

SLACTERIERNES FORSKNING SINSTITUT
21. juli 1964

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HYGIENE - SLACTERIER
Manuskript nr. 282 E

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The Relationship between the Bacterial Count on Equipment
and the Count on Hog Carcasses

Contribution to the 10th European Meeting of Meat Research Workers
in Roskilde, Denmark, August 1964.

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Summary

The correlation between the bacterial count on equipment and on the meat handled on it has been determined by taking samples both after bad and after effective sanitation of the equipment.

The investigation showed that if the bacterial count on the equipment is higher than that on the meat before manufacturing, the meat will be contaminated by the equipment; if, on the other hand, the bacterial count on the meat is higher than that on the equipment, the equipment will be contaminated by the meat. During the day an equilibrium is obtained, and the level of this is determined by the bacterial count on the equipment or on the meat, respectively.

This means, that if the sanitation is satisfactorily done and the bacterial count on the product supplied is kept at a low level, it is possible to work at a very low level of contamination throughout the day.

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Introduction

Quite a lot of investigation in Danish Bacon factories have shown a correlation between the bacterial count on the equipment and that on the rind side of hog carcasses and bacon sides. In order to determine this correlation and to prove the effect of good hygiene the following experiment was carried out.

Method

The contamination during the deboning and trimming process in bacon production was determined by taking bacteriological samples using the swab-technique described by Hansen, N.-H. (1962) on the equipment and on the rind side of the hog carcasses which had been handled on it. The equipment was a steel conveyor belt with wooden planks along its sides where the sides were deboned and trimmed, a wooden roll-conveyor where the rest of the back bones were trimmed by sawing, and finally a rubber conveyor belt on which the sides were pumped with injection pickle and carried to the curing tanks. The samples were taken in the morning before work started, and 3-4 times later during the work hours.

At the same time samples were taken on the carcasses before they were placed on the conveyor belt, passing from this belt to the wooden roll-conveyor, and after the pumping just before going into the tank. These samples were taken on the first 10 sides manufactured in the morning and 3-4 times later on the day. On the following day the procedure was repeated.

The experiment was carried out over two weeks; in the first week the equipment was not sanitized satisfactorily, and in the second week the sanitation and disinfection was very carefully and effectively done.

Results

In fig. 1 the results obtained are shown. The figure is divided into 4 diagrams. In the two diagrams to the left are shown the bacterial counts from the first week (bad sanitation); in the two diagrams to the right are shown the counts from the second week (effective sanitation). All the bacterial numbers are antilog. to logarithmic means of the counts obtained on the two days in question. The two upper diagrams show the bacterial counts on the equipment in the morning

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before work started and on the first 10 pigs manufactured in the morning, while the two lower diagrams show the logarithmic means of the corresponding bacterial numbers obtained in the 3-4 sets of samples taken later in the day.

The diagrams show that if the equipment is unsatisfactorily sanitized the first sides to be manufactured will be badly contaminated by the equipment (upper diagram to the left). Later on in the day, an equilibrium between the equipment and the sides is obtained at a high level (lower diagram to the left). This means, that the sides are contaminated by the equipment at a level determined by the bacterial count on the equipment.

If, however, the equipment is well sanitized (upper diagram to the right) the equipment is contaminated by the carcasses. As a matter of fact several times a lower count was found in the second week on the sides after pumping than before deboning. Later in the day an equilibrium is obtained at a level much lower than that of the bad sanitation (lower diagram to the right).

In other words, if the sanitation has brought the bacterial count on the equipment down to a level lower than that of the carcasses, the equipment will be contaminated by the carcasses at a level determined by the level of the bacterial count on the carcasses before the manufacturing, and this may - if the hygiene on the slaughter line is extremely good - be kept very low.

Conclusion

The investigation showed a correlation between the bacterial count on the equipment and that on the meat handled on it. If the bacterial count on the equipment is higher than that on the meat before manufacturing the meat will be contaminated by the equipment; if, on the other hand, the bacterial count on the meat is higher than that on the equipment, the equipment will be contaminated by the meat. During the day an equilibrium between the meat and the equipment is obtained, and the level of this is determined by the bacterial count on the equipment or on the meat, respectively.

Consequently, it is possible - if the sanitation is satisfactorily done - to work at a very low level of contamination throughout the day.

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Technique

The bacteriological technique is described by Hansen (1962), using cotton-swabs and agar slants; the medium used was OXOID: Blood Agar Base to which was added 3½ % of NaCl and ½ % of DIFCO: Bacto-Agar.

Reference

Hansen, N.-H. (1962). J. Appl. Bact., 25, 46.

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Fig. 3. Hygiene during trimming and deboning

