

Chemical Test for Detection of Wheat Pasture Flavor Component in Raw Milk

H. S. Kim, S. E. Gilliland and
R. L. Von Gunten

An undesirable flavor characterized as "fishy" which occurs in milk from cows which have grazed on wheat pasture has been a problem in wheat growing areas. Even though the component that causes fishy flavor in milk was identified as trimethylamine, detection of low concentration of trimethylamine in field conditions remains a problem in dairy industry.

A rapid and easy chemical test for detection of trimethylamine in raw milk has been established by adding formaldehyde and sodium hydroxide to a sample of milk to release volatile amines. The formaldehyde serves as a complexing agent to retain ammonia, primary and secondary amines so that they will not appear in the volatile fraction. The volatile components which contains any trimethylamine are then checked with a pH indicator.

Twenty ml of a raw milk sample was placed into a 2.5 x 15 cm test tube. One ml of formaldehyde (37 percent formaldehyde in 10 percent methanol) and one ml of 5 percent aqueous sodium hydroxide were added to the milk. The tube was then stoppered with a rubber stopper fitted with two glass tubes (0.2 cm ID). One tube (5 cm long) contained a piece of white yarn (100% Virgin Orlon Acrylic fiber) saturated with bromocresol green (BCG). This was accomplished by dipping the yarn in the indicator (0.1 percent BCG) and drying it prior to placing it in the glass tube. This tube was inserted so that it extended above the stopper. The other tube was inserted through the stopper so that it reached the bottom of the test tube. The other end of the second glass tube was connected to an aquarium air pump via a rubber tube. Air was bubbled through the milk sample (6 ml/min). The height of color change (from orange to green) on the yarn was measured at one minute intervals during a six minute time period. The test tube was submersed in a 28 C waterbath during the test.

By this chemical test, the intensity of fishiness in milk from cows which had consumed wheat pasture was easily shown by the height of green color. Raw milk samples which exhibited more than a 1.0 cm height of green color change by this test were identified by a trained sensory test panel as having a very slight fishy flavor. Using a standard curve prepared with TMA standards in raw milk, such samples were found to contain approximately 2 ppm TMA. This concentration of TMA in raw milk could be estimated within three minutes by using the chemical test. Thus, the chemical test described herein could be used as a rapid detection method for TMA at the farm bulk milk pick up area.