
Some Observations on the Yeast and Mold Count of Salted Butter Made from Sour Cream

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SINCE the work of Lund (1), Bouska and Brown (2), the yeast and mold count of butter has been used with varying degrees of success as an index to the sanitary conditions under which the butter has been produced. In butter made with butter culture, the total bacterial count cannot logically be used to measure the sanitary conditions of production, and attempts to use groups of microorganisms other than yeasts and molds have not been successful.

The influence of medium upon the yeast and mold count has been studied, and from the data obtained it appears that the most suitable medium is potato dextrose agar acidulated with tartaric acid. The work of White and Hood (3) stated that 21° C. for 5 days was the optimum temperature and time for incubation, though later studies have indicated that, with potato dextrose agar, the yeast and mold count secured at 3 days at 21° C. was equivalent to the 5-day count.

In the past the yeast and mold count on butter has been made by using 1 ml., 0.1 ml. and 0.01 ml. of the sample; the 1-ml. amount was plated directly with the melted butter, while the 0.1- and 0.01-ml. amounts were obtained by the ordinary dilution method. This practice is still followed in many laboratories. With this procedure it was not uncommon to find upon examination of the 1-ml. plate a poorer distribution of colonies than was obtained in the two higher dilutions and a wide disagreement in count between dilutions. This lack of distribution and lower count in the 1-ml. plate is believed to be caused by the difficulty in securing adequate distribution of the butter in the plate, due to the lack of agitation of the sample with subsequent failure to break up clumps of the microorganisms.

For the above reasons, as well as for convenience in the routine examination of butter for its yeast and mold count, the following method of preparing dilutions was used. Into a 90-ml. warm dilution bottle was introduced 10 ml. of the melted butter to be examined. This dilution blank was shaken, as in milk, and from this bottle dilutions were prepared. The three dilutions made were: 1 to 2, 1 to 10 and 1 to 100. The 1-to-2 dilution was prepared by adding 5 ml. of the 1-to-10 dilution to the Petri dish. This procedure is open to question and, in order to test it, data were collected on the yeast and mold counts of 100 samples of commercial butter and counts in the 1-to-2 dilution were compared with the counts obtained in the 1-to-10 dilution.

The average yeast and mold count of 100 samples of commercial salted butter made from sour cream was found to be 133.2 per ml. of butter when the 1-to-2 dilution was used; whereas the count was 148.9 when the 1-to-10 dilution was employed. The latter gave a ratio count 1.117 times greater than the former.

Higher counts were secured in 63 percent of the samples in the 1-to-10 dilution; in 32 percent of the samples higher counts were secured in the 1-to-2 dilution. In but 3 percent of the samples the difference between the counts secured on the two was greater than 100 percent, and in these samples the counts secured on the 1-to-10 dilution were greater than the counts on the 1-to-2 dilution.

From these data it would appear that an accurate enumeration of the number of yeasts and molds in a sample of butter is obtained by plating 5 ml. of the 1-to-10 dilution. The agreement secured between the 1-to-2 dilution and the 1-to-10 dilution is within the limits of error of the technique used.

Macy and Richie (4) in studying the yeast and mold count of butter found that the yeast and mold count did not serve as a reliable index of the keeping quality of individual samples of butter, but that samples of butter with low yeast and mold counts as a group showed a tendency toward slightly better keeping quality than those with higher counts. The butter examined by Macy and Richie had been stored at low temperatures and held for periods of one to five months. Inasmuch as in the industry samples of butter are submitted to temperatures of 15.6° to 20.0°C. for 10 days to measure their keeping quality, it seemed desirable to correlate the yeast and mold count and the keeping quality of the butter as measured by the flavor change after incubation for 10 days at 15.6°C.

During the summer of 1936, 221 samples of salted butter made from sour cream were examined as to their yeast and mold content and keeping quality. This butter was produced in some 60 different plants. The salt concentration of the butter studied varied from 1.7 to 2.7 percent, and within the samples studied no definite trend was found between the

salt concentration (within these salt limits) and the keeping quality of the butter.

The size of sample used to determine keeping quality was about one-fourth pound; this was stored in a sterile jar with a tight-fitting cap and the samples were held in an incubator thermostatically controlled to 15.6°C. The results obtained were as follows:

No. of samples	Decrease in score after 10 days at 15.6° C.	Percent of samples containing less than 100 yeasts & molds per ml.
56	No change	58.75
50	0.5 point	54.00
38	1.0 point	49.97
77	More than 1.0 point	46.36

The results secured in correlating the yeast and mold count of butter with the change in flavor score after incubation for 10 days at 15.6°C. are similar to the findings of Macy and Richie (4).

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