

# Testing Market Milk for Keeping Quality



**T**HE Milk Act, 1944, was passed with a view to ensuring the provision for human consumption in New Zealand of an adequate supply of milk of the highest quality. In this article S. J. Cowen, Market Milk Instructor, Department of Agriculture, Palmerston North, describes how the methylene blue test is used by milk-treatment stations in helping town-milk producers to reach and maintain the high standard desired.

**O**NE of the results of the Milk Act was the formation of a Central Milk Council as a general guiding authority, and this, in conjunction with the establishment of producer co-operative milk-supply associations, gave both direction and stability to the town-milk industry as a whole. This meant that town-milk producers could concentrate on the production of a high-quality milk without having to worry about the vagaries of what in the past had proved an erratic market.

However, the organisation of town-milk producer co-operatives brought with it the difficulties inherent in a bulked milk supply. Fortunately, the milk-treatment stations which were the receivers of this supply took steps to ensure the testing of the quality of each consignment, and officers of the Dairy Division of the Department of Agriculture have been untiring in their efforts to ensure that this testing for keeping quality has been maintained regularly.

## Necessity for Testing

When urban areas were small and the delivery of milk directly from farm to consumer was economically practicable there was little need for a keeping-quality test; if the milk did not keep, only one producer was affected and the consumer soon told him in what respect his milk was lacking. Where modern development in urban areas has necessitated the provision of central milk-treatment stations, as it has in New Zealand, this system of direct supply from producer to consumer has had to be superseded.

Under the new arrangement there is always the danger that one supply of milk of poor keeping quality may become mixed with the bulk supply of good milk in the milk-treatment station, and this could readily cause deterioration of the bulk supply. When the milk is delivered to the consumer it may give rise to a considerable number of complaints, many or all of which are made public only too readily. This causes adverse criticism of a scheme which is the only means of ensuring a supply of milk to consumers throughout the year, and also creates the general impression that all the supply is of poor quality, whereas most of the producers concerned are supplying first-class milk.

Bulked milk is only as good as the poorest milk in the supply, so to safeguard the producers of good-quality milk a system of testing every supply of milk received is necessary. Normally this is done by taking a representative sample of the milk received from each producer and testing it for keeping quality, and the keeping-quality test which has been adopted almost universally in New Zealand and which is used equally as widely overseas is the methylene blue or reductase test.

Before the introduction of the methylene blue test a direct method of testing keeping quality was used. It was usually carried out by holding a sample of milk at 60 degrees F. in a covered glass bottle; at intervals the milk was tasted, and in addition a small portion was boiled in a test tube and the appearance and smell noted. As soon as any abnormality of taste or smell or evidence of clotting when

it boiled was noted, the life of the milk was considered to be at an end. Unfortunately, the result of this test could rarely be known before the milk had been delivered to the customers, and in this respect it failed to act as a corrective before the customer was inconvenienced. One advantage of this test was that it also picked out milk contaminated with non-bacterial flavours such as feed and absorbed taints; milk may have poor flavour but still be of good keeping quality.

Obviously, it is essential that any system of testing for keeping quality be sufficiently rapid to ensure corrective action long before the customer receives the milk. This fact challenged scientists to seek a quicker method of obtaining such results, and as a result two scientists, Neisser and Wechsberg, developed the methylene blue test and introduced it in 1900.

## Description of Test

Methylene blue is a dye which retains its colour as long as oxygen is present, but in the absence of oxygen changes to the colourless form of methylene white. As the bacteria usually found in milk consume oxygen, it will be seen that the more bacteria the milk contains the more quickly the dye is reduced in colour, and this speed of reduction provides the estimate of keeping quality.

For laboratory purposes methylene blue is usually bought in powder form. The stock solution is prepared by adding 0.1 gramme of dye to a flask containing 200 millilitres (ml.) of distilled water; after the dye has been dissolved a further 70ml. of distilled water is added, giving a stock solution of 0.1 gramme of dye in 270ml. of water. This solution may also be bought from dairy chemists, or the dye may be obtained in tablet form, packed in bottles

**HEADING PHOTOGRAPH:** A modern milk-treatment station laboratory. Jack Welsh and Sons photo.