

DuPont Qualicon RiboPrinter® System

APPLICATION PROFILE

Enterobacter sakazakii has no place in a product as important as infant formula

When organisms find their way into a production facility or process line, they can be tough to eliminate. As one producer of infant formula learned, accurate, detailed microbial information can be a manufacturer's best tool for combating unwanted organisms. A European producer of infant formula found that its finished product was consistently contaminated with low levels of *Enterobacter sakazakii**. The company realized that the bacteria could grow rapidly in reconstituted milk, and they wanted to understand how the product became contaminated.

Isolates from three plants

QC personnel were able to isolate *Enterobacter sakazakii* frequently in products from two factories and infrequently in products from a third. The production processes used in each factory were essentially the same; however, the operations and layout of each facility varied enormously.

A survey of raw materials and the environment at each site yielded several hundred samples of *Enterobacter sakazakii*. The QC team performed some preliminary screening using biochemical methods, but those data were not helpful in tracking the contamination. The team then decided to use the RiboPrinter® Microbial Characterization System for more information.

Grouping the isolates

The RiboPrinter® system was able to discriminate among many of the *Enterobacter sakazakii* strains below the species level, which allowed the company to learn how the contamination was being spread throughout the factories. For example, 30 strains of the organism found in one factory clustered into 8 RiboGroup pattern sets (two of which are shown in Figure 1). By examining this level of characterization and identification, the investigators could see which strains were confined to a single site and which were common to all three factories.

Important trends also became evident. The use of portable vacuum cleaners to reduce dust and powder contamination presented a cross-contamination hazard as the vacuum cleaners were moved from one area of the factory to another. Also, personnel movement appeared to be a factor in the transfer of some strains of *Enterobacter sakazakii*. Finally, investigators determined that "resident" flora of a particular type of *Enterobacter sakazakii* were able to evade standard cleaning and sanitation regimes. This source of contamination was considered significant.



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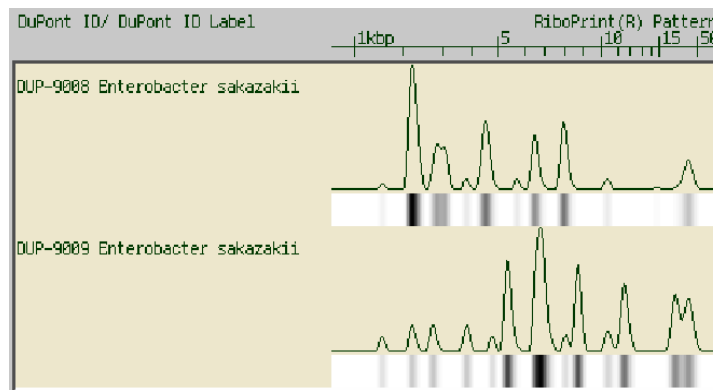


Figure 1. The plant environment yielded a number of strains of Enterobacter sakazakii. The distinctiveness of their RiboPrint® patterns, as illustrated above, allowed the manufacturer to track the sources of contamination.

Conclusion

The company changed its cleaning practices to address these issues. It has built the information into the QC database and regularly monitors the contamination patterns of the organism. The QC team recognizes that changes in the subspecies flora may indicate a problem in process or hygiene practices; the team can then quickly direct cleaning crews and engineers to the area of concern.

The RiboPrinter® system was invaluable in helping this business quickly, definitively address the source and route of contamination throughout its complex manufacturing operation.

** Note: The organism Enterobacter sakazakii was re-classified in June 2008 into the new genus Cronobacter. The genus Cronobacter is synonymous with Enterobacter sakazakii.*

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