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Letters To The Editor

Conclusions of the plate count are suspect?

DEAR SIR:

We have read with interest the recent article by Roughley, Johns, and Smith entitled "The Influence of Time and Temperature of Incubation on the Plate Count of Milk" (*J. Milk Food Technol.* 37:209-212, 1974). We feel that the conclusions resulting from the Duncan Multiple Range test are suspect and should be recalculated using analysis of variance after estimating the variance from the experimental data. We question why the authors elected to use an experimental error from previous research when a more appropriate and accurate error term for the immediate experiment could be normally calculated from their own data. The experiment as explained was a $2 \times 2 \times 2$ factorial experiment in which milk samples should be used as repetitions. The interaction of milk samples with the main effects and factorial interactions is an appropriate error for testing the factorial effects. The variance between plates, if more than single plates had been used, is an estimate of sampling variation and not of experimental error and therefore will generally be too small for a particular situation. Interactions of milk samples with other factors represents the failure of different milk samples to give the same results and as such is an approximate experimental error. We also feel that for statistical purposes all possible data should be used. *Standard Methods for the Examination of Dairy Products* recommends the use of plates containing 30-300 colonies. However, for statistical purposes the selection of plates for bacterial counts need not have this restriction. The statistical tests will overcome the errors in plating.

In addition, it is apparent that the percentages given in Table 1 could not have been based on 169 samples in each case, since $0.114 \times 169 = 19.226$ and $10/169 = 11.2$ not 11.4, etc. If all 8 combinations of the factorial were not evaluated for a sample, that sample should have been omitted from the data to retain comparability. Table 2 appears to be based on 74 samples in each case rather than the 76 mentioned in the text on page 210. The 2nd sentence in the 2nd full paragraph on page 210 does not appear to be borne out by the data.

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Conclusions are valid say authors

DEAR SIR:

We appreciate the interest in our paper shown by Huhtanen and Koch. Their suggestion to use interaction to test incubation time and temperature effects on Standard Plate Counts of raw and pasteurized milk samples did not change the conclusions reported in the paper. The recalculated analysis of variance tables are as follows:

RAW MILK

Source	d.s.	m.s.
Samples (S)	130	1.086
Time (Ti)	1	1.879**
S x Ti	130	.016
Temperature (Te)	1	.595**
S x Te	130	.032
Ti x Te	1	.022
S x Ti x Te	130	.007

PASTEURIZED MILK

Source	d.s.	m.s.
Samples (S)	50	1.457
Time (Ti)	1	1.918**
S x Ti	50	.032
Temperature (Te)	1	.040
S x Te	50	.101
Ti x Te	1	.013
S x Ti x Te	50	.013

The target population for these comparative studies is the mid-range population. Very low counts are of little interest in regulatory work and very high counts will be consistently high under the methods used in this study. Excessively crowded plates also create bias in the data by yielding underestimates of the counts.

The title in Table 4 is correct and the total number of pasteurized samples throughout the text should be 74. The second sentence in the second full paragraph on page 210 should read "and 5.0% after PI" not "and 9.0% after PI."