

FDA/Auburn Study Uses BAX[®] System to Confirm *Vibrio* Levels in Off-bottom Oysters



Introduction

In the Gulf of Mexico, a new type of oyster is gaining popularity amongst consumers and farmers alike. “Off-bottom” aquaculture provides rich-tasting mollusks, offering farmers a premium price and consumers access to oysters in the summer, when neither traditionally farmed nor wild oysters are available. Unfortunately, the new aquaculture method, which involves farming oysters in suspended nets instead of from the seabed bottom, also helps the deadly pathogen *Vibrio* flourish.

Farmers using traditional harvesting use three methods to reduce infestation by parasites and pathogens:

1. Expose oysters to air to desiccate them and reduce fouling from biologics
2. Dip the oysters in fresh water to reduce risks of bacterial infection
3. Dessicate the oysters in air to reduce risks of worm infections.

Numerous studies have shown differing levels of *Vibrio* after each of these steps, but not much is known about specific effects of processing on pathogen levels. Meanwhile, warm summer air and water temperatures have helped off-bottom oyster farming to expand, but also raised concerns about the risks of contracting *Vibrio parahaemolyticus* and *V. vulnificus* from eating raw oysters.

V. parahaemolyticus causes 4,500 cases of sickness each year in the US, while *V. vulnificus* has the highest fatality rate—between 30 and 40 percent—of any foodborne pathogen. Nearly all infections in the Gulf region from these organisms occur between May and October, indicating off-bottom farming as the culprit. Furthermore, the fact that all farmed oysters are shipped nationwide, means the risk of a *Vibrio* infection is not limited to the Gulf of Mexico. Until recently, some states like California banned sales of raw oysters from the Gulf of Mexico during these warm months.

New regulations

The popularity of summer raw oysters has continued to grow despite *Vibrio* risks, and currently, regulators like the Alabama Department of Public Health require “off-bottom” oyster farmers to take an additional, fourth processing step of re-submerging oysters in salt water for at least 14 days after desiccation. However, this requirement may be placing unnecessary restrictions on oyster farmers.

Researchers from the U.S. FDA and Auburn University used the Hygiena BAX® System for PCR-based pathogen detection to measure levels of *Vibrio* in oysters at various stages of processing. In a study published in the *Journal of Food Protection*, researchers found that the 14-day restriction was indeed excessive, and suggested shorter time period. Nonetheless, effective time limits that could deliver products to market had the least risk of containing dangerous levels of *Vibrio*.

What the Scientists Found

At Auburn’s research site in Portersville Bay, Alabama, the scientists studied oyster harvests for two weeks. More than 300 off-bottom oysters were grown, harvested, and monitored for *Vibrio*.

Bacteria levels were confirmed by using the BAX® System to determine levels of *V. parahaemolyticus*, *V. vulnificus* and *V. cholerae*. Researchers found that traditional aquaculture (air drying, freshwater dipping, and then more air drying) increased *Vibrio* spp. levels. However, new off-bottom methods of resubmerging in salt water reduced *Vibrio* levels to pre-harvesting levels in 3 to 7 days (and not 14 as required by state health regulators). The researchers concluded that 7-day final re-submersion is sufficient to protect consumers from *Vibrio*.



Conclusion

The potentially dangerous trend of off-bottom oysters is a powerful example of food processors responding to increased consumer demand for year-round access to a wider variety of foods, finding new farming methods to work around seasonal variations in foods like oysters. It also provides an example of how to manage the health risks coming from new sources of foods. In this case, the PCR-based BAX® System for pathogen monitoring could confirm levels of *Vibrio* bacteria during various stages of processing, and provided evidence in support of streamlining regulations set in place to ensure food safety. Off-bottom oysters are now shipped nationwide, and have become a popular addition to restaurant menus, seafood markets and consumers. DNA-based determination of the presence (or absence) of *Vibrio* in raw oysters is a valuable part of maintaining a safe supply chain, from farmers, to processors, to shippers, merchants and retailers of this new delicacy.

References

Grodeska, S. M., et al. (2017). Effects of Desiccation Practices of Cultured Atlantic Oysters on *Vibrio* spp. in Portersville Bay, Alabama, USA. *Journal of Food Protection*, 80(8), 1280-1287. doi:10.4315/0362-028x.jfp-16-297