QUALITY CONTROL COMMITTEE LABORATORY OF THE MINNEAPOLIS-ST. PAUL MARKET

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ABSTRACT

The Quality Control Committee Laboratory is a unique organization which was started approximately 32 years ago by Dr. Harold Macy of the University of Minnesota. The dairy industry operates a laboratory which does most of the official testing for the health agencies in the Minneapolis-St. Paul market. With higher costs of operations many health agencies are trying to find ways of saving money, and still have a satisfactory laboratory program to protect the public's health. Some health agencies are using industry laboratories, and the cost is passed on to the customer rather than the taxpayer.

The laboratory functions are to evaluate the quality of the raw milk supply from 4238 Grade A producers, and the finished products from 17 processing plants. The laboratory also does the official butterfat testing for the Federal Milk Market Administrator for Order 68.

This organization is supervised by a Steering Committee of nine individuals who represent the University of Minnesota; the producer cooperatives, who supply the raw milk; and the Grade A fluid milk processors from the Minneapolis-St. Paul market.

All of the routine results from the laboratory are provided to the health agencies. The health agencies and laboratory manager have a close working relationship to coordinate the program. In order for an organization like this to work, it takes cooperation from all parties involved.

There are two philosophies in operating a control laboratory to insure the quality of milk and milk products in a market. A control laboratory can be operated either by regulatory agencies or by industry. Of course, in most instances the taxpayer pays the bill if a regulatory agency operates the laboratory; and the consumer pays the bill when industry operates the laboratory. Like all public agencies, the cost of operation has been increasing; and if there is duplication of laboratory testing, a direct way to save money is to stop needless duplication.

DEVELOPMENT OF LABORATORY

The Minneapolis-St. Paul market chose to have an industry operated official testing laboratory. This came about 32 years ago when fluid milk processors were charged with a series of violations by the health agency for high bacteria counts on finished products. The processors approached Dr. Harold Macy, Professor of Bacteriology, University of Minnesota, to help them solve their problems. An industry meeting was set up in 1936 to discuss the quality problems of this meeting, a laboratory was set up in Dairy Bacteriology at the University of Minnesota, under Dr. Macy's guidance, to evaluate both the raw milk supply and finished products. By the fall of 1937, it was decided that the results were such that steps should be taken to establish a permanent organization. Thus, the Quality Control Committee came into being and held its first meeting January 3, 1938 (2).

PRESENT ORGANIZATION

The organization as it stands today has representatives of the University of Minnesota Food Science Department to give guidance when needed. This concept has continued from the very beginning of the organization and is probably a key factor for its success over these many years of operation. The manager of the laboratory may encounter a technical problem which he cannot handle, and can usually get expert advice from one or more staff members at the University. Each year a grant of $3,000 is made to the Food Science Department as a token of appreciation for the support the University gives the organization. Dr. S. T. Coulter of the University of Minnesota is the Chairman of the Steering Committee, and Dr. J. J. Jezeski, also of the University of Minnesota, is the technical advisor. Dr. J. C. Olson, Jr. acted as technical advisor to the organization for many years during his time at the University of Minnesota. The Steering Committee is the governing board of this organization. This board sets policy and approves the budget. The only officer of the organization is the Executive Secretary who also serves as laboratory manager. The producer cooperatives have representatives on the Steering Committee and there are also representatives from both the Minneapolis and St. Paul fluid milk processors to give a total of 11 members including the Executive Secretary. Each member on the Steering Committee has one vote regardless of the size of the organization he represents. In addition to the Steering Committee Meetings which are called periodically by the Executive Secretary, there is an annual business meeting of the entire membership. The Quality Control Committee has been an informal organization from the very beginning but has survived because a needed service was performed at a reasonable cost. The cost factor and the willingness of the various dairy organizations of the market to cooperate are the key factors of this organization. There is no

1Presented at the Fifty-sixth Annual Meeting of the International Association of Milk, Food, and Environmental Sanitarians, Inc., Louisville, Kentucky, August 17-21, 1969, the Minneapolis-St. Paul milk market. As a result
question in my mind that a parent organization of this kind with strategically located divisions could cover a complete state with an adequate quality control program for either Grade A or manufacture-grade milk.

**Financing the laboratory**

The program is financed equally by both the producer cooperatives and the fluid milk processors. The producers are assessed approximately 1/3 of a cent for each hundredweight of Grade A milk produced and the processors are assessed approximately 3/4 of a cent for each hundredweight of Class I milk processed. Last year it cost approximately $57,000 each for our producer cooperatives and our fluid milk processors to operate the laboratory. The income from the Federal Milk Market Administrator for butterfat testing was approximately $21,000. In 1968, there were 191,069 various tests conducted for approximately $135,000.

**Laboratory staff**

The laboratory and technicians are certified under the Interstate Milk Shippers Agreement. This certification is done by agents of the Minnesota Department of Agriculture.

**Laboratory Functions**

The laboratory function could be divided into four categories: (a) to evaluate the quality of the raw milk supply; (b) to evaluate the quality of the finished products of the market; (c) to study applied laboratory methodology for the market; and (d) to perform the official butterfat testing for the Federal Milk Market Administrator on a contractual basis. The manager of the laboratory is available to the various members of the organization to consult on quality control problems.

**Producer samples**

The individual producer's milk is check-tested 4 times in a 6-month period. The various tests conducted are the Standard Plate Count, disc assay for bacterial growth inhibitors, and a catalase test for abnormal milk. A freezing point determination is done during each 6-month period on individual producer milk.

In 1968, we had an average of 4,238 Grade A producers in our market which we check tested. Eight samples of each producer's milk were tested and 43.6% had a Standard Plate Count of <11,000 per ml; 85.5% had a Standard Plate Count of <51,000 per ml; and, 7.5% had a Standard Plate Count of >100,000 per ml. We conducted 34,465 disc assays for bacterial growth inhibitors on producer milk samples in 1968, and detected 46 positive samples or 0.13%. We are using the tube catalase test procedure as our screening test for the abnormal milk program. A total of 34,182 samples were tested in 1968, and 3.2% had 30% gas or greater.

**Commingled milk**

Another program to further insure the quality of the commingled raw milk was put into operation over a year ago. Twice each week a Standard Plate Count and a disc assay for bacterial growth inhibitors are conducted on all milk delivered to the 17 Grade A fluid processing plants. This milk is delivered directly from the farm in bulk tank trucks or from receiving stations in over-the-road tank trucks. This program was instituted when we found raw milk to be pasteurized in the fluid milk processing plants with high total bacteria counts. This program revealed that some of the over-the-road tankers were not being properly washed; also, some improper sampling and sample handling was detected. By investigation, a high bacteria count on a farm bulk load could be traced to an individual problem farm. If a bacterial growth inhibitor, such as penicillin, is detected in a farm bulk load, we will check all of the producers' milk on that load for bacterial growth inhibitors. By checking farm bulk loads, in several instances we have caught a producer that did not hold out milk from a treated cow. This program gives us constant control on the commingled raw milk supply. In most markets, quality evaluation of raw milk has been concentrated at the farm level, and the commingled milk at receiving stations and in transportation vessels has been somewhat neglected.

**Finished products.**

The second function of the laboratory is to evaluate the finished products which are sold in our market. We obtain a complete set of finished product samples from the coolers of 17 plants twice each month. On the one set of samples the standard routine tests, such as butterfat content, total bacteria count, coliform count, phosphatase, growth inhibitors, and freezing point are made. On the other set of samples a "shelf-life" determination is made. The samples are held for 5 days at 45 F and then a Standard Plate Count is made. This program pointed out that even though our fluid milk processing plants were meeting the regulatory standards, many needed to be upgraded from the "shelf life" standpoint. After 18 months of concentrated effort in this area, the improvement has been very gratifying. This again points out that all of us should evaluate our routine laboratory tests and programs and see if they are really giving us the correct information.

The health agencies of Minneapolis and St. Paul receive all routine testing results on both the raw milk and finished products. Results from raw milk
testing are used by the health agencies as official tests. All results from tests on raw milk are punched on computer cards, and there is no delay in these results reaching the farmer or the sanitarian. Results from tests on finished products are used by both health agencies to evaluate the processors' performance. In addition to this, the city of St. Paul uses the results for official evaluation.

We also do diagnostic testing, such as line trials, when requested by the fluid milk processing plants. Some of the plants have their own laboratories to do this kind of work, but most of them rely on the Committee Laboratory. In many instances, the processor will request the laboratory manager to come into his plant and make recommendations pertaining to quality problems.

Applied research

Over many years this laboratory has been involved in applied research of new laboratory methodology. An example of this is the study which was recently published in the *Journal of Milk and Food Technology* on the Milko Tester (1). A laboratory of this type can be of value in collaborative studies in new methodology.

Butterfat testing

Another unique function of this laboratory is the butterfat testing which we do for the Federal Milk Market Administrator of Order 68. A butterfat test is made on all Grade A tank truck milk received at all of the Grade A fluid milk processing plants in the market. Each day we will have approximately 100 tank samples for butterfat analysis. These samples are taken in sterile containers and are also used for our bacteriological testing program which was mentioned earlier. We also have a butterfat check-testing program which the Market Administrator uses to verify producer butterfat payment. Four fresh samples of all individual producer milk are tested and then the Administrator's office conducts an audit against the composite butterfat tests which are done by the cooperatives. This is a self-imposed program by industry, and each receiving station will be check-tested once each year. This again points out that industry in our market wants the job done right and can do a satisfactory job of self-policing. This work is done on a contractual cost basis. This Federal Milk Market Administrator's butterfat testing program makes up about 25% of our work load, since our market expanded May 1, 1969.

Sampling program

We also have a unique sampling program in this market which is worthy of mention. In order to reflect a true picture of a quality testing program, proper sampling as well as the unannounced sampling time is essential. Each time milk is picked up on the farm a sample is taken by the bulk milk hauler in a sterile container. This sample is used to build the composite butterfat sample, or it is used once approximately every 6 weeks for bacteriological testing purposes; it is also used for the fresh milk butterfat check-testing program mentioned above. Most samples are picked up early the following morning so that they can be plated before they are 24 hr old. We drive 9,000 to 10,000 miles each month to secure these samples from the various receiving stations in Minnesota and Wisconsin and from the fluid milk processing plants in the market which receive direct shipped milk from the farm.

The question will come to mind as to how many miles can be covered economically from a centralized laboratory. Most of our plants are within a 100 mile radius. The highways are good and we can easily get around from one plant to another. It would seem that if plants were beyond 100 miles, it would be difficult to get samples to the laboratory within the 24 hr period. The 8 hr working day could also be a factor.

Laboratory reports

Bimonthly, a complete laboratory report is compiled and a noon luncheon meeting is held to discuss the test results and mutual problems. There are usually 35 to 40 interested individuals who attend. These are people from the University of Minnesota, the various health agencies, the State Department of Agriculture, fluid milk processors, and milk distributors. Each year an annual laboratory business meeting is held which most of the membership attends.

The Future

In my opinion, the future of this organization looks good. Today we are all cost conscious and this certainly is a very economical way to do routine laboratory testing; but there is much more to a program like this than just being economical. The trust and cooperation between industry and regulatory agencies is a must to make an organization like this work. This concept has worked in Minneapolis-St. Paul for 32 years. The factual information which we can accumulate is another asset of this organization. Programs, like our "shelf life" program, can be done on a market wide basis, thus benefiting the whole market.

References