

DuPont Qualicon RiboPrinter® System

APPLICATION PROFILE

Finding The Source Of A Tiny Organism May Save Your Company From Large-Scale Shutdown

Processing in a food plant can come to a costly halt when routine QA/QC discovers product contamination with *Staphylococcus*. The problem is compounded when the same strain is discovered in several areas. In this case, there is no way of knowing which is the source.

Refining microbial analysis to below species level is the best way of pinpointing the culprit. Today's cutting edge companies can do just that with the help of the RiboPrinter® Microbial Characterization System.

Staph detected in product

A food processing plant that produces packaged, ready-to-eat foods routinely monitors its finished products as part of its quality assurance program. Microbial testing is a part of this program, and on one occasion, the plant detected *Staphylococcus* contamination in two different products. This raised a red flag to the corporate Quality Assurance and Control team, whose task was to determine the source of contamination as quickly and cost-effectively as possible. Since *staphylococcus* is often present in many parts of a given plant, the challenge would be to pinpoint the source of contamination that was making its way into finished products.

The QA/QC team explored all potential avenues for contamination. At first, they used conventional microbial testing techniques to test samples from a variety of sources within the plant, including raw materials, the plant environment in general, the processing equipment, and even the hands of personnel. These results proved to be inconclusive because *Staphylococcus* was isolated from many of these sources, as expected. The suspect organism, *Staphylococcus epidermidis*, was observed in several of them. There was no way to tell whether these isolates originated from a single source or whether they were related in any way.

Avoiding a plant shutdown

The company faced a difficult situation. If it could not pinpoint the problem quickly, a full-scale shutdown and clean-up of the facility might be necessary.

The QA/QC team had access to the RiboPrinter® Microbial Characterization System and decided to use that technology for further investigation. They realized that the genetic "fingerprint" provided by RiboPrint® patterns would allow them to extract below-the-species level information for the various *Staphylococcus* isolates, giving them answers not available with conventional techniques.



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The definitive and fast results provided by the RiboPrint® pattern technology proved to be invaluable. Species-level information on each of the isolates was 100 percent accurate, based on the extensive RiboPrinter® system database. Additionally, the QA/QC team could see that the RiboPrint® patterns for isolates from both of the contaminated products were in fact *Staphylococcus epidermidis* of the exact same type (see Figure 1). This strongly suggested that there may have been a single source of contamination.

Further comparisons showed that, although *Staphylococcus epidermidis* had been isolated from several different sources in the plant, only one source yielded *Staphylococcus epidermidis* with a RiboPrint® pattern matching those from the contaminated products. This source was, in fact, the hands of one of the employees.

Conclusion

With such a clear implication, the QA/QC team moved quickly to institute corrective procedures that would not disrupt plant time. These included new regulations requiring frequent hand washing and mandatory glove usage. Additional precautionary measures were also implemented to minimize the potential introduction of bacteria between plant areas considered low-risk (raw material handling) and high-risk (post-processing). These measures proved to be indeed effective, as no *Staphylococcus* was detected in subsequent testing of finished products.

By quickly and effectively pinpointing the source of contamination, one food processing plant was spared the expense of a costly full-scale shutdown and decontamination effort.



Staphylococcus epidermidis
(from raw material)



Staphylococcus epidermidis
(from finished product)



Staphylococcus epidermidis
(from employee hands)

Figure 1. *Staphylococcus* RiboPrint® Patterns - The pattern of the raw material (top) is clearly not the same as the one from the finished product (middle). However, the pattern from the sample taken off an employee's hands was an exact match.

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