THE DEVELOPMENT OF NATIONAL MINIMUM QUALITY STANDARDS
FOR MILK TO BE USED IN MANUFACTURING

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Recently there has been renewed interest in improving the quality of milk used in manufacturing. A number of organizations whose members are producing milk for the manufacture of dairy products, as well as industry leaders and college and regulatory officials, have recognized the need for quality improvement in manufacturing milk. During the past year, the U. S. Department of Agriculture has done considerable work on the development of a set of quality standards for milk for manufacturing. These standards would be available for voluntary adoption by the several States and the industry, to provide a focal point for the development of a more uniform approach to the total problem of improving the quality of manufacturing milk.

The quality improvement program which we have been constructing during the past several months re-establishes some well recognized and accepted guides and does not reflect any particular bold steps or novel ideas. Many in the industry have stated that the standards we are recommending for voluntary adoption by the States have long been overdue and will offer valuable assistance to the States and to the industry groups in improving the quality of milk for manufacturing purposes.

Need for Standards

While significant progress in improving milk quality is being accomplished in some quarters, the situation leaves much to be desired in others. Progress has not by any means been uniform nor is any final solution of the problem in sight.

Many persons believe that platform inspection of incoming raw milk is all that is needed to enhance milk quality and that any quality deficiencies can be rectified through processing or manufacturing methods. Others contend that the measure of dairy product quality can be confined to the finished product. These views are not consistent with experience nor with logic and approach the problem precisely backward.

The Dairy Division's plant survey work, which has been conducted over a period of many years, further reveals the needs for quality standards for milk for manufacturing. These surveys have shown an extremely wide range in milk quality received at manufacturing plants and somewhat comparable gradations of plant operations in many sections of the country. For example, in the last half of 1956 and early 1957, we made 56 special plant surveys at milk drying plants, in 7 States, primarily in the Midwest area. The raw skim milk represented the product from 371 creameries due to the fact that some plants received supply from numerous sources. Bacteriological examinations of the raw whole milk or raw skim milk showed counts ranging from approximately 500,000 per ml to well over 200 million per ml. The raw milk supply for all manufactured products in any given area is essentially the same. Cheese plants, evaporating plants and butter plants all buy from the same general source of supply.

In too many instances producers are allowed to deliver poor quality milk which is blended with good quality milk from other producers. This method of operating is not sound and not in the best interest of producers who day after day are delivering top-quality milk. In many cases the producer of poor quality milk is not informed of this situation and nothing is done in the way of field service to ferret out and correct the contributing causes at the farm level. The producer under these conditions is naturally of the opinion that the quality of the milk he is delivering is what plant management wants or needs.

It seems obvious that industry is not sufficiently self-disciplined to handle this problem, and that there is need for a blueprint of production and quality requirements.

A study of the provisions in present state requirements for milk for manufacturing shows that generally little attention has been given to the development of a set of well-balanced quality standards. Many States attempt to control the quality of milk for manufacturing through sediment content requirements only. In general the State requirements are fragmentary and diverse. Undoubtedly the absence of adequate quality standards has impeded progress in quality improvement. The manufacturing branches of the dairy industry are fully aware of the problem and the attendant deficiencies.

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REQUEST FOR STANDARD

In order to place this discussion of quality requirements for milk for manufacturing in its proper setting let us review some happenings of the last few years. In February 1957 the Dairy Division conducted a series of eight industry conferences in various parts of the country to present a suggested revision of the U. S. Standards for Grades of Nonfat Dry Milk. This revision featured the inclusion of the direct microscopic clump count test as a means of evaluating product quality. At that time some members of industry suggested the desirability of a national regulation requiring that all milk for manufacturing purposes be inspected and classified. They contended that such an approach would be more equitable since there was no other comparable objective test that would reflect both the case history of the raw milk and the hygiene of manufacture for butter, cheddar cheese, evaporated milk and other manufactured dairy products.

Since that time various industry groups have urged the Department to draft quality standards for milk for manufacturing and specifications for dairy plant operations. In the fall of 1958 we received approval from the Assistant Secretary of Agriculture to activate a working group of industry technicians to assist us in the formulation of these standards. We recognized that industry had a mutual interest in the raw milk and the hygiene of manufacture for butter, cheddar cheese, evaporated milk and other manufactured dairy products.

The Animal Husbandry Division, Agricultural Research Service, U. S. Department of Agriculture, as well as a small group of technicians designated by the American Dairy Science Association also furnished advice and guidance in the formulation of the initial drafts of the quality standards.

While there was substantial agreement on the primary objectives of the program, there was divergence of opinion on a number of items, particularly the bacterial standards for raw milk, the requirements relating to farm certification, and transfer of producer records. We were well aware at the very outset that it would be impossible to have a meeting of minds on all issues. This couldn’t be accomplished even if we were dealing with only one segment of the industry, let alone all segments. Differences were inevitable and in a sense salutary. Nevertheless, practically every item in the quality standards for milk received the support and approval of a number of the members of that working group. The industry, through the working group and others, furnished valuable ideas and suggestions which were incorporated in the initial working drafts.

The third working draft, dated July 2, 1959, was prepared after the work session in May and was distributed to the working group technicians, state regulatory agencies, trade associations, and other interested parties for comments and suggestions.

I wish to emphasize at this point that the proposed quality standards are still in the working draft stage. Perhaps the use of the term "recommended" in the title has caused some misunderstanding. The drafts which we have distributed do not represent at the present time anyone’s final recommendations. The term "recommended" was used in the title because the standards, in their final form will be presented as recommended quality standards.

We distributed the documents in the working draft form so that we might have the benefit of the thinking of state regulatory authorities and other interested groups in the early developmental stage of the program. Normally in developing a program such as this one, working drafts are not distributed so widely for public review before preliminary recommendations are firmed up.

We have been receiving many comments and suggestions, and we welcome such additional ones as members of industry and other interested parties care to submit. All will be given careful study and consideration before the standards are published in the Federal Register. Following such publication, all interested parties again will have an opportunity to express their views, comments and suggestions.

BASIC REQUIREMENTS

In seeking to develop a blueprint for recommended quality standards, intended for voluntary adoption by states, we have endeavored to shape a well-rounded program, and have incorporated basic requirements fundamental to the production of good quality milk. We have tried to draft the standards in such a way that they can be met by the small as well as the large dairy farmer, with a minimum financial outlay. The standards provide for farm inspections as well as platform inspection of the raw milk supply and quality testing of the finished products. We feel that without adequate routine farm inspections the value of platform inspection and laboratory control of finished product is greatly lessened.

Specifically the basic requirements are related to (a) farm certification, and (b) quality specifications of the raw milk.

Farm certification requires compliance with only
two fundamental factors in the production of good quality milk, namely, health of the herd, and design, construction, condition and sanitation of the utensils and equipment. Farm certification would not have to be completed before a producer could begin shipping manufacturing milk. However, it is intended that certification would be completed within 12 months from the adoption date of the standards.

In addition to farm certification, the producer would be required to meet the quality specifications of the raw milk as to flavor and odor, physical appearance, bacterial limits, and sediment content.

With respect to the bacterial standards, the proposed basic class requires a methylene blue reduction time, or its equivalent, of not less than 2½ hours. At the present time there are at least seven States that have bacterial limits for milk for manufacturing that are basically comparable to, or more rigid than, the 2½ hour standard. These States are California, Iowa, Minnesota, Oregon, Virginia, Wisconsin and Wyoming. The Evaporated Milk Industry Sanitary Standards Code likewise specifies a methylene blue reduction time of not less than 2½ hours for its basic class. Three States, namely, Colorado, Idaho and South Dakota require a methylene blue reduction time of not less than 2 hours.

We recognize that some States may not be ready to adopt the recommended standards as soon as others. Some may wish to defer application of the bacterial standards for a period of time so that they could inaugurate or accelerate a producer education program for milk quality improvement. These are decisions which would have to be made in each individual state in the light of local conditions.

In addition to the requirements referred to above, we have developed an appendix to the quality standards which contains some guide-lines for the production of good quality milk. This material suggests to producers how they may achieve the prescribed standards, but it is not intended to be an integral part of the quality standards. For example, sections relating to milking area, milking systems and milking procedures, feeding practices, milkhouse, milkroom, milk cooling facilities, 50 degree cooling temperature, and the like, are all included as suggestions only, and compliance would not be required.

MIXED REACTION AND MISUNDERSTANDING

Reactions to the third working draft of the recommended standards have been mixed, with considerable variation among regions and among states, as well as among individual and groups within a given State. It appears that a considerable amount of the unfavorable reaction stems from a misunderstanding of what is intended under the program. I should like to briefly summarize some of the reactions we have received, and to comment briefly on them.

As I said before, the material in the appendix was included only on a suggested or guideline basis, and never was intended to be a required part of the recommended quality requirements. However, the appendix has been the cause of so much misunderstanding and apprehension, that it has been suggested that this material be deleted entirely from the document and perhaps be used as a basis for developing a separate manual for use by fieldmen, extension workers or others engaged in educational programs for milk quality improvement. This suggestion is being seriously considered.

Some regulatory officials and industry representatives have expressed the fear that USDA intends, through the proposed standards, to impose its will on the States, and, to administer and enforce the program at the State level. This never has been contemplated, and, in fact, is not legally possible. Congress, through Public Law 733, the Agricultural Marketing Act of 1946 -- authorized and directed the Secretary of Agriculture "to develop and improve standards of quality . . . and recommend and demonstrate such standards in order to encourage uniformity and consistency in commercial practices." With respect to the applications of standards through the inspection and grading service, the Act further provided that "no person shall be required to use the service authorized."

To repeat what I said before, these standards are for voluntary adoption by the States. Whether or not an individual State adopts the proposed standards, and when, are left entirely to the State's own discretion. The administration and enforcement of the program, once adopted, also would be entirely up to the State. The role of the Federal Government in the program is strictly that of a service agency and no Federal regulatory activity is or can be contemplated. We are aware of the fact that the statutes of a few States (Wyoming and Idaho) provide for automatic adoption of Federal standards, but this is a matter which remains within the control of the respective States.

Some persons have pointed to similarities between the recommended standards and the U. S. Public Health Service Milk Ordinance and Code for Grade A milk. Except that both programs are recommended for voluntary adoption by the States, there is no similarity between the two. The requirements of the two are quite different and our proposed program includes no provision for a Federally administered rating system such as exists under the U.S.P.H.S. Milk Ordinance and Code program.

Some in the industry have objected to the proposed
standards on the grounds that they would lead to trade barriers. They claim that if one State (A) adopts the standards, and another (B) does not, then A can prohibit products from B from moving into A. Certainly at the present time there is nothing to prevent individual States from adopting different standards, and in the absence of any uniform guide, wide differences do exist. It seems to us that the availability of some uniform standard, even though there was no compulsion for any State to adopt such a standard, could only result in greater uniformity among States and a consequent reduction of trade barriers.

Another fear that has been expressed is that as soon as the Department publishes these standards, the Food and Drug Administration will adopt them and the program will automatically become mandatory. The objective of the Food and Drug program relates to standards of identity, purity, wholesomeness, and questions of fitness for human consumption, whereas the USDA objective is related to gradations of quality. The two programs are so different that any adoption of the proposed quality standards by the Food and Drug Administration is hardly feasible.

There has been some apprehension that the adoption of the standards by any State would require USDA resident inspection service in order to assure compliance. This fear is unfounded. The State of Wisconsin, for example, has had regulations governing the production and quality of milk for manufacturing purposes since 1949, yet only a few plants in Wisconsin utilize USDA resident inspection service and in no case did the need or the desire for the service relate to or stem from the State regulations. The same is true in the case of Iowa and Minnesota.

A suggestion has been made that we experiment with the proposed standards on a trial basis, selecting one state as a starter. This suggestion again appears to be based on an assumption that the Federal standards will be compulsory. Since we are acting only as a service agency in the development of the proposed standards, we are not in a position to direct any state to adopt this program. Moreover, it is our feeling that the adoption of the recommended standards by the States will take place slowly, and in the normal course of events the first States to adopt the program would serve as a proving ground for the others.

Some trade association representatives feel that the suggested standards would place in jeopardy existing industry-administered quality programs. It seems to us that any existing milk quality improvement program and the suggested standards would be compatible. This situation exists today in many states. There is no valid reason why industry codes cannot function effectively within the framework of the suggested standards.

Another common assertion is that the program will damage the dairy industry by increasing production costs and forcing more small farmers out of the dairy business. I think that a good answer to this is found in a quote from a talk at the Central Minnesota Dairymen’s and Creamery Operator’s Convention in February, 1959, given by Professor James A. Gholson, then Extension Specialist at the University of Minnesota. Professor Gholson stated: “I suspect that many producers will be of the same opinion as one I heard expressed the other day. The question of higher standards came up and the producer’s comment was ‘Well, looks like I’ll have to spend 3 or 4 thousand dollars for equipment if standards are raised.’ Good equipment helps but clean equipment is what’s really important and the cost is negligible. I am sure you can see the true problem that is present. It’s a difficult one. It calls for an informed patron who is willing to put out some elbow grease.”

We are aware of the economic implications of the program we are suggesting, and as I stated earlier, we have attempted to develop the proposed standards in such a way that both large and small producers could meet them with a minimum financial outlay. On the other hand, I think we must also consider the economic benefits which might accrue from such a program, in the form of better quality products, greater consumer confidence and acceptance, and expanded markets for dairy products.

**Conclusion**

In conclusion, I wish to emphasize again that a program of milk quality improvement such as we have been discussing, needs to be inaugurated at the state level, and effectively coordinated, so that industry efforts can be concerted and directed to a definite end.

The standards which we are proposing are reasonably comparable in structure, including bacterial levels, to systems or programs already provided by progressive privately-owned or cooperative organizations. Therefore, the idea does not embody a totally different approach to the quality problem, nor does it flow in an opposite direction. The principles contained in the recommended standards merely serve to re-establish some accepted guides to quality improvement and product stability.

It is highly important that before the States or industry act in this matter, the issues be explored carefully and thoroughly. Any State interested in this program should arrange to have industry representatives, regulatory officials, and dairy extension work-
Before steam introduction into milk and milk products, the following procedures for providing steam of culinary quality are recommended to ensure the establishment of a comprehensive milk quality code governing raw milk quality and end product quality. In those States where legal machinery authorizing the establishment of a comprehensive milk quality code does not already exist, appropriate legislative action would be required.

The interest of the entire industry demands the support and encouragement of the adoption of these standards. It is heartening to note that several trade associations passed resolutions at their annual meetings last fall favoring the development and implementation of a quality improvement program such as we have been recommending. No door should be left unopened in our search for improved quality of dairy products. If there is something wrong with the emerging pattern, now is the time to find it out and work for changes. It seems to us that the implementation of a set of quality standards susceptible of voluntary adoption would provide the basis for greater uniformity and promises to be the most inviting and profitable door to open in our quest for higher quality dairy products.

### PRODUCING CULINARY STEAM FOR PROCESSING MILK AND MILK PRODUCTS

To clarify current methods suitable for the production and transmission of steam satisfactory for use in steam-vacuum treatment or pasteurization by direct steam introduction into milk and milk products, the following procedures for providing steam of culinary quality are recommended.

**Source of Boiler Feed Water**

Potable water or water supplies acceptable to the regulatory agency in jurisdiction shall be used. Water containing organic materials such as leaves, algae, etc. should not be used for feed water without adequate pretreatment. (This is necessary to prevent such organic materials from causing foaming and priming in the boiler with resultant carry-over into the steam distribution system which could cause off flavors in milk).

**Feed Water Treatment**

Feed waters may be treated if necessary for proper boiler care and operation. Boiler feed water treatment and control should be under the supervision of specially trained personnel or a firm specializing in industrial water conditioning. Such personnel should be informed that the steam is to be used for culinary purposes. Pre-treatment of feed waters for boilers or steam generating systems to reduce water hardness before entering the boiler or steam generator by ion exchange or other acceptable procedures is preferable to addition of conditioning compounds to boiler waters.

There are a number of different chemicals that are commonly employed in boiler water treatment. These include sodium triphosphate, sodium hexametaphosphate, sodium hydroxide, sodium sulfite, sodium silicate, sodium aluminate, and sodium alginate, all of which are nonvolatile. Accordingly, there would be no objection to these compounds when they are properly used and the boiler is properly operated. Tannin is also frequently added to boiler water to facilitate sludge removal during boiler blowdown. This product, while essentially nonvolatile, has been reported to give rise to odor problems, and for this reason should be used with caution. Compounds containing chromium shall not be used.

The compounds named above do not include all the compounds to which there is no objection. Compounds in addition to those cited above may be permissible but should be cleared with regulatory authorities having jurisdiction.

The above compounds are used to prevent corrosion and scale in boilers or to facilitate removal of sludge. There are other compounds—namely, cyclohexylamine, morpholine, and octadecylamine, which are volatile and are used to prevent corrosion in condensate return lines. Cyclohexylamine and morpholine are not regarded as hazardous in concentrations of less than 10 p.p.m. in steam used in direct contact with foods other than milk.

However, because of the importance of milk in the diets of infants and children, these compounds should not be added to boiler feed waters when the steam is introduced into milk. The use of octadecylamine in steam contacting food has not been sanctioned by the Food & Drug Administration and any approval in the future depends upon the presentation of proper application and information under the new food additives amendment of the Federal Food, Drug, and Cosmetic Act.

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1Prepared by the National Association of Dairy Equipment Manufacturers, 1012 Fourteenth St., N. W., Washington, D. C. Copies available on request.