FRDC 2021-097: Environmental risk factors that may contribute to *Vibrio* outbreaks: A South Australian case study

Vibrio parahaemolyticus is a bacteria that are commonly found in estuarine and marine environments and can cause foodborne illness through the consumption of raw or undercooked seafood.

What happened in 2021

- There were two *Vibrio parahaemolyticus* outbreaks that were traced back to Pacific oysters produced in South Australia. The first outbreak commenced in March 2021 and the second outbreak started in September 2021.
- The second outbreak resulted in a closure of the implicated oyster bays and a recall of Coffin Bay oysters. These were the largest vibriosis outbreaks on record associated with Australian product and resulted in substantial costs for industry.

What did we do

- Scientific information on key pathogenic *Vibrio* species, their ecology, environmental risk factors and potential mitigation strategies were reviewed.
- Environmental data (sea-surface temperatures, salinity, phytoplankton/chlorophyll-a and weather observations) surrounding the time and location of the outbreaks was collated from industry, Bureau of Meteorological and satellite data sources.
- Tools that could be used to identify and assess potential *Vibrio* risk factors and any approaches for improved surveillance were reviewed.

What are the general *Vibrio* risk factors

- Growing area – Water currents/circulation, water inputs/run-off
- Farming practices – Tumbling, desiccation, water depth, intertidal exposure, sediment disturbance
- Climatic variations – Seawater temperature, salinity, turbidity, dissolved oxygen, extreme weather events
- Handling practices – Cross-contamination, cooking practices, temperature abuse

Key findings

- The environmental conditions, notably sea surface temperature, oyster basket temperature and salinity, during the onset periods of the two *Vibrio* outbreaks (February 2021 and September 2021) would support the growth of *V. parahaemolyticus*.
- No clear climatological anomalies were found in the collated data that help to substantiate why these *Vibrio* outbreaks occurred in South Australia at these times.
- Prior to the outbreaks there were no significant changes in oyster production, harvest and post-harvest practices.
- Large spatial and time-based averaging of environmental data is useful to determine interannual/seasonal variations but have limited value in site-specific conditions.
- A small *Vibrio* outbreak was reported in 2016 in Western Australia which authorities attributed to the consumption of oysters sourced from South Australia.
- A small number of sporadic *Vibrio* illnesses had also been reported by SA Health in 2017, 2018 and 2019. These illnesses were suspected to be linked to raw oysters, but these did not result in outbreaks.
- A range of tools and approaches are available which can be used to identify and assess potential *Vibrio* risk factors and improved surveillance. These include local and remote-sensing of the environment, microbiological sampling and molecular diagnostics.

What can growers implement to reduce future *Vibrio* outbreaks

- Accredited bivalve molluscs producers in South Australia have a responsibility to implement and maintain a HACCP plan for the production and sale of live bivalve molluscs as part of their approved Food Safety Arrangement with PIRSA. These requirements, particularly around post-harvest time and temperature control, have been tightened following the two outbreaks.

For more information contact
Dr Stephen Pahl (Project Leader)
Email: stephen.pahl@sa.gov.au
Phone: 0477 336 181
pir.sa.gov.au

This project was supported by funding from the FRDC on behalf of the Australian Government