



IFAS EXTENSION

Food Product Quality: It Isn't Just Food Safety That Counts¹

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Case study: Food Contamination Issues and the Influence of Packaging

Summary

A recent case of food contamination in the Southeast resulted in lawsuits. The contamination did not involve any injury to people, and the lawsuits were only concerned with the dollar loss to the food producer, estimated between \$3-6 million. The food producer's bottle supplier was among the litigants under the claim that the bottle supplier had improperly packaged and managed the bottles used by the food company. Expert witnesses were hired by several of the litigants to explore different liabilities and to describe standard practices in the packaging industry and proper uses and handling of packaging. This case study illustrates a trail of liability, the importance of good record-keeping, and the role packaging can play in preventing contamination (and liability) at several points in the manufacturing process.

The Case of the Expanding Salad Dressing

A few years ago, a food company located in the southeast United States decided to market a honey mustard salad dressing. This product was extremely high in acid, and initially was hot-filled into its final packaging, a food-grade plastic (polyvinylchloride) bottle. The high acidity and the hot-fill provided two "kill cycles," that is, steps in the product's manufacture that can kill potentially harmful organisms. A third kill cycle was provided by the addition to the product of preservatives -- chemicals or agents that reduce the growth of mold, yeast, or other organisms.

A significant amount of this salad dressing was produced using the hot-fill procedure. However, based on feedback from retailers, the food company decided that the dressing might taste better if the bottles were filled with cold product rather than hot. The new procedure required FDA approval, and a series of tests found no toxicological issues or food contamination issues that would cause any health or

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safety problems for the general public. The company was given clearance to proceed with their cold-fill operation. At the same time, they switched from the polyvinylchloride bottle to a polyester food-grade bottle with a different shape from the original bottle.

Soon, reports of strange occurrences began to come back to the food company. Customers complained of bursting bottles of salad dressing or when the dressing was poured out, it would expand to three times its initial volume. These complaints started in September and peaked in November; by the end of December there were no more complaints. The amount of product involved and the loss of sales were fairly significant for a small food company.

The company confirmed that the salad dressing did indeed expand and pressurize the bottles, sometimes causing dressing to ooze out. They did not know what was causing the product to behave this way, but they suspected contamination. Testing by a state agency showed that the salad dressing contained some type of yeast, which they did not specify. Fermentation of the yeast produced carbon dioxide gas, which was pressurizing the bottles. The state agency also found other, relatively benign bacterial infestations of the sort that tend to be present in raw vegetables and similar raw materials.

In September/October, shortly after the problem began to appear and the contamination was identified as some sort of yeast, the food producer decided to sterilize his entire facility with caustic solutions and chlorine solutions. Nevertheless, customers continued to complain, and with a now very clean production facility, the food company sought another source of contamination. The next logical element to consider was the packaging, and they began to look into the handling of bottles by their supplier.

The bottle supplier was basically a broker. He bought bottles from a manufacturer, and received and stored them in a warehouse. Usually, he used his own warehouse, but sometimes, he used the bottle maker's, in which case, the bottle maker would ship directly to the food producer. The food producer did not have facilities for large numbers of bottles, and wanted no more than a palette of bottles at a time. Therefore, to keep supply to the food producer

consistent, the broker did a lot of warehousing bottles.

The food producer began to focus more sharply on the bottle broker after an incident in January of the next year. They sent a truck to pick up a shipment of bottles, and when the truck arrived at the bottle broker's facility, a palette of bottles was brought out. As the palette of bottles was broken down to fit into the small truck, water ran out of the middle of the palette and across the loading dock area. A broker employee at the dock said, "Oh, that palette must have been in an area where we have a roof leak. We've been trying for a long time to get that leak fixed." When this was reported to the food producer, they brought it to the attention of the broker. Both food producer and the broker jumped to the conclusion that the roof leak was the source of the yeast.

By January, the food producer was not receiving any more complaints, but they had suffered significant losses. The food producer pursued resolution of the problem with the broker, but was not satisfied. Around March/ April, the food producer sued the bottle broker claiming they had mishandled the bottles and caused the contamination. Eventually, the bottle maker was also sued under the claim that the bottles had not been palletted properly so as to exclude the water which dripped on them.

The bottle producer kept very good records about when bottles were made, where they were stored, where they were shipped, and how they were handled. The bottles were typically shipped in a large corrugated container that held approximately 180 bottles. The container itself had a poly liner about 1/2 millimeter thick, basically a dust cover to prevent gross contamination of the bottles from dust or fibers. This is a traditional way to ship bottles. The lawsuit against the bottle maker claimed that the palettes and cases of product should protect the bottles from intrusion by rain or other water which might fall on the palette or cases and contaminate the bottles. This is not standard practice for bottle makers.

The bottle maker hired an expert who positively identified the contaminating yeast as *Zygosaccharomyces bailii* (hereafter, 'ZB'). ZB is not used in food production, instead it is common in

rotting fruit and vegetables. It is resistant to high acid environments, such as the salad dressing, but the hot-fill procedure would have killed it. This may explain why it began to cause problems when the food company switched to cold-fill for the salad dressing. The dressing, however, also contained preservatives, but ZB was known to have a very unusual characteristic -- if exposed to low levels of the preservatives, it develops into a strain that is extremely resistant to the preservatives.

By the time the case went to court, there were no consumer complaints coming back to the food company, however, the case proceeded. The bottle broker, who claimed to act only as a go-between, put forward the defense that the bottle maker was the only party who could be responsible for the contamination, and therefore the only party liable. Nevertheless, the broker was never able to overcome the statements from his own employee about the roof leak. The fact that this information about the broker's operation came from the food producer rather than the broker himself made it appear as if the broker was less honest than the bottle producer who had gone to great lengths to be forthcoming about every phase of its operation. After the roof leak became known, no further attention was paid to the possibility of the food producer being the source of the contamination.

Although the roof leak was a very obvious source of contamination, it is unlikely that water leaking from a roof would contain ZB, since this yeast is produced in rotting fruits and vegetables. The broker's efforts to prove that the bottle maker improperly organized the pallets of bottles so as to exclude the water was supported by extensive photographs showing how the pallets were put together and how they were vulnerable to contamination. However, the photographs were of a pallet which yielded no contaminated bottles, and at the time, complaints had ceased. The bottle broker failed to show that the possibility of contamination was a more serious problem than tolerating a leaky roof. The jury found the bottle broker 80% responsible for the food producer's losses, and food producer himself 20% responsible.

If not for the roof leak and the broker's strategy of shifting attention to the bottle maker, the food producer might have been more suspect. The food company kept no written records other than how much of a particular product was being made and when it was made. They had no written standard operating procedures of how to clean the equipment or how to produce different products. Their entire staff was trained by personal instruction. There was no quality control and no paper trail on any process. Both the company owner and the plant manager were very knowledgeable, but there was a significant language barrier. The owner spoke very little Spanish, and the manager spoke very little English. The crew were all Spanish speakers. The entire operation was run like a very large kitchen instead of a professional manufacturing operation. Under those circumstances, safety and hygiene procedures would be highly suspect.

There were many points in the food producer's operation that might have caused cross-contamination between old food and new bottles. The food producer transported almost everything in one truck, which they swept out between loads. This means the truck hauled vegetables, raw materials, preservatives, and other components used to make the product. Bottles were then brought into the food production area on pallets from the bottle broker. These wooden pallets were used for everything in the broker's warehouse and were rarely cleaned, therefore, traces of anything which they might have come in contact could be carried in. An additional problem related to this was created by the air knives on the doors. These devices create a strong downblast of air every time the door is opened, thus preventing flies from entering the food preparation area. However, this downblast is so strong that it visibly stirs up whatever is on the floor. This gives a picture of how rotten debris from vegetables in a warehouse could be carried by a multiple use pallet and end up inside one of the large, uncovered mixers in which the salad dressing was prepared. Other producer faults that might have caused real problems in a legal situation:

- The mixers were in a fume hood whose upper area appeared not to have been cleaned in years.

- The food preparation building abutted pastureland for horses, sheep and other animals. The pasture was close enough that the animals could come right up to the edge of the building.
- Equipment was stored behind the building in an area with overgrown grass, which would provide an ideal environment for rodents or insects.
- Long PVC hoses were used to carry food from kettle to filling line. These hoses were cleaned with long brushes that were encrusted with rust and other foreign matter.
- The food producer had no procedure for cleaning the bottles, rather, they assumed that the bottles were sterile as delivered. It is not standard practice in the bottle industry to deliver sterile product. The food producer should have had a procedure for washing the bottles with chlorine water or clean air blast to assure that there was no contamination.

Some Lessons to be Learned

First and foremost is the importance of simple honesty. The broker's behavior in shifting responsibility and trying to create an elaborate theory drew suspicion, whereas, the bottle maker went to great pains to explain all standard procedures and to uncover the exact nature of the contamination. Had the broker been more open about the leak, the focus might have shifted to the near impossibility of a roof leak leading to ZB contamination.

Second is the value of standard operating procedures and quality control. It seems likely that the food producer's very casual manufacturing environment led to the contamination, however, there was no way to prove that since no sample bottles were analyzed. Several bottles from all runs were kept from different lots and all cold-filled bottles were hard or pressurized. There were no samples taken in the food production facility in an attempt to find the source of the yeast until after the area had been sterilized. It might seem that the food producer's lack of documentation was protective, but had a consumer been injured by contamination, either through the bursting of a bottle or ingesting contaminated dressing, and then put the food producer on the

defensive, that sloppiness would have been a serious aggravating factor. This is an important lesson for small producers. Good documentation and good internal communication are critical for standardizing a manufacturing process, for training, and for defending a company's actions in the event of a lawsuit.

Third, any time a manufacturer changes a process, it is critical to be aware of potential problems. In this case, changing to the cold-fill very likely allowed a contamination that was being killed by the hot-fill to appear. This source of contamination will never be known, but adequate procedures for cleaning the bottles might have prevented any problem. The bottle maker was under no obligation to provide a sterile bottle, it was the food producer's responsibility.