



Controlling Risk of Hepatitis A Virus in Seafood

Q: What is the issue?

A: The recent Hepatitis A outbreak in Australia is suspected to be associated with imported frozen berries. The Australian media have suggested that the lack of Hepatitis A testing in fresh produce (domestic and imported) is an issue. Information on Hepatitis A in seafood is contained in the attached SafeFish fact sheet.

Q: What is Hepatitis A Virus?

A: Hepatitis A is a human enteric virus which causes acute infectious disease of the liver, known as hepatitis. It is spread from person to person via the oral-faecal route. It can be transmitted in food via infectious food handlers or via contaminated food or water.

Q: Do we need to be concerned about Hepatitis A in domestic and imported seafood?

A: Hepatitis A is not generally associated with seafood other than bivalve shellfish. Bivalve shellfish represent additional risk as they are filter feeders and are generally consumed raw. Shellfish quality assurance programs in Australia address this risk through identifying potential pollution sources and events that may result in contamination. The programs include strict regulations around harvesting following potential contamination events. Imported shellfish for direct consumption must demonstrate that equivalent food safety outcomes are achieved.

Q: What do I need to know?

A: The most effective risk management strategy is to prevent contamination. This is achieved through Good Hygienic Practice (GHP) and hazard analysis critical control point (HACCP) systems which include the use of potable water supplies, adequate sanitation facilities, educating staff, and preventing staff from working when sick. GHP pre-requisite programs require these procedures are followed in businesses supplying food ingredients that enter into your processing environment.

Q: What can I do about it?

A: Ensure your GHP and HACCP programs are appropriate (including pre-requisite programs), use clean potable water, and make sure staff are adequately trained and follow good hygienic practices.

Q: Is there a test I should be doing?

A: Viral testing is not an effective tool for managing this type of virus. Current methods are not sensitive enough to pick up the virus at low (but infectious doses), and cannot tell you if the virus detected is infectious or not i.e. whether or not it will cause illness. Testing may be useful in human illness cases to determine the source of the virus, or after known contamination events to determine the level of contamination.

What is Hepatitis A virus?

Hepatitis A virus (HAV) is a human enteric virus which causes acute infectious disease of the liver, known as hepatitis. Hepatitis is a generic term for inflammation of the liver and can also be caused by chemicals, drugs or other viral infections. HAV is a non-enveloped, spherical (approximately 30 nm in diameter), positive stranded RNA virus.

How is HAV transmitted?

- HAV spreads via the faecal to oral route, either by direct contact with a HAV infected person or by ingestion of HAV contaminated food or water.
- Foodborne illness accounts for approximately 5% of all HAV cases worldwide.
- HAV can enter the aquatic environment from septic tank leachates, boat discharges, sewage discharges and people defecating or vomiting into waterways.
- Filter feeding bivalve shellfish can acquire HAV from their aquatic environment.
- Other seafood products may become contaminated via infected workers during processing if good hygiene practice is not followed.

What shellfish related outbreaks have occurred?

- HAV has been widely linked to consumption of contaminated shellfish worldwide.
- The first documented shellfish related outbreak of “infectious hepatitis” occurred in Sweden in 1955.
- The most significant shellfish related outbreak of HAV occurred in 1988 in Shanghai, China, resulting in approximately 300,000 cases of illness.

- Australia has only reported one shellfish related outbreak of HAV; in 1997 consumption of contaminated oysters from Wallis Lakes, NSW, resulted in 444 illnesses, including one death.

What are the symptoms caused by HAV?

- HAV is an acute illness with moderate onset of symptoms (fever, malaise, anorexia, nausea, abdominal discomfort, dark urine) and jaundice.
- The incubation period of HAV ranges from 15-50 days.
- Illness generally lasts for 2 months, but can be longer.
- HAV is shed in high quantities in the faeces of infected people 2 weeks prior to the onset of symptoms, and for at least 4 weeks during symptomatic infection.
- Effective vaccination against HAV is possible.

How much HAV is a harmful dose?

The infectious dose of HAV is low, presumed to be 10-100 virus particles.

What can be done to inactivate or eliminate HAV?

- Freezing and refrigeration does not significantly reduce viral load in shellfish.
- Depuration is ineffective in controlling viruses in shellfish.
- Pasteurisation of shellfish is unlikely to inactivate HAV.
- Human enteric viruses are very stable at low pH levels. A greater than 3 log₁₀ inactivation of HAV may occur at pH < 3; however, this may render the sensory quality of food unacceptable.
- Ultraviolet (UV) irradiation is ineffective in reducing viral loads in or on food.
- Cooking shellfish at temperatures exceeding 90 °C for greater than 90 seconds is likely to significantly reduce the level of infectious HAV.

What can be done to manage HAV in seafood?

- Regular sanitary/pollution source surveys of shellfish growing areas to identify potential faecal inputs and manage harvest accordingly.
- Regulation of shellfish harvesting areas to ensure adequate periods of closure following a faecal contamination event.
- Use of extended relay periods to cleanse shellfish grown in poor or unknown water quality.
- Prevention of contamination during processing of seafood through good hygiene and manufacturing practices.

How can we test for HAV?

Only molecular biology (real time RT-PCR) methods are sensitive enough to detect and quantify HAV in shellfish. The Limit of detection of the method is

approximately 100 genomes per gram of shellfish gut. The method used cannot distinguish between infectious and non-infectious virus particles. Recently an ISO technical specification for the detection of HAV in shellfish was released (ISO/TS15216, 2012).

Regulatory standards

There are currently no formal regulatory criteria for HAV. Codex has developed guidelines on how to control viruses in foods, available at <http://www.codexalimentarius.org>, and testing for HAV following high risk events is recommended.

International regulatory limits can be found in the Trade & Market Access Database, available at www.frdc.com.au/trade

Where can I get more information?

- C.A.C. 2012. Guidelines on the application of general principles of food hygiene to the control of viruses in food. Codex Alimentarius Commission, Food and Agriculture Organization of the United Nations, World Health Organization.
- FDA 2012. *Bad Bug Book, Foodborne Pathogenic Microorganisms and Natural Toxins*, USA, Food and Drug Administration.
- GROHMANN, G. & LEE, A. 2003. Viruses, Food and Environment. In: HOCKING, A. D. (ed.) *Foodborne Microorganisms of Public Health Significance*. Sixth ed. New South Wales: Australian Institute of Food Science and Technology Inc.
- ISO 2012. ISO/TS15216: Microbiology of food and animal feed - Horizontal method for determination of hepatitis A virus and norovirus in food using real-time RT-PCR.

Contact us:

<http://safefish.com.au>



Considering the Benefits and Risks of Seafood Consumption

Eating seafood confers many benefits: it provides top-quality protein, and is an excellent source of important nutrients like iodine, selenium, vitamins A and D, and long-chain polyunsaturated omega-3 fatty acids. However like all foods, some seafood products may contain substances that are harmful to health. Illness from seafood is rare, so the benefits of seafood consumption must be weighed against the risks. For most people, following the recommended national dietary guidelines is the best means of balancing risks and benefits. For some groups such as pregnant women and children, specific advisories on healthy and safe seafood choices should apply. For more information, see http://www.nap.edu/catalog.php?record_id=11762

