BACTERIOLOGICAL TESTING OF UTENSILS FOR QUALITY CONTROL IN AN OYSTER SHUCKING PLANT

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TABLE 1. RESULTS OF SWAB TESTS OF VARIOUS SURFACES

<table>
<thead>
<tr>
<th>Source of sample</th>
<th>Most probable number of coliform bacteria per 3 square inches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial examination</td>
</tr>
<tr>
<td>Shucking knife</td>
<td>&gt;7,000</td>
</tr>
<tr>
<td>Shucking block</td>
<td>7,000</td>
</tr>
<tr>
<td>Shucking pail</td>
<td>1,300</td>
</tr>
<tr>
<td>Shucking table</td>
<td>2,400</td>
</tr>
<tr>
<td>Washer tank(^1) No. 1</td>
<td>&lt;45</td>
</tr>
<tr>
<td>Washer tank(^1) No. 2</td>
<td>60</td>
</tr>
</tbody>
</table>

\(^1\)During the initial examination, washer tanks were flushed with clear water before swabbing. After corrective action washer tanks were swabbed without rinsing.

The usual practice for in-plant sanitation control in an oyster shucking and packing plant depends upon continued efforts of management to achieve conditions of maximum cleanliness. This, combined with periodic inspection visits by a sanitary engineer or sanitary and frequent bacteriological examinations of the finished product completes the sanitation program. With dependence on visual inspection techniques only, it is often impossible to pinpoint sources of contamination of the product. It is the object of this paper to describe a method suitable for identifying trouble spots and also to show some results of the application of the method.

Swab testing procedures for the determination of the bacteriological quality of utensils (1) have long been used in the evaluation of dishwashing practices in restaurants. These methods have been applied to operations involving food production to only a limited extent. Use of a modified bacteriological swab test for surfaces and utensils with which oysters come in contact is discussed here. The method approved for bacteriological examination of food utensils in California (2) was used throughout this work with one major exception. This exception was that instead of making a total plate count for the enumeration of all bacteria, a series of lactose broth tubes was incubated to determine the most probable number (MPN) of coliform bacteria. Since coliform bacteria are the indicators most used in the laboratory analysis of the sanitary quality of oysters, this modification provided a means for correlating swab results with other tests performed in shellfish control. The area swabbed routinely was three square inches per utensil or surface.

An oyster plant in Northern California which has been experiencing difficulties in terms of the sanitary quality of the end product was selected for making before and after surveys. As an example, the data in Table 1 show analyses of a variety of samples within the plant. Following the first set of observations, a series of recommendations was made to management for improving the sanitation practices used in the shucking process. These recommendations covered both general operations and more specifically utensil sanitation.

After these observations and recommendations the following process changes were made:

1. A hypochlorinator was installed to inject a chlorine solution into water used for washing shell-stock coming into the plant.
2. An elevator-conveyor was installed to distribute ice among the shellstock as the hopper was loaded.
3. Water used for washing shucked oysters was pre-cooled to 44°F.
4. Flow of oysters from the shucking bench to packing of finished product was improved so that all oysters are processed within one hour at temperatures below 50°F.
5. More frequent washing and disinfection of shucking knives, blocks, and gloves was carried out.

It had also been recommended that a steam generator be installed in the plant to provide a source of steam for sterilizing shucking pails and washers between each use and for sterilization of the shucking table and storage bins after completion of the day's operation. No action was taken on this recommendation.

TABLE 2. COLIFORM COUNTS OF OYSTERS

<table>
<thead>
<tr>
<th></th>
<th>Shell Shucked</th>
<th>Shell Shucked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial examination</td>
<td>2350 3300</td>
<td>90 790</td>
</tr>
<tr>
<td>After corrective action</td>
<td>14 24</td>
<td>15 39</td>
</tr>
</tbody>
</table>

A repeat examination made after the changes were completed showed a remarkable reduction in coliform count on the shucking utensils which received additional disinfection treatment. Not only was there improvement in the sanitary quality of the utensils used in the operation, but also an improvement in the finished product. Table 2 shows results obtained before the initial examination and after corrective action.
It has been shown that a swab test of utensils and surfaces, coupled with an estimation of the numbers of coliform bacteria on these surfaces is a useful adjunct to visual observation in locating sources of contamination of the finished product in an oyster shucking and packing plant. Use of this procedure also helps to develop confidence by industry toward the enforcement agency by providing a means for demonstration of problem elimination by cooperative efforts. It is recommended that this or similarly useful procedures be applied more extensively to the sanitary investigation of oyster shucking and packing operations.

REFERENCES

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FUTURE IMPERFECT

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A look into the future of sanitation sees an increasingly higher level of responsibility and professional achievement. In particular, with respect to food, the need for further research, advanced training, and appropriate preventive measures is underlined by the increasing complexity and articulation of the system of food protection, processing, and distribution. The complexity and articulation of urbanized society even requires that the sanitarian assume some of the stature of a statesman or political scientist. While professional alliances are important in this prospect, essentially the drive of dedicated individuals is what will carry the profession and society to new levels of achievement. An important instrument in this drive is the body of professional literature which is both the possession and product of those who serve public health.

The 50th milestone has two advantages. It is first of all a great satisfaction to have reached it at all. Take it from one who knows. Second, it is an occasion for reflection, not only for reviewing the history but for taking bearings for the next 50 years.

This anniversary is a reminder that you are carrying on a tradition that is as old as any in our civilization. Indeed, sanitation is the bed-rock of civilization: Even without other records of the past, the remnants of ancient cities tell us that the oldest civilizations understood the need to protect the public from its own by-products and from the mischief of nature.

While scientific theories and technologies have been modified since the first cities grew along the Nile, certain fundamental policies have persisted, such as the belief that life is good, that it should be preserved and protected. This sounds about as obvious as one can be, but it isn't necessarily so. If life must be protected, most people prefer to protect their own. The lives of others usually are secondary. At times, murder has been a considered act of public policy. At others, it has been the accepted by-product of commercial enterprise.

The other day, one of your associates, after an enjoyable lunch, realized he had to return to his work and said, a bit wearily, "Well, I have to go back to saving lives." He thought he was joking, but actually he was more in earnest than he realized. The business of saving lives is not to be taken for granted at anytime. But it has been the persistent theme of sanitation.

If there has been any critical, strategic change in sanitation since this Association was founded, it is a shift in basic strategy, from the simple to the complex, from a plain cause and effect situation to one where a multitude of factors move into the act. It is the difference between a game of marbles and a game of basketball with 30 players, five basketballs, and no time out. This is a basketball game, incidentally, which is remarkably free of scandals.

In these conditions, new strategies of sanitation have to be invented. Leon Buchbinder recently published in Public Health Reports a paper which recommended several steps to reduce food poisoning. To summarize his ideas here may not do them justice, but the main recommendations clearly identify the increased professional responsibilities in sanitation. These are indicated by the need for an expanded program of research, advanced professional education, and a stronger course of public education, including specialized training of students in secondary schools. Improved detection and reporting of food

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1 Keynote address given at the 48th Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., at Des Moines, Iowa, August 14-17, 1961.
2 Editor, Public Health Reports.