

# Dairy Scientists Study Ways to Aid Butter Quality

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Kentucky creameries manufacture about 17 million pounds of butter each year, thus providing a market for some 40-45 million pounds of cream. To insure the continuation of a profitable market for the cream producer, the creamery operator must, in turn, be able to dispose of the finished product at a price which will repay him for processing and marketing the butter. The quality of the butter which the creamery offers for sale is the most important single factor determining the price which that butter will bring. In fact, the quality of the butter may at times determine whether there will be *any* market for this product.

## Federal Standards

But there is also another reason why the Kentucky butter industry must be constantly alert to new methods of maintaining and improving the quality of its product. Butter entering interstate commerce must meet certain standards of the Federal Food and Drug Administration.

A few years ago chemists in the Food and Drug Administration devised a new test to assist them in judging the quality of butter. This test measures the amount of water-insoluble free fatty acids in butter (or cream), and is popularly referred to as the "WIA Test." Because the water-insoluble acid (WIA) concentration of butter appears to be a measure of chemical break-down of the fat molecule, the Food and Drug Administration feels that the WIA test on butter gives an indication of the extent to which the cream had deteriorated at the time it was churned. Therefore, butter with a WIA content above a certain maximum value will not pass inspection by the Food and Drug officials.

## Problem Studied Since 1951

Since 1951, the Kentucky Agricultural Experiment Station has been studying the WIA problem in this state, in an attempt to discover the conditions which either promote or prevent the occurrence of excessive amounts of WIA in farm-separated cream.

## Conditions influencing production of water-insoluble free fatty acids in farm-produced cream being investigated

It has been found that many conditions under which cream is produced and handled on the farm do influence the WIA content of the cream at the time it reaches the cream station. For instance, cream obtained by means of a mechanical separator will have a much lower WIA concentration than that obtained by hand-skimming methods or by the use of a water-dilution "separator." In fact, cream obtained by the latter two methods generally is not acceptable on the basis of its WIA content.

The method of cooling and storing the cream on the farm also has a bearing on the production of WIA in such cream. Cream that is cooled quickly to 50° F or below, and held at such temperature until delivered to the cream station, will have a much lower WIA concentration than cream not cooled properly. Some sort of artificial refrigeration (ice or an electric refrigerator) is virtually a necessity.

## Frequent Delivery Essential

One of the most important factors related to WIA concentration in cream is the age of that cream. It has been consistently demonstrated in many trials and experiments that the older the cream the higher the WIA content. Our studies have shown that most of the cream over 4 days old will not make butter that will pass inspection by Food and Drug officials. Frequent delivery of the cream thus becomes a very important part of the "quality butter" program.

It appears that the amount of WIA in farm-separated cream is related to the season of the year. Strangely enough, it has been discovered that the WIA concentration is higher, on the average, in the winter than in the summer. The reason for this is not yet fully understood, but at least two factors may be given on the basis of information thus far obtained: (1) Certain minor chemical constituents of milk, capable of promoting the production of WIA in raw cream are present in slightly greater quantity during the winter than during the summer; and (2) many farmers do

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