EXIGENT PROBLEMS IN THE USE OF QUALITY
APPRASAL STANDARDS IN THE PROCUREMENT OF
DAIRY PRODUCTS FOR MILITARY REQUIREMENTS

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The relationship of the Veterinary Corps to the Surgeon General and the Quartermaster General; a discussion of the types of milk provided under the newly revised Federal Specification C-M-381E; coliform requirements of this new specification as they will apply to military purchases of fresh milk; other specification changes concerned with analytical, processing, and procurement provisions; estimate of the effect of emergency procurement on existing milk supplies; personal observations in uncontrolled milk areas; military voting of frozen homogenized milk; and the relationship of sanitary requirements to the quality of butter and cheese.

It is considered a privilege to appear before this Association as a representative of the Veterinary Corps, United States Army Medical Service. On behalf of the Office of the Surgeon General, I wish to thank all the members of the civilian milk control agencies for their excellent cooperation in assisting the Armed Forces with their dairy product procurement programs both in the past and at the present. The generous assistance which members of this organization have rendered has been of immeasurable value in making it possible to provide the soldier with a safe and wholesome addition to his ration in the form of dairy products.

PROCUREMENT QUALITY SPECIFICATIONS

As you know, the procurement of milk and milk products, in addition to other food items is the responsibility of the Quartermaster General. The Quartermaster Corps will initiate bidding and subsequently award contracts to the successful bidders, anticipating that the product desired will be prepared in compliance with the applicable Federal Specifications. It is at this point that the Office of the Surgeon General enters the picture. The Army Medical Service through the Veterinary Corps must ascertain that the product is prepared under the best sanitary procedures and under acceptable standards of processing control so that there is no possibility of the product adversely affecting the health of the troops. There is also the additional responsibility of determining that contract requirements have been fulfilled and that the product has not been fraudulently manufactured from inferior grade, low cost raw materials.

Due to be released shortly is a recently revised Federal Specification for Fresh Whole Milk, C-M-381E. This specification contains some changes in which I am sure you will be interested and which should stimulate the revision of local ordinances in areas that are not governed by the United States Public Health Service Milk Ordinance and Code. Some of these changes are minor in nature whereas others may be expected to assume a role of major importance.

The specification provides for three types of milk. Type I is Certified Pasteurized Milk (Certified raw milk has been withdrawn from this specification). Type II is Pasteurized Milk and consists of three sub-types; No. 1, No. 2 and No. 3. Type III is Pasteurized, Homogenized milk consisting of the same sub-types.

The Type I certified pasteurized milk is not intended for general purchasing except as authorized by the Quartermaster General, the Medical Department, or Headquarters of the United States Air Force. When it is deemed advisable to purchase Certified milk, the specification states that it is to be prepared and processed in conformity with the current requirements of the American Association of Medical Milk Commissions as has been the practice heretofore.

The bulk of the milk purchases, therefore, fall into the Type II and Type III categories. Whether or not No. 1, 2, or 3 are purchased depends entirely on their availability. No. 1 milk, for example, is not always available in sufficient quantities to meet military needs. For milk to meet this No. 1 classification, it must be produced in an area that has and enforces an ordinance that conforms to the Grade A requirements of the latest revision of the United States Public Health Service Milk Ordinance and Code. The specification of No. 1 milk also contains a statement to the effect that milk from other localities may be accepted when it is of at least equal quality. Some localities feel that their milk should be rated of at least equal quality when their logarithmic average bacteria counts read:

200,000 per cc or less on raw milk as delivered to the plant.
400,000 per cc or less on raw milk just prior to pasteurization.
30,000 per cc or less on the pasteurized product.

Managements making this assumption are not interpreting the specification correctly. This milk cannot be judged to be of equal quality on the basis of bacteria counts alone. The dairies, the processing plant, and equipment shall also meet the Grade A pasteurized milk requirements as set forth in the U. S. Public Health Service Milk Ordinance and Code. It is unfortunate that many areas in the United States are not capable of supplying the Armed Forces with milk of this quality. Local and state milk ordinances are so divergent in character that it is not possible to obtain a sufficient quantity of this kind of
milk to meet national or, sometimes, even local Armed Forces needs.

Restrictions like this have led the Army milk procurement program into the No. 2 milks. Such milk is produced in areas having less stringent ordinances than those recommended by the U. S. Public Health Service. The maximum logarithmic average bacterial count shall not exceed 500,000 per cc. The maximum logarithmic standard plate count on the pasteurized product is 30,000 per cc. This is the kind of milk which is most commonly purchased for the use of the Armed Services. It is less restrictive on the dairies, the raw milk, and plant facilities than is No. 1 milk, but is equally rigid as far as the design and operation of the pasteurization apparatus is concerned. Even though No. 2 milk is a reasonable kind of milk to expect, far too many localities are unable to produce it. For that reason it is frequently necessary to draw No. 2 milk from other sections and ship it by carload quantities into these deficient areas.

In times of stress and emergency, such as during World War II, it became necessary to relax the standards in order to meet military needs. This led to No. 3 milk, a milk which corresponds somewhat to Grade B pasteurized milk. It shall be produced under conditions which will assure it wholesomeness. The logarithmic average raw count shall not be in excess of 1,000,000 per cc. The design and operation of the pasteurization apparatus shall be in compliance with the U. S. Public Health Service Milk Ordinance and Code, however; the logarithmic average standard plate count on the pasteurized product may be as high as 50,000 per cc.

At first glance it might seem strange that a single specification should in itself contain as wide a range as just outlined. This has been brought about by the necessity of trying to make the specification fit the diversity of the industry.

**New Coliform Requirements**

On all types of pasteurized milk there is now inserted a coliform requirement. It reads like this:

"Pasteurized milk, after pasteurization and until delivery shall not have a coliform count exceeding 10 per ml in more than one sample in each series of four, each sample to be taken on separate days."

This requirement, used in conjunction with the phosphatase test, equalizes any divergence of thought that may be implied elsewhere in the specification. Perhaps the first reaction to the new coliform requirements might be that a plant need not exercise a great deal of sanitary control in order to meet a specification that allows as many as 10 coliform organisms per ml. However, Armed Forces purchases are frequently written calling for inspection of the milk at either origin or destination with final acceptance of the product being determined at destination based at the time of delivery. If acceptance of the milk was based on coliform series drawn immediately after pasteurization or before shipment, it is admitted that the new requirements should not be hard to meet. Considering, though, that the coliform series may be conducted at destination 48 hours away from origin puts the new requirement into an entirely different light.

The specification requires that milk shall be cooled to 40°F or lower immediately after pasteurization and shall be held at temperatures of 50°F or lower until delivery. Deliveries that are only a short period of time away from origin should not be troubled with the coliform count even though the milk may arrive at temperatures approaching 50°F. On the other hand those shipments that are delivered within 48 hours as the specification reads, or are covered by contract exception which permit delivery at 72 hours or longer should find the new requirements quite restrictive. This is especially true if the in-transit milk temperature should be in excess of 45°F. Considering that coliform bacteria multiply more rapidly at temperatures between 45°F and 50°F than do other milk-borne bacteria, it is conceivable that a shipment of milk transported within this temperature range could meet the coliform requirements at origin but would not be able to meet them at the point of final acceptance. Contracts covering shipments involving late deliveries consider these facts and are now bearing a clause which limits bottling temperatures at origin as well as arrival temperatures to a maximum of 45°F. This of course places a greater stress on adequate refrigeration both in the pasteurizing plant and the carrier. By the same token it also places a greater stress on plant sanitation.

The basic thought behind the adoption of the coliform requirements just listed is exactly for that purpose, to place greater stress on plant sanitation. The coliform test used in conjunction with the phosphatase test should be more indicative of an adequately processed, properly handled milk supply. These two tests are much more revealing than a standard plate count on the pasteurized milk. There is no intent to use the coliform test to imply pathogenic significance, especially at such low levels. Instead, repeated counts higher than those specified may result in the discontinuance of a plant as a source of supply on the basis of inadequate sanitation. Likewise, failure on the part of the plant management to correct such non-compliance certainly suggests lack of interest in producing a quality product.

**Additional Changes in Specifications**

Other additions and changes in the new specification are:

- Provision permitting the addition of Vitamin D in amounts equivalent to 400 USP units per quart.
- A requirement that dairy herds shall in any event be tested for tuberculosis once every six years.
- Raising the minimum percentage of milk solids not fat from 8.0 to 8.25 percent.
- Raising the minimum temperature for short-time pasteurization from 160°F to 161°F.
- Provisions stipulating that inspection may be performed at dairy or milk plants, both during and after processing, at any suitable point in transit and/or at time of delivery to the point of destination.

New provisions are introduced whereby the purchasing agency has the option of asking for pre-award surveys or bid samples prior to the awarding of the contract. This clause will be of particular value especially when expanded procurement may encompass new areas. The spot checking of plant facilities and the surveillance of the raw and pasteurized milk quality before the awarding of the contract should be of considerable value to the procuring agency, the contractor, and the inspector. Minor discrepancies can be detected and corrected before...
the start of the contract. Otherwise correction of defects while a contract is in progress is liable to incur stress on all parties concerned.

**PROBLEMS FROM EXPANDED PROCUREMENT**

Foremost in thought, at the present, is the effect which a national emergency might have on the fluid milk industry. It is logical to assume that expanded milk procurement may result in the same difficulties encountered during the World War II period, namely, a general reduction in overall milk quality. That is the end point of course brought about by a complexity of circumstances. It is logical to assume that there will again arise the problem of providing suitable equipment for the dairy and the processing plant. Experienced plant personnel may gradually be replaced by untrained help. As a result processing control as well as sanitary operations will undoubtedly suffer. Farm employees will not be able to maintain the customary control over their milk supply. This same condition will be reflected in quality control programs. Hence replacement programs will have to be inaugurated in order to keep such containers as the forty-quart milk can in suitable condition. Pasteurizing plants may reach out for milk beyond their normal channels, and unless they exercise care and forethought, they will find themselves struggling with an unsatisfactory milk supply. The same plant may also find that they have overtaxed the capacity of the plant. It may be necessary to set up dual intakes to meet military needs. Acceptable and unacceptable milk may have to be diverted at the platform and the two supplies later handled separately. Milk control officials may undoubtedly find it more difficult to exercise suitable control measures in the larger milk sheds. All of these conditions will combine to make it more and more difficult for many plants to produce an acceptable end product.

I believe that these points could best be brought out by citing an example with which I had contact a little less than three years ago.

This particular plant was located in an area that did not come under the control of any milk ordinance and was beyond the reach of civilian milk control officials. The milk arrived at this fluid milk plant at an average temperature of seventy degrees. Direct microscopic examination of the raw milk which had been held in storage as long as 18 hours before pasteurizing was in excess of twenty million. When the milk was finally pasteurized, it was brought to 155° F and held there for 45 minutes. Milk temperatures were reduced to 68° F by use of a very small cabinet cooler. From this point the milk again went in storage where it was held as long as 18 hours before bottling. Bottling temperatures ranged from 68° F to 70° F. Since refrigeration facilities were completely overtaxed there was no attempt made to place the bottled milk in a cooler; instead, it was hauled to the retail outlets on an uncapped truck. Standard plate counts read at 24 hours showed an excess of 150,000 bacteria per cc. Observation of equipment at the time of breakdown showed a very generous deposit of milk stone on each piece of equipment.

On one other occasion I had the opportunity to visit a plant which was the sole source of milk for a community of approximately 1,000 people. In this plant the milk was pasteurized and cooled in a coil vat without the benefit of any time or temperature devices other than a dairy thermometer carried in the pocket of the plant operator.

Needless to say, I was somewhat taken aback by the conditions noted in these two plants. I do believe that anyone could have gained by those experiences. Could there be a better plea presented to substantiate the promulgation of uniform milk laws and consistent enforcement of those laws?

**FRAUDULENT PRACTICE**

There is one other subject which I would like to present at this point. Instances are known wherein an inferior grade of raw milk is partially pasteurized until the bacteria count is reduced to the point where it will pass as Grade A raw milk. Sometimes the practice is modified by completely pasteurizing the product and then adding a quantity of raw skimmed milk so that the milk will yield a positive phosphatase test. In some areas this practice has come into such general use that it has become routine procedure. Personally, I believe that such practices are nothing short of fraud and are a means of expressing utter disregard for the basic concepts of all milk laws and ethical competition, and as such, steps should be taken to correct these practices.

**NON-FLUID MILK PRODUCTS**

Thus far I have stressed only the fluid milk side of the discussion. In some instances when it is not possible to supply troops with fluid milk, it can be given to them in the form of frozen homogenized milk. Frankly, this program cannot claim 100 percent success. As you know part of the low acceptability of frozen milk is its tendency to develop an oxidized flavor and to flake upon defrosting. In an effort to overcome the flaking of this product, attempts are being made to freeze it faster, that is, in periods under forty-eight hours, and to hold it at uniform storage temperatures. More stress is being placed upon the refrigeration of the carrier between points of origin and destination. At the present time the milk is not considered frozen at origin if its temperature has not been reduced to 10° F or below within forty-eight hours after entering the freezer. Likewise, a milk temperature above 10° F at destination makes the shipment subject to rejection. Experimental studies on the use of ascorbic acid gives hope that its incorporation could greatly reduce the development of oxidized flavors.

**BUTTER AND CHEESE**

Many people fail to realize that many of the Armed Services procurement programs are based on long storage acceptance. A product must be sound at the time of purchase, and it must not possess inherent qualities which will tend to lower its acceptability upon storage. The prime examples of these kinds of products are butter and cheese. These products, soon after manufacture, may have every appearance of a quality product, but because of insanitary plant practices, unsatisfactory equipment, or improper processing procedures, they may deteriorate very rapidly upon storage. All of these conditions may be grouped under the heading of general plant sanitation.

Butter contaminated with proteolytic types of bacteria during its manufacture and receiving processing treatments that are not sufficient to destroy these organisms cannot be expected to hold its grade after pro-
longed storage. Equipment with exposed copper surfaces or difficult to clean surfaces cannot help but have a deleterious effect on the storage of the butter. Off flavors can develop in cheese as a result of impurities both chemical and bacterial incorporated into the product at the time of manufacture. Both of these products rate high as potential public health hazards, especially if they have been subjected to insufficient pasteurization methods.

Special contract clauses now applicable to butter procurement state that butter offered shall be not more than 30 days of age. Since the Armed Forces normally purchased butter in print form, this statement has been inserted into the contract to prevent the butter being printed out of storage stock. This, of course, is a standard industry practice but when the industry prints butter out of storage stock, it is aware of the very short shelf life of the prints and markets them as soon as possible. Butter printed out of storage stock for military needs cannot normally enjoy the advantage of fast disposition, but instead may be subjected to prolonged storage periods.

Cheese purchased for use by the Armed Forces may be manufactured from raw or pasteurized milk. No distinction is made between them, though, after they have been placed in storage. Both kinds of cheese are treated equally, that is, they will not undergo at least a 90-day storage period and can be considered free of pathogenic bacteria.

As stated previously, many of these concepts are based on general plant sanitation, and because of this, notice has been circulated among the butter and cheese industry, that effective 1 March 1951, no product shall be offered for Veterinary Corps inspection unless it can be definitely established that the product originated in the plant that was inspected and approved by the Veterinary Corps.

This means of course that vendors offering butter or cheese for Veterinary inspection must purchase these products from only Veterinary approved sources and must be able to identify the product as to its origin. This may cause some temporary restrictions on a great many vendors. Contractors interested in supplying the Armed Services with butter or cheese should familiarize themselves with the status of the plants from which they are now purchasing these products.

State and local regulations controlling sanitary conditions in butter and cheese plants vary so markedly that it may be anticipated that a number of plants cannot be approved at the time of initial inspection but may be approved after remedial corrections have been made. This of course will vary according to the standards under which the plants operate and the type of enforcement to which they have been subjected.

It has been these two conditions that have made it necessary to insert these contract provisions in order to standardize the procurement of butter and cheese.

It can be anticipated that Veterinary Corps personnel when requested to conduct origin sanitary inspections of butter and cheese will place stress on:

a. The type of vehicle in which the raw product is transported to the plant.

b. The suitability and cleanliness of wall, floor, and ceiling surfaces.

c. The adequacy of lighting facilities from the standpoint of cleaning the plant and preparing and examining the final product.

d. The efficiency of ventilating systems in regard to odors and condensates.

e. The source and potability of water supplies especially when water contacts or is incorporated into the product.

f. The manner in which waste materials are removed from the premises.

g. The condition, repair, and construction of equipment and utensils.

h. The efficiency of sanitizing operations.

i. The degree and control of processing procedures as they apply directly to applicable Federal Specifications.

j. The degree and efficiency in which the plant operates a program designed to control the quality of the raw material.

k. The adequacy and cleanliness of refrigerated and dry storage facilities.

l. The effectiveness of programs or methods designed to control vermin.

m. The facilities available for the health and comfort of plant employees including toilets, dressing room, and hand washing facilities.

Br. abortus in Cheese

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York State Department of Health, Professor Frank V. Kosikowsky of Cornell University, and the Chaplin Dairy Products Company of Rochester, New York.

REFERENCES


