reduced the microflora development, and the product was acceptable for 48 hr. Acidification could be accomplished by adding lactic acid or milk fermented with Lactobacillus acidophilus or L. bifidus. An initial acidity as high as 3.5% was not necessary if the milk mixture was sterilized before inoculation with the pure cultures. The use of pure cultures had the disadvantage of requiring a bacteriologist.

L. S. Olsen


The fat/milk solids-not-fat ratio of milk is adjusted to 0.5-1.75/1 by the addition of butterfat. After concentrating to 40-70% total solids and pasteurizing in the range of 150–190° F. for 0.5–30 min., the product is homogenized while hot at a pressure in the range of 500-3500 lb./in.². This product is free of cooked flavor, keeps well at refrigeration temperatures, is easily spreadable, has a uniform and smooth texture and is resistant to changes in viscosity at temperatures encountered during storage and use. 

R. Whitaker


A number of experiments in a commercial bakery were made to test the possibility of using whey flour in the baking of bread. Substitution of part of the wheat flour by whey flour caused a smaller loaf volume; in using 2%, a volume decrease of 2.7% was obtained which could not yet be considered significant. Baking flour consisted of: I. 80% of wheat flour of foreign origin + 20% of flour of home grown wheat. II. 90% of mixture I + 10% of potato flour. In case II with 2% whey flour, 4.2% decrease in volume was found. This tendency to diminish the volume of the loaf was the only objection to the use of 2% whey flour, as other properties remained the same or were slightly better. Difference in processing or fat content of the whey gave the same result. Lactose, a lactalbumin preparation, casein and dried skim milk (roller and spray) all caused a greater decrease in volume. Use of 2% whey flour in bread would take away a good part of the whey surplus. It would be good from a nutritional standpoint, as minerals and vitamins would be supplied which are deficient in plain normal bread.

A. F. Tamsma


Whey is fed into the bowl of a centrifuge where an albumin-rich portion collects on the peripheral wall and a lactose-rich, albumin-free portion is removed from the central area. The albumin-rich portion, containing some lactose, leaves the bowl through ports, is collected and diluted with water and is directed back into the bowl through a channel ending at the ports. By proper balancing of the diluted albumin against the whey intake, a lactose-free albumin can be recovered from the ports.

R. Whitaker

To produce a dehydrated hydrolyzed starch product, free from hygroscopicity, the sirup is spray dried with milk. R. Whitaker

Also see abs. 503.

DAIRY BACTERIOLOGY

P. R. ELLIKER, SECTION EDITOR


The addition of 5.0 ml. of a 25% solution of sulfamethazine to 100 ml. of "drug-free" milk almost completely inhibited acid production when inoculated with 1% active buttermilk culture. One ml. and 0.1 ml. additions of the "drug" resulted in a developed acidity of 0.35% and 0.46%, respectively, as compared to 0.71% for the control. Thus, milk from 1 treated cow would render the milk from more than 80 untreated cows unfit for fermented dairy products.

The addition of 0.005 mg. of aureomycin hydrochloride to 1 ml. of "drug-free" milk greatly retarded the production of lactic acid in starters. However, reducing the concentration to 0.00005 mg. allowed a nearly normal acid production. A single infusion of 200 mg. of aureomycin hydrochloride thus would inhibit acid production in 1,000 lb. milk and retard it greatly in 1,400 lb. milk.

Milk from aureomycin-treated cows contained sufficient amounts of the "drug" after 12 milkings to retard acid production considerably. When 1% of the milk from the 1st milking was combined with 99% of "drug-free" milk, acid production was completely inhibited. Mixtures containing 10% of milk from treated cows and 90% of milk from untreated cows did not favor acid production until the 6th milking.

The use of penicillinase as an inactivator of penicillin in milk was not practical since the cost of the enzyme necessary to permit normal acid development exceeded the cost of the milk.

J. A. Meiser, Jr.


The pH of a chloramine-T compound greatly affects its germicidal activity. Those compounds with a pH higher than approx. 7.5 were found to be too slow for practical use where short exposure periods were used. Increasing the concentration of the chloramine-T compound from 50-1,500 ppm. did not reduce the killing time sufficiently to equal that of even the more alkaline hypochlorites at 50 ppm. concentration. A chloramine-T compound in a concentration of 250 ppm. with a pH of not more than 7.0 or a concentration of 500-1,000 ppm. at a pH of not over 7.5 appeared to have a germicidal action, in the absence of organic matter, as rapid as that of the slower (alkaline) hypochlorites at 50 ppm. The author reported that commercial chloramine-T products do not as a rule have a pH as low as 7.0-7.5 and concluded that, while chloramine-T compounds appear to have a limited value where rapid germicidal action is needed, they may be the sterilizer of choice under conditions where long exposure periods are necessary.

D. D. Deane


For the first time, bacteriophage active against multiple-strain starters has been demonstrated in Denmark. The phage did not survive a temperature of 85° C. (185.0° F.) for 5 min. or a temperature of 88° C. (190.4° F.) for several seconds. The bacteriophage was active against 11 of 14 isolated single cultures of lactic streptococci from "slow" starter.

One strain of the bacteriophage did not pass through a Seitz filter. Two electron micrographs showed that the head of the bacteriophage had a diameter of 0.15μ and the tail had a length of 0.30μ.

In a creamery that had experienced difficulty with slow starter, it was thought that bacteriophage from the air entered the starter and cream-ripening vats. After thoroughly sanitizing all equipment and atomizing a 5-10% hypochlorite solution in the various manufacturing rooms, no more difficulty was experienced.

The literature review contains 51 references.

G. W. Wilster


In testing for bacterial lipase a loopful of the culture is inoculated into 10 ml. of sterile skin

Lipolytic activity of a strain of P. fluorescens was greatest when the reaction medium was at approx. pH 8.9 at the start of a reaction period and when the reaction was carried out at approx. 42° C. The lipase hydrolyzes tricaprylin less readily than tributyrin. CaCl₂ inhibited activity. Lipolytic activity was greater in nutrient broth-base medium than in skim milk, but the former gelled when ether was added. Lipolytic activity and fluorescence were not related.

O. R. Irvine


This new principle in food preservation is based on the destruction of enzymes and microorganisms with subtilin and mild heat. Some of the non-spor-forming bacteria, particularly the Gram-negative ones, are resistant to subtilin but sensitive to heat, while the heat-resistant organisms, such as clostridia and thermophiles, are extremely sensitive to subtilin with mild heat. Peas, asparagus, corn, green beans, peeled potatoes, tomato juice and milk have been preserved from microbial spoilage by this method of treatment. Experiments with peas, asparagus and corn were described to illustrate the process and its effectiveness in food preservation. In general, the addition of 10 or 20 ppm. of subtilin prevented spoilage when these foods were sealed in no. 1 cans, and the cans heated in boiling water for 10 or 20 min. and then stored at 77 and 122° F. All of the control cans (without subtilin but heated) spoiled during storage. The possible physiological effects of continued use of foods containing subtilin and other antibiotics has not been determined, and additional information on this subject is needed before safe use can be made of this principle in preserving foods.

E. R. Garrison


Fifty-two cultures of coliform bacteria were isolated from olive brines by direct plating on Levine's E.M.B. agar after enrichment of the brines in glucose broth containing 10% salt. These cultures were identified as Aerobacter aerogenes, but differed from the common types of this species in their appearance on E.M.B. agar and from all other coliform bacteria tested because of their striking resistance to NaCl. In-
creased tolerance to salt, which extended up to 14.5% NaCl with some cultures, was obtained by periodically transferring the cultures to glucose broth with increasing salt concentrations. The additional resistance gained through acclimatization was adaptive and was readily lost when the bacteria were returned to a salt-free environment.

E. R. Garrison


Concentration of an acid-labile factor required for the growth of Leuconostoc citrovorum (ATCC 8081) was achieved by norit adsorption of liver extract (fraction S) and butanol extraction of the concentrated eluates. In media lacking folic acid the concentrates containing the citrovorum factor promoted the growth of Streptococcus lactis R (S. faecalis R) and Lactobacillus casei. The citrovorum factor stored at room temperature for 24 hr. in 0.1N HCl lost 90-100% of its activity for L. citrovorum, but only 41-48% of its activity for S. lactis R. A similar treatment of folic acid failed to alter its activity. The implication of these results are discussed; however, further purification of the citrovorum factor is necessary before a satisfactory interpretation can be offered.

H. J. Peppler


Chromatographic and cultural studies provided an indication that the “citrovorum factor” (CF) is a compound which contains folic acid. The attending observations further suggest that certain precursors are converted to B₁₂ (reaction A), which in turn participates in the conversion of other precursors into the desoxyribosides of guanine, adenine, hypoxanthine and cytosine. Also, folic acid is converted to CF (reaction B), which in turn participates in the reversible conversion of thymidine to the desoxyribosides. Previous findings established that vitamin B₁₂ or the desoxyribosides of either guanine, hypoxanthine, adenine, cytosine or thymine promote the growth of Lactobacillus leichmannii 313, while CF or thymidine, but not the other desoxyribosides or vitamin B₁₂, permitted the growth of Leuconostoc citrovorum 8081 in a purified culture medium. Thus, L. leichmannii may accomplish step B in the above scheme, but not step A, while L. citrovorum would be able to carry out step A but not step B. The scheme is given further support by the discovery that L. citrovorum produced vitamin B₁₂ activity in purified media, and L. leichmannii synthesized CF.

H. J. Peppler


The relative degrees of utilization of pure optical isomers of methionine and formylmethionine in a defined medium by Lactobacillus arabinosus 17-5, Leuconostoc mesenteroides P-60 and Streptococcus faecalis R were determined by an acidimetric method. None of the bacteria utilized D-methionine or formyl-D-methionine at levels of 6µ or 10µ/ml. medium. Only S. faecalis utilized L-methionine and its formyl derivative; growth with the latter was slightly better than it was with free L-methionine. Pyridoxine was found ineffective in promoting the utilization of D-methionine by L. arabinosus.

H. J. Peppler

Also see abs. no. 461, 462, 472.

DAIRY CHEMISTRY

H. H. SOMMER, SECTION EDITOR


Milk lipase is determined by allowing 2 ml. of the skim milk to react on 0.6 ml. of tributyrin for 30 min. at 37°C. at pH 8.8 in the presence of borate buffer. The reaction is stopped by adding phosphoric acid and reducing the temperature, after which the reaction medium is extracted with ethyl ether. An aliquot of the ether layer then is titrated. The result of a blank determination is deducted from this value. Such factors as extraction efficiency, substrate concentration, pH, temperature and length of reaction period were examined and are discussed.

O. R. Irvine


See abs. 75.

496. New and improved methods of extracting fat from cheese, fresh curd and milk for fat acidity determination. J. F. BOWEN, E. G. HODGSON.

The milk used in this study was produced by a 70-cow herd composed of 5 breeds and was pasteurized at 143° F. for 30 min. in stainless steel vats. Riboflavin was added to 19 weekly samples of the freshly pasteurized milk in amounts of 0.0, 4.0 and 8.0 rag./1., and the milk stored in the dark at 10 ° C. Ascorbic acid determinations were made on the samples after 0, 24, 48, 72, and 96 hr. of storage. Additions of riboflavin did not increase rate of loss of reduced ascorbic acid in pasteurized milk. Samples fortified with 0, 4 and 8 mg. of riboflavin/l, showed an average loss of 77, 73 and 69%, respectively, of the original amounts of reduced ascorbic acid after 96 hr. of storage.

E. R. Garrison


The inhibitory effect of borate and other anions on alkaline phosphatase prepared from cow's milk and calf intestinal mucosa was studied in ethanolamine-HCl buffer containing sodium phenylphosphate; the phenol liberated was determined with the reagent of Poffin and Ciocalteu. Both milk and mucosa phosphatases were inhibited competitively by sodium tetraborate, apparently of the anionic type, while the inhibition of milk phosphatase by ethanolamine was found to be of the noncompetitive (cationic) type. Milk phosphatase closely resembles kidney and bone phosphatases and is distinguished from the intestinal mucosa enzyme by its higher pH optimum, lower enzyme-substrate constant (Ks) at pH 9.6, greater inhibition by cations and lesser interference by anions. The inhibitory effects of the anions phosphate, pyrophosphate, carbonate and arsenate on the alkaline phosphatases are given for comparison with the data obtained with tetraborate.

H. J. Peppler


Earlier studies (ibid., 26, 1: 112-122) of attempts to distinguish between 2 types of alkaline phosphatase by determining the relative effects of anions and cations have been extended to include observations on the effects of lysine, glutamic acid, carbonate and the ammonium ion. Milk phosphatase was inhibited to a greater extent by lysine and the ammonium ion than was the intestinal mucosa phosphatase; the latter enzyme was inhibited more strongly by glutamic acid and carbonate ion. Low substrate concentrations of lysine stimulated milk phosphatase. The results further the suggestion that there are 2 types of alkaline phosphatases, the intestinal enzyme and the milk enzyme, the latter appearing to be similar to the phosphatases of bone and kidney.

H. J. Peppler


Although the mechanisms of action of lactoperoxidase and horse-radish peroxidase appear to be identical, the oxidations of the milk enzyme proceed at a much faster rate than those of the plant enzyme. In spite of the differences between their hemes and proteins, both enzymes exhibit similarities in the formation of primary peroxide complexes, alkyl hydrogen peroxides and the oxidation of pyrogallol and ascorbic acid.

H. J. Peppler

Also see abs. no. 471, 473, 474, 523.

DAIRY ENGINEERING

A. W. FARRALL, SECTION EDITOR


The more common causes and methods of eliminating excessive waste losses in dairy plants are: (a) Leakage and drippage, such as the constant and continual loss of milk from improperly
assembled or fitted equipment. (b) Overflow, which can be greatly reduced if not completely eliminated by careful attention and by the use of liquid level control devices. (c) Spillage, largely due to careless handling. (d) Freezing-on, which can be minimized with adequate refrigerant controls and proper operation. (e) Willful waste. Perhaps the largest volume of milk solids entering the drainage system is put there more or less willfully or get there because no effort is made to save them. (f) Residual waste, the total losses from which may reach amazing proportions unless care is taken to allow time for proper drainage. (g) Separators, the open type of which produces large quantities of foam, causing loss of milk solids.

C. J. Babcock


The simplest device for measuring the flow of waste is a standard 90° V-notch sharp-crested weir located in a weir box and equipped with either a hook gauge or water level recorder. Instructions and detailed drawings for the construction and use of a weir are given. C. J. Babcock


Casein or other protein is dried on a perforated belt, by passing heated air countercurrently through the belt in a series of tunnel compartments. The moisture-laden air is reheated before entering the 1st compartment to cause the curd to adhere to the belt on its immediate entrance to the drying tunnel.

R. Whitaker


Success in the dairy processing field demands the use of a plant and facilities designed to meet, (a) present production requirements, (b) probable future expansion of the business without seriously disrupting operations and (c) high standards of efficiency and flexibility of operation.

Formulation of any expansion program should be based upon careful study and analyses of all factors involved. The probable cost of expanding an existing plant and facilities should be carefully weighed against the cost of a new plant. In making such comparisons, maintenance and operational costs should be carefully studied in addition to the initial investment. In 1 instance cited, savings of $20,000 in plant costs and $75,000 in operational costs over a 10-yr. period would have resulted from building a new plant rather than enlarging the old one.

A careful study of all factors will enable the plant owner embarking on a building program to do so with confidence, for his decisions will be based upon facts and not guesswork.

W. J. Gaulfield


Equipment is illustrated and described which has performed satisfactorily in maintaining uniform temperatures in unrefrigerated storages during the period Oct. 4-Apr. 19, at levels of 32 and 40°F. The storage rooms are equipped with constantly-running fans to ensure air circulation within the rooms. Cooling is accomplished by drawing air through a duct at floor level past an automatic shutter. Warmer air is expelled from the room at ceiling level past an automatic shutter by a fan connected to a differential thermostat and operates when the outside air temperature is below that within the storage. This fan also is cut off thermostatically when the room temperature falls to the desired level. A thermostatically controlled heat source also is connected to the air circulation system and may be used if necessary. The specially-designed differential thermostat is described and the performance of the equipment is related to weather records for the district.

O. R. Irvine

Also see abs. no. 470.

DAIRY PLANT MANAGEMENT AND ECONOMICS

L. C. THOMSEN, SECTION EDITOR


Edisto Farms Dairy of Columbia, S. C., has inaugurated a tanker pick-up system which promises to improve quality and at the same time bring other labor and product saving advantages inherent in bulk handling methods. The milk is cooled to 38°F. in stainless steel insulated refrigerated producer's tanks on the farm. A milk pump with piping for transferring the milk is carried on the tanker. At each farm the amount of milk in the producer's tank is ascertained by measuring the depth of the milk with a stainless steel ruled measuring stick. At 2 farms the pick-up is made only 5 every other day but there
is no significant difference in bacterial count as a result of 2 d. holding on the farm. A charge of 20¢/cwt. is made for the tanker pick-up service. As the milk is transported in bulk in a well insulated tank there is only about 1° F. rise in temperature during transportation. The system is a labor saver as the handling of both full and empty cans is eliminated. C. J. Babcock


Efficient plant management requires a continuous inspection of the following business phases: (a) physical plant, (b) procurement, (c) processing and (d) sales. Sound judgement based on the above findings is the difference between a reasonable profit and complete failure.

J. A. Meiser, Jr.


Indirect expenses, which include office expenses, advertising, delivery and other administrative or commercial outlay, must be prorated to the various lines in a plant if a company wishes to determine the profit or loss per line. Advantages of this system are: (a) provides experience figures for setting up prices, (b) determines if sales volume per line is ample to cover overhead, (c) gauges efficiency of operations and (d) obtains a true picture of yearly profits.

J. A. Meiser, Jr.


The advantages of punched card accounting system are: (a) Reports are more easily obtained on time. (b) Special reports can be prepared more easily through the use of the punched cards, because once the information is recorded in punched form, a variety of reports can be printed other than the routine ones. (c) Routemen are relieved for more productive work since the machines do their “paper work.” (d) Reports are automatically printed by machines and, since they are on a standard form, they are much easier to read. (e) More comprehensive reports may be obtained just as easily as all routine reports and without additional expense. (f) It has reduced the cost of forms. (g) Due to the flexibility of equipment used, other applications also may be performed. The farmer’s payroll also is prepared. This includes checks, check registers and other product reports.

C. J. Babcock


Each product handled by the plant was rated according to the point system. Utilizing the previous month’s sales as the base period, each route man was given a base number for each by-product sold. The object of the contest was to meet this quota or better it. For men who sold 60-70% of their quota, an award of $2.50/mo. was given. Those reaching 90% or better received $5.00/mo. To insure added sales, the quota was changed each month, taking into account the seasonal demand for individual by-products. In addition to the above plan, incentive programs were incorporated to promote milk sales and reduce route returns. This latter contest paid cash bonuses of $5.00 and $10.00 for the leading routemen.

J. A. Meiser, Jr.


The weather, buying power, quality of product and merchandising effort are factors which will influence ice cream sales in 1950. For the first time in its history the majority of ice cream manufacturers engaged in a merchandising program concentrating their sales effort on a single flavor, cherry-vanilla.

The fluid milk industry is faced with a problem of disposing of an increased supply of milk resulting from a record production. Intensified sales training programs, now engaged in by many milk companies, are producing results.

Increased production of butter will necessitate greater sales effort. Such programs now are under way. Prospects are for increased imports of cheese and decreased exports; this may result in lower prices for cheese. The dry milk industry is faced with the problem of doubling domestic sales; failure to do so may result in a demoralized market. The outlook for the evaporated milk industry for 1950 is for a stabilized demand throughout the year.

Also see abs. no. 501, 504.

W. H. Martin

FEEDS AND FEEDING

W. A. KING, SECTION EDITOR


The conditions of exposure of finely divided alfalfa meal to oxygen are severe and most edible antioxidants lack sufficient activity to afford the
necessary protection. Structure of the compound appeared to be correlated with antioxidant activity. 2,5-disubstituted hydroquinones, p-substituted phenylenediamines, and derivatives of 2,2,4-trimethyl-1,2-dihydroquinoline were the most active compounds tested. Vegetable oils plus acetone were suitable solvents. The addition of increasing amounts of antioxidants gave increased stability but approached a limit above which additional amounts gave no effect. B.H. Webb


Finely ground samples of herbage collected at several periods during 1942 and 1943 were air dried and finely ground. Lignin then was determined by the standard (Manning-DeLong) and Crampton-Maynard methods. The results indicated that widely different amounts of lignin were isolated and that the fractions differed in purity, as indicated by nitrogen and methoxyl content. Absorption spectra on 3 samples of forage lignin when compared to that of wood lignin confirmed the presence of impurities in both types of fractions. The ratio of clover to grasses in immature herbage may influence the nature of the fractions isolated.

Samples of the above herbage were fed to a steer in 1942 and to sheep in 1943 and samples of the feces were collected and analysed for lignin. Oven drying resulted in higher apparent lignin content in the isolates than did freezing and extracting before drying. Lignin content on the 1942 samples isolated by the standard method ranged from 14.85–16.32% and by the C-M method from 23.92–26.69%. Nitrogen and methoxyl values showed the C-M fractions to be less pure. Spectrographic analysis and solubility values in sulphite solution indicated that both fractions were about 50% pure relative to wood lignin. The data, however, suggest that lignin is not demethoxylated in its passage through the animal.

The study reveals the need for more accurate methods of lignin analysis before this means can be used as an accurate index of digestibility of herbage.

O. R. Irvine


A crusher consisting of 2 spring-loaded steel rolls, 6 in. in diam. and 5 ft. long and driven by an auxiliary 45 h.p. engine is used to hasten the drying of hay in the swath. On early-cut hay, drying time was reduced from 2–3 d. to 1 d. by crushing. O. R. Irvine

GENETICS AND BREEDING

N. L. Van Demark, Section Editor


Observations were made on the semen of bulls with the ordinary and phase contrast microscopes. Using the phase microscope reduced the risk of artefacts which may appear in stained preparations. An attempt was made to classify certain morphological variations of the anterior portion of the head beneath the galea capitis as seen with the phase microscope. Three types were classified: (a) sperm with a dark zone under the anterior portion of the membrane of the galea capitis and separated from the nuclear substance by a narrow light zone, (b) sperm showing a diffuse grey zone below the anterior portion of the limiting membrane and (c) sperm showing a clear zone between the membrane of the galea capitis and the extremity of the nucleus. Ten good photomicrographs illustrate the paper.

B. B. Morgan


Egg yolk for diluting semen was prepared by homogenizing followed by lyophilizing egg yolk, sodium citrate (3%) and sulfanilamide (0.3%). This mixture was reconstituted at the rate of 3 parts yolk to 5 parts distilled water and filtered through cheese cloth. Survival time of bull sperm in the reconstituted egg yolk diluent was equal to that in diluent made with fresh egg yolk. Refrigeration of the lyophilized product for 30 d. at 40° F. was without effect. Pasteurization of the prepared diluent was not harmful and produced a product which could be stored refrigerated without development of contamination and without precipitation of yolk material.

E. W. Swanson

Three strains of mice were used to study the effect of fostering on the growth pattern of the mouse. The strains used breed true for size and have been designated as "large," "small" and "intermediate." The 14-d. mean weight of mice that received milk from "large" strain mothers is significantly different from those that received milk from either the "small" or the "intermediate" strain mothers. Although these differences tend to remain, they are not statistically significant at 140 d. The significance of these results are discussed in relation to the arithmetic and geometric concepts of polygenic growth.

O. R. Irvine

HERD MANAGEMENT

H. A. HERMAN, SECTION EDITOR


A pail of liquid calf feed, held in a slightly tilted position by a rack, is provided with a tube leading from the lowest corner of the pail to a nipple held in a horizontal position over the rack. Suction provided by the sucking calf draws the feed from the pail to the nipple.

R. Whitaker


A U-shaped stanchion is hinged on the bottom and attached to the floor by means of a chain; the top is attached to a bar but is arranged for easy opening and closing. The bar is attached to an upper support or to the ceiling by means of a centrally located swivel which permits rotary movement of the stanchion.

R. Whitaker

ICE CREAM

C. D. DAHLE, SECTION EDITOR


Commercial and laboratory prepared samples of carrageenin were heated in milk at 70° C. for 20 min., cooled rapidly to 10° C. and stored at 5–10° C. for 24 hr., when viscosity determinations were made. Suspending power varied from sample to sample but was closely related to viscosity (r = 0.98). The high viscosity of cold milk containing as little as 0.04% carrageenin appears to be due to the formation of a casein-carrageenin gel which is heat sensitive. Viscosity-concentration curves for whole milk and skimmilk were almost identical. That for dialysed milk was similar. The behavior of carrageenin in 0–0.5 N solutions of NaCl, CaCl₂ and KCl was also studied. The correlation coefficient between suspending power in milk and viscosity of 0.05 N NaCl was 0.91, suggesting that the latter could be used to predict the former.

O. R. Irvine


Agar, sodium alginate and carrageenin are food and beverage thickeners derived from 3 types of seaweeds. Canada has ample quantities of alginate- and carrageenin-bearing seaweeds which are harvested along the coasts of the Maritime provinces.

Carrageenin is a hot water extract of Chondrus crispus, known commonly as Irish moss or carrageen. The extract is filtered, concentrated and dried. It thickens foods by gelling and by reacting with milk protein. The addition of potassium salts increases the gelling temperature of the solution and the strength of the resulting gel. The stabilizing effect of small amounts of carrageenin in chocolate milk recently has been shown to be due to a gelling action on the milk proteins.

O. R. Irvine


Stabilizers aid in producing smooth texture in ice cream hydration, formation of a gel structure throughout the mix or reaction with certain milk constituents to form substances that take up water as water of hydration. In selecting a stabilizer, ease of incorporation into the mix, effect on mix viscosity, type of body produced in ice cream, ability of the stabilizer to retard ice crystal growth, quantity required to stabilize the mix and cost must be considered. Pertinent data with respect to 12 different stabilizing agents for ice cream are summarized by the authors.

Emulsifiers are ester combinations of long-chain fatty acids with a higher alcohol, such as glycerol or sorbitol. Emulsifiers may be classified into 3 groups which are: (a) a mixture of monoglycerides and diglycerides, (b) esters of fatty acids and sorbitol or other higher alcohols and (c) polyoxyalkylene derivatives of group b. The chemical structure of each group of emulsifiers is presented. Emulsifiers aid in promoting dispersion of the fat. They tend to orient themselves at the fat-water interface in the mix, thereby reducing interfacial surface tension and retarding clumping of fat globules. Emulsifiers do not re-
place stabilizers but provide a supplementary effect which results in a drier ice cream and possibly a smoother texture. Use of emulsifiers in ice cream has not been ruled on as yet by regulatory officials.

W. J. Caulfield

523. Shrinkage of ice cream as affected by the state of milk proteins. N. P. Tarassuk and J. T. Hutton, Univ. of Cal., Davis. Ice Cream Trade J., 46, 5: 44. May, 1950.

Shrinkage was determined by subjecting pint samples of ice cream, which had been stored at \(-10^{\circ}\) F. for 48-72 hr. and tempered at \(2^{\circ}\) F. for 3 d., to a vacuum of 230 mm. of mercury for 2 min. and then replacing them in the cabinet at \(2^{\circ}\) F. for 5 d.; the volume of water required to fill the space evacuated by the ice cream was determined. Surface tension, viscosity, \(pH\), titratable acidity and protein stability were determined, the latter by the temperature of coagulation on addition of 0.30 ml. of 2% \(CaCl_2\) to a 5-ml. portion of mix.

A modified Hull spectrophotometric test was used to determine the effect of incipient hydrolysis of proteins of the mix on shrinkage of ice cream. The higher concentration of milk solids in ice cream, as compared to milk, necessitated the addition of 20 ml. of 0.72 \(N\) trichloroacetic acid, in place of 10 ml. for the precipitation of proteins. Upon addition of the phenol reagent, the filtrate becomes cloudy and requires refiltration before making spectrophotometric color determinations. Abut 80% of the blue color developed in the test was attributed to tyrosine and 20% to tryptophane. Results were expressed in "tyrosine units." A unit is 1 mg. of tyrosine/1. of sample, or its equivalent.

A direct relationship between shrinkage and overrun throughout the range of 90-130%, was found to exist. Ice cream containing emulsifiers of the Span and Tween series contained smaller air cells and was more susceptible to shrinkage. Addition of diglycol laurate, a surface tension lowering agent, resulted in increased shrinkage due to the presence of free fatty acids. No correlation was found between the use of previously frozen milk ingredients (cream and condensed skim milk) and shrinkage.

Shrinkage susceptibility is markedly influenced by differences in milk from individual cows, possibly due to inherent breed characteristics. Wide differences in \(pH\) and protein stability observed in individual milks could not be correlated with shrinkage. However, the correlation between shrinkage and tyrosine value is outstanding. Aging of mixes resulted in a definite and consistent increase in shrinkage.

The addition to the mix of a hydrolysate prepared from acid-precipitated casein at the rate of 0.1% (calculated as dry unhydrolyzed casein) and the mix allowed to stand overnight increased shrinkage. These tests also indicated that products other than tyrosine were responsible for shrinkage.

Heat denaturation of lactalbumin and globulin were studied. As the heat treatment of the mix was raised, shrinkage increased. Whey proteins added to the mix to replace the proteins precipitated by heat markedly decreased shrinkage. The undenatured globulin fraction of whey protein was a factor in reducing shrinkage; addition of lactalbumin appears to increase shrinkage.

W. H. Martin


A too "rich" and "eggy" flavor, coupled with poor sanitation, are the reasons given for discontinued success of the old "custard" type soft ice cream.

The new soft ice cream industry is credited with starting in southern Illinois and northern Missouri and has made rapid gains on the Pacific Coast. The so-called soft ice cream machines are based on the principle of extruding ice cream, continuously or intermittently, at a temperature of about 16-19\(^{\circ}\) F.

A survey in Los Angeles County, Cal., reported that 36-40% of the ice cream sold is soft. Soft ice cream outlets in the county, on the average, sold 5 times the gallonage per store as did the competing conventional outlets. Owners of these stores are drawn from nearly all walks of life and the patrons represent a cross section of American life.

The success of these stores is due to guidance from franchise and equipment people in getting started. Beyond that they depend on the following: (a) Soft ice cream is good. (b) Soft ice cream usually is a low-fat, high-solids product which is not too rich. (c) The value of low overrun is recognized, 50-55% usually being taken. (d) These stores generally are operated under sanitary conditions. (e) They nearly always employ the drive-in principle. (f) The operation is kept simple and as a result is profitable.

Soft ice cream in California, it is felt, has decreased the sale of hard ice cream, whereas in other localities this effect is not so prominent. The ice cream industry should consider better merchandizing methods, improved sanitation, as well as the possible use of so-called "converts" which will convert small portions of hard ice cream into soft ice cream, or still another con-
verter which will extrude soft ice cream from a can of hard ice cream in a cabinet. W. C. Cole


A new type of combination package including a pint of ice cream and a transparent plastic “bag” of sundae topping in 1 convenient carton has been introduced by a number of ice cream manufacturers in the midwestern markets. The plastic bag which contains the proper amount of topping for 4 or 5 servings withstands subzero temperatures. Sponsors of the combination package believe that convenience, economy and the desire of the consumer for sundaes will result in increased sales of ice cream.

W. H. Martin


Redi-kut ice cream cake is made in a special 2.5-qt. mold consisting of 20 individual segments. The segmented mold may be filled direct from the freezer. The top of the mold then is clamped down. In the top of the mold and separate from it is a disk holding 20 metal spikes which become imbedded in the ice cream. After the mold containing the ice cream is passed through a brine tank, it is plunged into hot water, the top of the mold is removed and the segments of the cake adhere to the disc containing the spikes. The segments then are pushed by a lower movable disc onto the base of a cardboard cake-dispensing unit. A steel ring brings the segments together and a 0.5-in.-high flexible cardboard strip stapled to 1 edge of the cake-dispensing unit is closed with a clasp holding the cake in shape for decorating. The decorated cake is ready for delivery or storage in the hardening room.

W. H. Martin


A description is given of a rotating machine designed to automatically freeze, chocolate coat and wrap ice cream bars. It was developed in Denmark and Switzerland and is known as the RIA system.

W. C. Cole


A crisp pastry cup with tapering sides for nesting and a flared top portion having an internal notched ring to provide an anchorage for the ball of ice cream is described.

R. Whitaker


This device, easily attached to an ice cream freezer, has a sliding valve which, when lifted, allows the ice cream to pass through a suitably shaped opening into the package.

R. Whitaker


The ratio of lactose to mineral salts normally present in ice cream mix is increased 10% by addition of lactose to improve the flavor, impart an additional refreshing sensation when eaten and overcome “sickness,” especially in high-fat ice cream.

R. Whitaker


Experiments conducted by the Laboratory of Fruit and Vegetable Chemistry in Los Angeles in 1947 and since show that satisfactory frozen citrus purees can be prepared. Sound, mature fruit is washed with a good detergent and then rinsed well with cold water. Next, the stem end is cut off and other dark specks are removed; in the case of Navel oranges the “navel” end should be cut off. Next, the fruit is quartered or crushed and finally reduced to a puree by passage thru a mechanically driven screwing device with minimum incorporation of air. Screen sizes of 0.027 and 0.033 are preferable when purees are intended for use in sherbets, ices, pies and beverages, but larger sizes are better where the purees are to be used for marmalades, jams or toppings.

The yield of puree from whole fruit is about 50–60%; 0.65–0.75% peel oil is recommended. To control the oil content it may be necessary to pass part of the fruit thru an abrasive machine before it is quartered or crushed in order to remove most of the oil sacs.

One part of sugar is added to 5 parts of puree. This mixture then is placed in containers and the contents frozen in an air blast at sub-zero temperatures. The containers are stored at 0–10°F. Lacquered or enameled cans are recommended for high-acid purees. Purees can be kept satisfactorily for more than a year.

Navel orange purees can be stored for several months without bitter flavors developing but upon prolonged storage, the purees gel. This problem now is being studied.
Orange and lemon purees have been used successfully in commercial milk sherbets and water ices. Sherbets with 2.5% butterfat were considered better than water ices. It is recommended that 14–18 oz. of 5:1 orange puree and 1.5 oz. of citric acid (50% solution) be added per gal. of sherbet mix.

W. C. Cole


A new type apple juice and the use of apple juice concentrate in ice cream is reported. Ice cream made with this concentrate appeared like vanilla ice cream but had a strong true apple flavor. The success of apple ice cream depends upon the preparation of the juice and concentrate.

McIntosh apple juice was prepared by the ascorbic acid method of Pederson (1947) and Holgata, et al. (1948). The concentrate was prepared by the freezing concentration described by Pederson and Beattie (1947). The ascorbic acid inhibits the action of oxidizing enzymes during extraction, deaeration and pasteurization. Pasteurization was accomplished at 165–175°F. for 20 sec., with cooling in 30-lb. enamel-lined cans. Concentration to 3.6:1 was accomplished by slow freezing to the desired degree and then removing the ice by centrifuging. McIntosh apples will yield 60–65% juice; it is claimed.

This McIntosh juice concentrate was used in ice cream to the extent of 24%. Baldwin concentrate blended with McIntosh 1:4 gave a good product but other concentrates were too acid. McIntosh concentrate was the best product tried.

W. C. Cole


Chocolate almond ice cream has been introduced by the Borden Co. The almonds are chocolate coated and then injected into vanilla ice cream in the same manner as cherries or other fruits. Nationwide promotion has been placed behind the new flavor with full page advertisements appearing in several of the leading magazines.

W. H. Martin


On the west coast there has been an increase in the sale of packaged ice cream, resulting in a decline in bulk sales as a percentage of total sales. Dealers have not pushed hand-packed ice cream. The sale of soft ice cream also has cut into the sales of bulk ice cream. To cope with this situation, Carnation Co. has been holding dealer meetings for the purpose of teaching them to dip bulk ice cream and to make attractive fountain items. Dealers have been shown that a gross margin of 33 1/3% will result in increased sales and a greater net profit than resulted when a 43% gross was taken. Other dealer helps in the form of point of sale advertising, proper location of display cabinets and properly trained personnel should be provided as a means of increasing bulk sales.

W. H. Martin


The Bureau of Agricultural Economics of the U.S.D.A. estimates that the 1949 ice cream production was 553,705,000 gal. for the U. S. This amounted to a 3% reduction as compared to 1948. The largest percentage decrease occurred in New Jersey, whereas the southern states, as a group, showed the greatest decrease. Washington State showed a gain of 8% over 1948, which was the greatest increase shown by any 1 state. Sherbet production showed a 17% increase over 1948. Tabulated gallonages are given for the U. S. by months for 1949 and for states for 1948 and 1949.

W. C. Cole


Profits will be satisfactory in 1950 if ice cream manufacturers will refrain from giving unnecessary service and not offer items on which a profit cannot be made. Costs are likely to be up in 1950 because of increases in labor costs, increases in taxes and higher replacement costs, coupled with the possibility of reduced volume of sales. Costs on each item offered should be determined for the purpose of deciding whether or not the item should be sold. In figuring the cost of an item, material cost, manufacturing expense and truck and cabinet cost on basis of space occupied by the particular item should be considered. Greater operating efficiency and sales efforts may help to reduce costs and improve the profit picture.

W. H. Martin


The author stresses the importance of planning the menu for a fountain before the fountain is planned. Location is important in deciding upon
the menu, but some items in the menu usually will increase the sale of others. If a fountain in a drug store sells ice cream items only, it will do an average of 5–10% of the store’s business. Adding sandwiches may increase this to 12–15% and adding hot food can increase it to 20–30%. Adding hot food or any other service at a fountain necessitates planning for the problems that accompany such additions. In tabular form the author recommends the proportions of various items to use in various sized fountains. A discussion of costs, expenses and profits is given, and data reported in tables and charts serve as guides in determining these values. Examples in making such calculations are included. W. C. Cole


This is the concluding article in the series. The author outlines the considerations in deciding upon placement of fountain in store, type and shape of equipment and dimensions of equipment used. Drawings of the most common types of layouts are shown and the advantages and disadvantages of each type discussed. W. C. Cole


A study of consumer buying habits in super markets in 7 cities indicated that 59.1% of ice cream purchases were completely unplanned. This fact shows the need for major emphasis on the point of sale suggestion for buying ice cream. The industry should concentrate on the points that will help influence the sale of ice cream when the customer enters the store. Some of the tools and devices which may be used include point-of-sale-posters, a lighted super structure over the ice cream cabinet, the location of the cabinet in a strategic place, accessibility of packages, attractive package design and insulated bags to protect the ice cream while in transit to the home.

W. H. Martin


The Knerr Dairy of Fargo, N. D., has been successful in building up its volume of ice cream sales through the use of newspaper and radio advertising to help its many small dealers in rural towns to sell more ice cream. Spot radio announcements and co-sponsored athletic events on the radio and advertisements in small town newspapers and at the movie houses are some of the things which have been used as sales builders. W. H. Martin

Also see abs. no. 511.

MILK AND CREAM

P. H. TRACY, SECTION EDITOR


The sale of fat-free milk will not ruin regular milk sales unless it is sold as a cheap product; best results are achieved when the price is not more than 1¢ under the price of regular milk. A survey showed that 32% was sold as a baby food on doctors’ orders, 18% was being used by women during pregnancy because of its high calcium content and low fat, 36% was being used by persons on reducing diets and the remaining 14% was being used by the lower income groups because of the slight economic advantage. Members of the medical profession point out that about 20% of the people today should be using this type product since it is protein they need most, not fat; therefore, it is reasonable to assume that about 20% of bottled milk sales could be sold in this manner. If the value of skim milk and cream is utilized by selling more low-fat milk at a reasonable price, then butter can be sold at a comparative price of oleo and still make money.

There is a definite place in the market for this product and if the price is kept up so that a profit is made and not sold as an economy package, new markets can be captured. There has been a greater consumer acceptance with a low-fat, high-solids milk than with a purely fat-free milk.

C. J. Babcock


The Jacobson theory that for every increase of 0.1% in fat test an increase of 0.04% SNF occurs is cited. This theory is based on averages of 100,000 tests. According to this theory, 3% milk has an SNF content of 8.27%. Therefore, for each pound of fat in 3% milk there would be 2.75 lb. of SNF. Since each increase of 0.1% in fat means an increase of 0.04% SNF, then 5% milk would contain 9.07% SNF. The advantages of evaluating milk by the SNF-fat combination are as follows: (a) All types of milk would sell on an equal basis as far as both fat and SNF are concerned. (b) It would equalize the purchasing power of plants in localities which are receiving milk from milksheds on which varying types of milk are produced. (c) It would make it pos-

An improved pouring opening for paper containers for milk and other liquids, consisting of a cover-all flap to protect the pouring lip and the corner of the container molded in a rounded manner to facilitate pouring is described.

R. Whitaker


This cap for milk bottles comprising metal foil, laminated on the outside to paper and on the inside to machine glazed paper, extends over and protects the entire pouring lip. By having the glazed surface of the inner layer next to the foil and the rough side next to the bottle, any difference in pressure between the exterior and interior of the bottle is equalized, but the product does not leak, as this layer is gas permeable and liquid impermeable.

R. Whitaker


Preliminary results in the use of frozen cream to produce a 40% cream which will whip and which can be standardized down to 18% to produce a satisfactory coffee cream indicate that cream should be frozen and stored with a 40% fat content rather than as 50% cream, as is practiced for the ice cream industry. Best results are obtained by combining fresh cream and frozen cream on a 50-50 basis, heating the mixture to 140°F. or higher and then homogenizing at 150 lb./in.², single stage. The resulting mixture appears to be entirely satisfactory for commercial usage.

C. J. Babcock


In Nov., 1940, a Danish regulation provided that cream to be sold retail must not contain more than 20% fat. On Feb. 10, 1943, the rule was changed to 15% in cream sold retail. Consumers were not able to whip 15% cream satisfactorily. It had been made unlawful, in 1925, to add any whipping aid to cream.

A good whipped cream must have a fine aroma, flavor and appearance. The foam must have a certain firmness and be of a definite volume, while no wheying off should occur after standing for a time.

The volume increases with an increase in the fat percentage until an optimum fat percentage is reached for stabilizing the foam, which is formed only from the liquid phase of the cream; therefore, less foam will be formed when the fat percentage is high.

Cream contains more foam substance (Skumstoff), which is not composed of casein and albumin, but is the “membranestimme” that surrounds the fat globules. During whipping, many small foam lamellae, the walls of which must be strong, serve to hold the foam firm. The fat in satisfactory whipped cream should be present in small aggregations; large fat aggregates are undesirable as they cannot find a place on the lamella walls. The Danish experiments confirmed Hening's and Dahlberg's findings that it was possible to increase the viscosity and improve the whipping property of low-testing cream by reheating it. Cream of 15% fat was pasteurized and cooled to 2°C. (35.6°F.) and held at this temperature for 3 hr. The cream was slowly heated to 28–29°C., held at this temperature for 0.5 hr, cooled to 2°C. (35.6°F.) and left at this temperature until the following day.

Dahlberg's and Hening's findings that superior whipping property and greater viscosity of cream resulted when the milk was separated at 5°C., as compared with separating at 50°C. were confirmed. Cream obtained from milk that had been frozen had a poor whipping property.

For economical and technical reasons it might prove of benefit to reheat cream having a high fat content, cool it and then standardize with cold skim milk to the desired fat content. Reheating gives the best results when cream having a high fat percentage is used. When cream of a higher fat content for whipping purposes comes into general use again, the method of reheating the cream for increasing its whipping properties would have definite significance. By use of the heat treatment method, marketing 20% cream that has as good a whipping property as 30% cream is possible.
SANITATION AND CLEANING

Eleven tables and 2 illustrations are given in the article. There are 23 references. G. H. Wilster

547. 3-day-a-week retail delivery. W. Holm, Sec., Columbus Milk Distributors Assn., Columbus, O. Milk Dealer, 39, 7: 146-151. Apr., 1950.

Going from every-other-day delivery to 3-d.-a-week delivery eliminates Sunday delivery. The advantages of eliminating Sunday delivery are lower labor costs, fewer relief problems, employees like it, 52 less operating days for the plant and consumers like it. C. J. Babcock

Also see abs. no. 475, 497, 506.

PHYSIOLOGY AND ENDOCRINOLOGY

R. P. Reece, Section Editor


This paper is a review citing 80 references concerning the excretion of estrogens, androgens and progesterone. A critical discussion is presented of the observations concerning estrogen excretion by the cow in urine and feces and androgen excretion in cattle feces. E. W. Swanson

Also see abs. no. 498, 499.

SANITATION AND CLEANING

K. G. Weckel, Section Editor


Although physical force is largely responsible for removal of soil from dairy equipment, scrubbing can be reduced greatly by compounding cleaners for specific jobs. Protein removal by chemical action of alkali cleaners can be facilitated by use of wetting agents. Grease films which necessitate saponification are removed more readily after emulsification. Mineral deposits usually are removed by acid cleaners; these deposits can be prevented by alkali cleaners in combination with wetting agents. Although mildly alkaline all-purpose cleaners are used for cleaning equipment in dairy plants, different methods for applying these compounds must be used for the varied pieces of equipment. These methods are vat solution, solution pail, dry powder, solution spray and circulation. J. A. Meiser, Jr.

Also see abs. no. 483.