CHEESE


Milk to be used for the manufacture of roquefort cheese is modified by the addition from 0.7 to 1.5 mg. of iron for each 100 ml. of milk.

R. Whitaker


A growth-promoting factor for L. bifidus prepared by absorption from defatted, de-stéarinated, demineralized human milk. The factor is recovered in a highly purified form from the absorbent with acetic acid. Some information as to the nature of the substance is given.

R. Whitaker

DAIRY BACTERIOLOGY


A laboratory study was made to determine the effectiveness of hypochlorite, quaternary, and iodophor germicides on the destruction of lactie streptococci bacteriophage. A concentration of hypochlorite as low as 12.5 p.p.m. inactivated phage of S. cremoris within 30 seconds. A concentration of 100 p.p.m. of quaternaries was required to attain the same results. Iodophors were not effective, even in concentrations of 200 p.p.m., during 60 seconds of exposure.

It appears that sodium hypochlorite compounds are the most effective agents in controlling bacteriophage in dairy plants.

H. H. Weiser


Standard thermoduric and psychrophilic plate counts were made on raw milk samples from different farms and held at 36, 38, and 45° F. with periodic heating to 45° F. or 50° F. The plate counts were made daily for four days. At 36° F. there was no appreciable increase in microbial numbers. However, there was a noticeable increase in bacterial counts within one or two days. There was very little growth at 45° F.

No correlation was found between farm source of milk and bacterial growth. Summer milk was more favorable for psychrophilic organisms than winter milk.

H. H. Weiser


Nine per cent of the dwellings in the United States are without refrigeration. This condition prevails principally in rural areas of the South and West, and in migrant labor camps. In other countries, much of the population is without home refrigeration. There is a direct connection between this fact and the high rate of infant diarrheal diseases which result in death.

The growth of Escherichia coli and Shigella flexneri in feeding formulas containing four per cent commercial vinegar was measured. The acetic acid concentration in the formulas ranged from 0.214 to 0.224%. After in-
oculation with the test cultures, the formulas were incubated at 20 and 37° C. For comparison, identical runs were made on formulas with no added acid. Plate counts made at intervals up to 24 hr., demonstrated that the vinegar exhibited a bacteriostatic effect, and in some cases the counts were reduced to near zero. It is postulated that the growth inhibitory effect is the result of more than the influence of the H ion. The acetate radical, or possibly the undissociated acetic acid, may exert a specific inhibitory effect. For this reason, and also because of the low cost and availability of vinegar, its use is recommended over lactic acid or the mineral acids.

F. E. Rice


The author describes the procedure for a simple test for inhibitory substances, other than bacteriophage, in milk. The test, which is particularly sensitive to penicillin, and least sensitive to streptomycin, is not a platform test that can be used as a basis for accepting or rejecting milk on delivery, but it is adaptable to routine use.

An eight-week study revealed that 15% of the producers frequently contributed milk containing inhibitors, while 74% contributed positive samples only rarely, or not at all. Producer cooperation through proper educational programs should help in minimizing this problem.

J. J. Janzen

DAIRY CHEMISTRY


This article is a review of the literature of the various applications made by research workers, of the electrical conductivity of milk.

T. Kristoffersen


Milk from 42 Belgian creameries, evenly distributed throughout the ten provinces, was analyzed for major constituents. The samples for analysis were representative of the entire intake of milk at the day of sampling. Samples were taken monthly over a one-year period from March, 1955, through February, 1956.

Fat was determined by the Gerber method, protein by the micro-Kjeldahl method (factor 6.38), lactose by polarimetry, and total solids by the Mohrmoner method. The results show the following average composition of Belgian milk: fat, 3.46 ± 0.253; protein, 3.11 ± 0.242; lactose, 4.75 ± 0.104; ash, 0.706 ± 0.0157, total solids, 12.11±0.327.

T. Kristoffersen

DAIRY ENGINEERING


A sanitary-type pouring spout located in one corner of the top of a Canco-type paper milk-bottle.

R. Whitaker


A folding carrier for six bottles, such as quart milk-bottles.


A freezer with an auger-type dasher. A tube connecting the draw-off valve with the back of the freezer permits a portion of the frozen ice cream to return to the freezer, where it mixes with unfrozen mix and produces a smoother and more homogeneous, finished product.

R. Whitaker


A slit in the outlet pipe, through which the cream is discharged from a standardizing separator, permits measurement of the cream flow.

R. Whitaker


A filling nozzle for placing two flavors of plastic ice cream in ice cream cones, one flavor surrounding a core of the other flavor.

R. Whitaker

Portions of ice cream and similar products are deposited on a table in a refrigerated zone, and moved slowly outward toward the edge by rotating the table, until they are finally discharged, frozen hard, on a conveyor belt for packaging.

R. Whitaker


A description of the method of refrigerating the portions of ice cream described in Abstract 312. (Patent 2,784,566.) R. Whitaker

DAIRY PLANT MANAGEMENT AND ECONOMICS


The charges that no single factor has delayed the growth of bulk-tank cooling so much is its unfairness to the small-volume producer, and that it imposes a hardship on him, are not true. In New England, the economics of bulk tank total 29.5¢ per cwt. for the direct city-plant producer and 25.5¢ per cwt. for the country-plant producer. For a producer averaging 150 lb. per day, the added income at the rate of 25¢ per cwt. would amortize in five years, an added investment of only about $825. An added income of about 40¢ per cwt. is needed for the 150 lb. producer, to enable him to amortize an added investment of $1,000, plus interest, over a five-year period. The calculations use no savings in labor or electricity, no salvage value for the present equipment, and give no weight to more convenient, lighter labor. Bulk-tank cooling offers an opportunity for the small producer to lighten his work-load, become more efficient, increase his productivity, and improve quality. For all producers with higher production volume, the financial logistics appear to be indisputable.

C. J. Babcock


The Warren Sanitary Milk Company is concentrating on new customers, instead of competing for old business. The new customers are the students in the Warren schools. For a school milk program to be successful, cold milk must be available and accessible. Instances are given where the per capita consumption of milk increased from 0.16 to 0.77 and from 0.20 to 0.82, when vendors were installed in the schools.

C. J. Babcock


Every effort should be made to expedite the training of all new sales people. After at least four days of experience in their territories, they should be given individual instruction in the manufacture of dairy products, and the successful conduct of route sales, including the use of company forms. The initial training can spell the eventual success or failure of the man. The use of training aids and methods is discussed.

C. J. Babcock

FEEDS AND FEEDING


This article is an extensive review of the literature on the effect of various feeds and feeding practices on the composition and quality of milk. Major emphasis is placed on fat content and consistency, protein content, and vitamins A, B, and D.

T. Kristoffersen

HERD MANAGEMENT


A pipe line-type of vacuum-operated milker is described. A milk reservoir is provided which holds the milk under vacuum until the quantity collected is sufficient to open a gravity-operated valve, and deliver the milk to a large, refrigerated storage tank under atmospheric pressure.

R. Whitaker


Details are given for the construction of a bulk-milk cooler, suitable for farm use. A motor-driven, demountable refrigeration system cools a cooling liquid, which in turn cools the walls of the milk tank.

R. Whitaker

Feed is held in a bin, from whence it flows by gravity through gates to compartments accessible to the animals. R. Whitaker

ICE CREAM


A hand-operated device for forming cubical-shaped, individual portions of ice cream from bulk containers. R. Whitaker


Experimental data indicate that exterior aluminum laminates, aluminum foil containers, or aluminum overwraps will effectively retard deterioration in the body and texture of ice cream stored for 4 to 5 weeks in the top level of ice cream cabinets, where temperature fluctuations are the greatest. The use of aluminum foils or exterior laminates in packaging ice cream also prevented shrinkage of the ice cream. Samples of ice cream from the same batch packaged in waxed fiber, polyethylene, and styrene cartons, and stored under the same conditions, showed pronounced shrinkage and marked deterioration in body and texture. The use of a foil laminate inner liner was ineffective in retarding body and texture losses or preventing shrinkage.

The protective ability of aluminum can be attributed to its excellent heat-conductivity properties and, to a lesser degree, to its ability to reflect radiant heat. The application of colored lacquers to all aluminum foil containers did not affect their protective ability.

Aluminum foil laminates and overwraps were found effective in retarding temperature rise in ice cream exposed to room temperatures. The laminates and overwraps were comparable in insulating ability to a corrugated paper sleeve. The best protection against warm-up of ice cream exposed to room temperatures was obtained from the use of a heavily insulated Jiffy bag, or a corrugated paper sleeve with a foil overwrap. W. J. Caulfield


The various types of plastics, their properties, and their varied applications in the ice cream industry are discussed.

Polystyrene is most widely used for ice cream packages. Its light weight, and the fact that it can be produced in a wide variety of colored as well as transparent types, makes it especially desirable as an ice cream packaging material.

Polyethylene, when produced as a film, is used as can liners for transporting milk, cream, and ice cream mix. It may also be used as a wrapping material for brick ice cream.

The vinyl plastics are widely used in the dairy industry as flexible tubing for conveying milk and ice cream mixes.

W. J. Caulfield


Numerous suggestions for more effective merchandising of ice cream at supermarkets are listed and discussed in this article. W. J. Caulfield


The establishment of neighborhood dairy stores is a satisfactory means of selling ice cream and milk when it is impossible to bid on or to get chain-store business. Five stores operated by the Illinois Valley Ice Cream Co. are selling from 13,000 to 25,000 gal. of ice cream per store per year, and milk sales have averaged $25,000 per year.

Factors considered to be important to success in this type of business are proper pricing, proper merchandising, low overhead, and accessibility to the customer. W. J. Caulfield

MILK AND CREAM


The dairy industry should pay more attention to flavor of milk because the competition from other food products and within the dairy industry is more evident, and consumers judge the quality of a product by its flavor. Children are the best milk consumers and they detect off-flavor more quickly than most adults. In addition, methods used in the production and processing of milk have changed, and milk now is held for longer periods before it reaches the consumer. The flavors most often found in milk include those described as feed, weed, oxidized, rancid, barny and unclean, bacterial, salty, and foreign. The cause and prevention of these flavors are discussed. C. J. Babcock

NUTRITIVE VALUE

OF DAIRY PRODUCTS

This is a general summary of the present status of radiation sterilization of foods. It has been found that sterilizing doses of gamma radiation destroy large percentages of vitamin A, ascorbic acid, and tocopherols in milk. It is estimated that ten years of further study may be required before the radiation sterilization of dairy products can be considered commercially feasible. In dairy products, as in most foods, the destruction of micronutrients is one of the main disadvantages of this type of sterilization. Induction of radioactivity in foods does not constitute a hazard. Measurements of the treated foods, with the most sensitive detectors, revealed no induced activity.

F. E. Rice


Estimations of the minimum protein requirements for weight gain and for maintenance are tabulated for ages ranging from 0.5 month to 17.5 years. The sum of the two—requirements for weight gain and maintenance—is given as “total requirement.” These theoretical estimates are noted to be comparable to reported protein retention values that have been published. Calculations of protein intake by breast-fed infants indicate that in the early months these infants receive less than the theoretical protein needed for maximum protein storage.

F. E. Rice


The survival rate of premature infants, weighing 2,500 gm. or less at birth, was greatly improved by modifications of treatment made at this hospital. Observations on 974 unselected infants are included in this report. All infants weighing less than 2,200 gm. were started on lactose milk, and then graduated to an evaporated milk formula, before discharge from the nursery. Above that weight, the evaporated formula was given from the beginning. The feeding of premature infants poses no very real problem, and even the very small infants can be fed successfully with the various modifications of cow’s milk. Other conditions carefully regulated in handling the premature infants in the nursery were rigid isolation, high moisture content of the incubator atmosphere, use of oxygen only when indicated, and the prophylactic use of penicillin and vitamin K.

F. E. Rice


Six infants were fed synthetic diets at various levels of pure amino acids, including unessential as well as essential amino acids. In the lysine phase of the study, the minimal quantity which permitted normal growth was 90 mg. per kg. body weight per day. The data indicate that the lysine present in milk, as ordinarily fed to infants, covers the requirements for this amino acid, with an adequate margin of safety. The authors suggest that supplementation of the cow-milk formula with lysine is certainly unnecessary, and could possibly lead to amino acid imbalance, which is not without danger.

F. E. Rice

There has long been a controversy as to whether the higher levels of protein and minerals in a cow's-milk formula, as compared with human milk, are disadvantageous in infant feeding, or otherwise. Several investigators have observed higher retentions of nitrogen and certain essential mineral elements from formula feeding with cow's milk. Those who are apprehensive about the effect of such high retentions by a baby sometimes speak of “supermineralization,” etc. In the research reported in this paper, weaning rats were allowed to double their weights on diets of variable nitrogen and mineral content simulating the types of milk used in infant feeding. Total body analyses indicated that the lean body mass of young, growing animals consuming rations of variable protein and mineral content have essentially similar composition. (The extended discussion which followed the presentation of this paper also is reported. Some important relations to the feeding of infants were debated.) F. E. Rice


Composition of dairy foods is included in these tables, with special reference to fat, essential and nonessential fatty acids, and cholesterol; as well as carbohydrate, protein, and total calories. The data are compiled from various sources. F. E. Rice


This report goes directly to the question of whether a cow-milk formula, with its higher level of protein and electrolyte as compared with human milk, may be detrimental to the infant because of a possible excessive load of solutes presented to the kidneys. Calculations are made, and tabulated in terms of milliosmoles per kg. per day, which an infant would be required to excrete when fed human milk, or cow's milk, with and without added carbohydrate. The data demonstrate that the normal baby's renal capacity is not exceeded in the feeding of a cow-milk formula, particularly when that formula contains carbohydrate added to provide one-third of the calories. Under other conditions, and during periods of high environmental temperature, additional water should be given the baby to compensate for losses other than renal. It is concluded that there is no more reason to protect the infant against the increased renal load from cow-milk formula feedings, than there would be in the routine administration of antibiotics, just because the infant is exposed to harmful organisms. F. E. Rice


The preparation of low-sodium milk involves passing milk through an ion exchange resin in the cold (35 to 40° F.), which results in the replacement of sodium with an equivalent amount of potassium. While flavor is affected very little, there may be 50% losses in thiamine, niacin, and vitamin B6, and losses of calcium and B equivalent to 75% of their values in whole milk. The potassium content is increased to almost twice that of the original milk. The use of low-sodium milk is important in a low-sodium diet, because such a diet needs especially the protein, calcium, and riboflavin which such milk carries. The Council proposes a standard for low-sodium milk, and urges producers to make periodic analyses in order to assure compliance with the standard. F. E. Rice


Two international agencies (F. A. O. and W. P. O.) have adopted cow's-milk protein as a standard of reference in establishing protein requirements for various diets. This study was undertaken to determine the minimal requirements for this reference protein, cow's-milk protein, by small infants. Two infants were used. Weight gain continued to be satisfactory on reducing the protein intake, until it fell below six per cent of the total calories, or 1.85 gm. protein per kg. of body weight. The protein intake could be further reduced to four per cent of the calories without evidence of impaired nutrition, by supplementing the diet with the nonessential amino acid, glycine. Preliminary studies have indicated that urea also may have a protein-sparing action, though proving less effective than glycine. The findings point to the possibility of using simple, cheap nitrogenous compounds as protein-sparing agents, particularly in feeding programs for the so-called “underdeveloped” countries. The results tend also to correct the older assumption that cow's-milk protein must be fed to infants at higher levels than are required when human milk is fed. F. E. Rice


In vitro tests showed that milk and milk products, including butter, increased the coagulability of human plasma. Lard and margarine were less active. Other animal fats and vegetable oils similarly tested did not affect clotting time. In preliminary feeding tests with humans, the ingestion of two ounces of butter caused clotting time to be grossly altered when determined four hours after ingestion. The feeding
of margarine had no effect. Preliminary studies indicate that the active ingredient is in the group of phospholipids. The authors suggest that the findings "would support previous impressions of the influence of milk products on coronary thrombosis." F. E. Rice


A three-month-old infant exhibited diarrhea from birth when fed a cow's-milk formula (form of cow's milk not reported). The condition was corrected when a change was made to a soybean preparation. Both saturated and unsaturated fatty acids increased in the stools when cow's milk was fed, a condition not usually observed in a simple allergy to milk. Feeding trials with purified milk proteins eliminated casein as a possible causative factor. Beta-lactoglobulin when fed in amounts equivalent to 1/100th of those contained in one quart of cow's milk brought on the diarrhea, as did a whey protein mixture equal to one-third the normal intake. Crystallized alpha-lactalbumin had no effect. F. E. Rice


Studies were made to discover the causes of colic in 90 cases in private practice. In a large number of cases, colic symptoms disappeared, or were eased, by the elimination of cow's milk from the formula. It was found that many of these cases responded equally well to the elimination or lowering of the level of milk fat. The author points out that favorable results from the substitution of other products for cow's milk in the infant formula should not always be interpreted as indicating an allergy to milk protein. Equally favorable results might come from temporarily lowering the level of fat by using skimmed or half-skimmed milk. Of the 90 infants in the study, ten were definitely shown to be sensitive to milk fat. Other causes of colic were carbohydrate intolerance 22%, hunger or underfeeding 11%, allergy 10%, poor feeding technique 2%, psychosomatic 22%; the remainder included combinations of the above, and unclassified. There were five completely breast-fed infants in the group; in three of these cases, colic was established to be caused by underfeeding. F. E. Rice

SANITATION AND CLEANSING


This study indicated the feasibility of cleaning storage tanks and bulk pickup tankers with permanently installed spray assemblies. The spray-cleaning system was shown through bacteriological evaluation to give results which were satisfactory, and which were superior to manual-cleaning operations. Further application of the principles and procedures can be made to nearly any food product tank or vat. Such recirculation techniques not only aid in reducing cleaning costs and improving cleaning results, but are susceptible to complete automatic control. This permits a precise control of cleaning and sanitizing operations as is presently enjoyed with modern HTST pasteurization. J. J. Janzen