

## Method for Sampling Meat Surfaces

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A new method for sampling meat surfaces was developed. Bacterial counts of beef carcasses by the cotton swab technique and by the new method showed that the latter gave higher counts. These counts were closely correlated with data obtained by using the swab method. Advantages of the new method are its simplicity, rapidity, and adaptability to routine use on any type of carcass.

The method recommended by the American Public Health Association for sampling meat surfaces by using a knife or scalpel is very tedious and time consuming (1). A method recommended for sampling solid surfaces, using cotton or alginate swabs, can be used for sampling meat surfaces; however, the swab method also is tedious and does not completely remove the cells (7). Direct methods, such as the agar sausage technique (4), are not adequate because counts on meat surfaces are too high (7). Three different methods for sampling egg shell were compared by Gunaratne and Spencer (5). In a method described by Williams (7), a sharp-edged cylinder is pressed on a carcass and then cells are removed with peptone water and a scalpel. This method is adequate and simple, but there are some limitations. (i) Only one point can be sampled for each dilution series, unless samples are pooled; (ii) the carcass area must be reasonably regular and must be in a horizontal position for sampling; and (iii) the peptone water tends to spread over the surface

after the operation. A steel plate has been used to outline an area of poultry skin (6), and scalpel, forceps, and scissors have been used for removing the skin (3, 6).

The new method described in this paper utilizes a stainless-steel plate (1.6-mm thick) shaped as shown in Fig. 1. An oval hole (area of 8.24 cm<sup>2</sup> or any convenient size) in the center of the plate is positioned so that a knife can be used to cut the exposed area of the carcass in one movement (see Fig. 2). The inner edge of the plate is bevelled in such a way that the knife will remove the entire surface of exposed area.

For sampling procedure, the previously sterilized plate was pressed on the meat surface, and the exposed area was cut with a sterile knife.

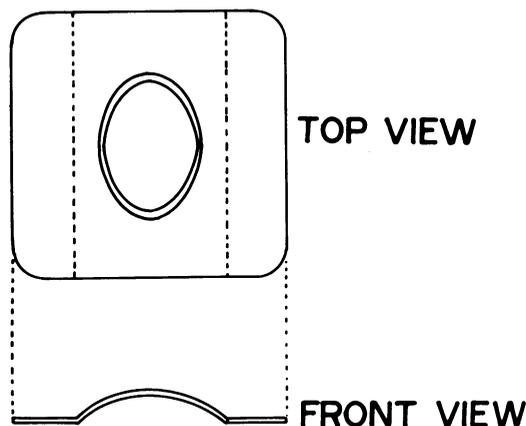


FIG. 1. Template for sampling the meat surface.

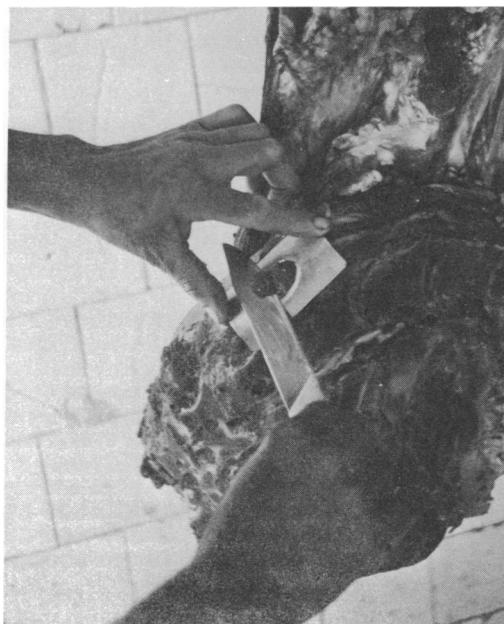


FIG. 2. Cutting a surface from a beef carcass.

**TABLE 1.** Total microbial counts on raw meat surface obtained by the swab method and the new method

Sample no.	Swab method (counts/ cm <sup>2</sup> × 10 <sup>-6</sup> )	New method (counts/ cm <sup>2</sup> × 10 <sup>-6</sup> )
1	3.7	7.3
2	0.48	1.0
3	0.092	0.14
4	0.14	0.30
5	0.084	0.13
6	0.17	0.39
7	0.22	0.37
8	3.3	4.3
9	1.2	2.6
10	0.080	0.12

The removed portion was then placed in a 250-ml Erlenmeyer flask containing 100 ml of sterile distilled water with sterile sand. A total of five areas were taken from each carcass and placed in one flask. One milliliter of sterile Tween 80 was added to each flask, and then it was shaken in a rotary shaker set at 150 rpm for 15 min. After proper dilution it was placed in petri dishes, and molten standard plate agar (Difco) was poured. The plates were incubated at 30 C for 48 h, and the number of colonies was recorded. From the corresponding carcass, a sample was taken by the cotton swab technique (1) and the cell counts were carried out as above.

The results of such experiments are shown in Table 1. The technique described in this paper showed higher counts than the cotton swab method. The correlation analysis was carried out on a logarithm of microbial counts. The results showed a correlation coefficient of 0.988, which indicated that they were very closely correlated. The regression analysis showed a slope index of 0.986 and an intersection of 0.349, which indicated that the results obtained by both techniques were proportionally related.

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