

IMPORTANCE OF MILKING MACHINE RUBBERWARE AS A SOURCE OF BACTERIAL CONTAMINATION

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SUMMARY

Examination of samples of milk collected at farms whose bulk milk supply was bacteriologically unsatisfactory revealed that the milking machine rubberware contributed from 10.3 to 117.0 times the number of contaminants contributed by the metal parts of the farm dairy equipment.

When the rubberware was in satisfactory mechanical condition and the milk supply was bacteriologically satisfactory, the rubber and the metal parts contributed similar degrees of contamination.

I. INTRODUCTION

Bacteriological examination of samples drawn from the raw milk supplies received at factories in Queensland revealed considerable variations in their plate counts. Visual inspection of the production conditions on farms producing high-count milk and on farms producing low-count milk suggested that the use of unsatisfactory rubberware could be one of the factors contributing to the production of milk of unsatisfactory bacteriological quality. Accordingly, the bacterial contamination from the rubberware and that from the metal parts of the milking equipment were separately determined firstly under the conditions prevailing when the first inspection was made, and secondly with new or very recently replaced rubberware.

II. METHODS

The methods used to assess the bacterial contamination during milking were as follows:—

- (a) Two milking machine buckets complete with lids, air-lines, milk-lines, inflations, cups and claws were sterilized in the laboratory.
- (b) An additional two milking machine buckets complete with lids were also laboratory-sterilized.
- (c) This sterile equipment was then transported under aseptic conditions to the test farm.
- (d) At the test farm composite milk samples were aseptically hand-drawn from two groups each consisting of two cows. Subsamples were retained for examination.

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- (e) Two of the test cows were then machine-milked, using the laboratory-sterilized air-lines, milk-lines, inflations, cups and claws. Subsamples of the milk obtained were then taken for analysis.
- (f) The other two test cows were machine-milked into the laboratory-sterilized milking machine bucket, using farm-treated air-lines, milk-lines, inflations, cups and claws. Subsamples of the milk obtained were then taken for analysis.
- (g) The milk drawn through the laboratory-sterilized air-lines, milk-lines, inflations, cups and claws was then drawn into the farm-treated metal milk-line and collected in the farm-treated milk vat. Subsamples of this milk were then drawn from the vat for analysis.

The difference in bacterial count between the milk sample taken after passing through the farm-treated rubberware and the sample drawn aseptically from the cows used in this section of the experiment was taken as representing the bacterial contamination due to the farm rubberware.

The difference in bacterial count between the milk drawn through the laboratory-sterilized rubberware and the sample collected in the farm-treated vat was taken as representing the bacterial contamination of the farm-treated metal parts of the milking equipment.

The samples were plated on tryptone glucose agar and counted after incubation at 30°C for two days, using the methods described by the American Public Health Association (1953).

III. EXPERIMENTAL RESULTS

The results obtained are summarized in Table 1.

TABLE 1
RELATIVE CONTAMINATION FROM RUBBER AND METAL PARTS DURING
MACHINE MILKING

Plate Count	Ratio of Counts of Milk Drawn Through Rubber Parts and Milk Drawn Through Metal Parts		No. of Comparisons
	Minimum	Maximum	
1st series—unsatisfactory rubberware—			
30,000 to 100,000 ..	1·7 : 1	6·5 : 1	7
100,000 to 500,000 ..	4·6 : 1	15·1 : 1	14
Greater than 500,000 ..	10·3 : 1	117·0 : 1	13
2nd series—new rubberware			
Less than 30,000	0·7 : 1	2·8 : 1	36

When unsatisfactory rubberware was replaced by new rubberware, the plate counts of the milk drawn through the rubberware were in all cases less than 30,000 colonies per ml whereas they were invariably higher than this before the replacement. When the bacteriological quality of the milk produced was unsatisfactory (i.e. plate counts higher than 30,000 colonies per ml), bacterial contamination from the rubberware was much greater than that from the metal parts of the equipment, the ratio of plate counts ranging from 10·3:1 to 117·0:1 when the counts were very high.

There was no significant difference evident in contamination from the rubberware and that from the metal parts when the bacteriological quality of the milk produced was satisfactory. The range in this case was 0·7:1 to 2·8:1.

REFERENCE

AMERICAN PUBLIC HEALTH ASSOCIATION (1953).—"Standard Methods for the Analysis of Dairy Products" 10th Ed.

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