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A Research Note

THE EFFECT OF MIXING ON DISTRIBUTION OF SOMATIC CELLS IN BULK TANK MILK[1]

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ABSTRACT

Agitation of milk in bulk tanks for at least 1 min is necessary so that representative samples for somatic cell counts can be obtained.

Improved methods have recently been developed for estimating the level of somatic cells in milk *(1, 2, 3)*. In order for test results to be useful, it is necessary to establish the amount of mixing required to obtain a representative sample from a bulk tank.

MATERIALS AND METHODS

Bulk tanks. Samples were obtained from 10 different commercial bulk tanks among which a variety of designs (cylindrical and rectangular designs with both round and flat bottoms) was represented. No attempt was made to select bulk tank types to reflect any frequency distribution in the field. The amount of milk ranged from 400 to 3,000 lb. The concentration of somatic cells ranged from 300,000 to 1,300,000/ml.

Samples. Milk samples (5-10 ml) were obtained by pipetting before agitation (tank undisturbed for > 1 hr) and after 1, 2, 3, 4, and 5 min agitation with the bulk tank agitator. Six samples were obtained at each time from each tank at each of 3 depths (surface, center, bottom) and at each of 2 locations (center and periphery).

Cell estimates. Somatic cell levels were estimated using the Direct Microscopic Somatic Cell Count (DMSCC) *(1)*.

RESULTS AND DISCUSSION

Samples were obtained from the undisturbed tank and after 1, 2, 3, 4, and 5 min agitation. Analysis of variance of results is presented in Table 1. The difference attributable to sampling location (depth) was highly significant in samples taken from the unagitated tanks. After 1 min agitation there were no significant differences in samples obtained at various depths and after additional agitation there was no further change.

TABLE 1. ANALYSIS OF VARIANCE

Source		DF	Mean squares	F-ratio
Agitation time		5	54,330	115.01**
Depth[1] within agitation time	(0)[2]	5	155,782	329.78**
	(1)	5	44	.09
	(2)	5	8	
	(3)	5	41	.08
	(4)	5	2	
	(5)	5	28	
Error		180	472	

[1]Depths: surface, middle, and bottom
[2]Minutes agitation indicated in parentheses.
**P <0.005

The data demonstrate that samples obtained from these bulk tanks after agitation for at least 1 min were representative enough for use in estimating the somatic cell counts for the entire volume of milk. It seems reasonable to require a minimum of 1 min agitation period as a standard procedure.

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