

What is Staphylococcus aureus?

Staphylococcus spp are ubiquitous in the environment and can be found in food due to environmental, human and animal contamination.

S. aureus is a Gram-positive, non-motile, spherical (cocci) shaped, non-spore forming bacterium that is responsible for almost all staphylococcal food poisoning. *S. aureus* can grow under aerobic and anaerobic conditions, but is a poor competitor and is often outcompeted by other microorganisms.

S. aureus is a versatile human pathogen capable of producing highly heat-stable enterotoxins that can cause gastroenteritis.

What foods are most at risk?

Foods that require extensive handling during preparation and are kept above refrigeration temperature (4 °C) for extended periods after preparation have an increased risk.

What outbreaks have occurred?

Since 2001, there has been only 1 reported outbreak involving three cases of staphylococcal food poisoning that was linked to seafood consumption. This outbreak occurred in 2006 and was associated with the consumption of sushi rolls.

How much *S. aureus* is a harmful dose?

Staphylococcal enterotoxins are produced during the exponential growth phase of *S. aureus*. The intoxication dose of the enterotoxins is less than

1.0 microgram. This toxin level is typically reached when *S. aureus* populations exceed 10^5 - 10^8 colony forming units per gram of food. However, in susceptible individuals (young children, the elderly and severely debilitated) ingestion of 0.1-0.2 micrograms of enterotoxins is sufficient to cause symptoms.

What are the symptoms?

The onset of staphylococcal symptoms are usually rapid (1-7 hours after ingestion) and in many cases acute. Symptoms commonly include nausea, abdominal cramping, vomiting and diarrhoea. In more severe cases, dehydration, headache, muscle cramping, and transient changes in blood pressure and pulse rate may occur.

The duration of illness usually lasts from only a few hours to one day; however in some instances, hospitalisation may be required.

Fatalities from staphylococcal food poisoning are rare in the general population but have been reported from other countries.

What can be done to manage *S. aureus* in seafood?

- Prevention of contamination during processing by Good Manufacturing Practice (e.g. wearing gloves and proper personal protection), Good Personal Hygiene and proper sanitisation of food contact surfaces and utensils.
- Avoid time and temperature abuse of food products, especially those that require considerable handling during preparation.

How can we test for *S. aureus*?

Enumeration of *S. aureus* by enrichment isolation, or selective enrichment isolation, may be achieved by using either:

- The Australian Standard direct plate count (AS 5013.12.1-2004). The direct plating method is suitable when *S. aureus* is expected to be greater than 100 colony forming units per gram of food.
- The Australian Standard most probable number (AS 5013.12.3-2004). The most probable number procedure is recommended

for surveillance of products expected to have a small population of *S. aureus* and a large population of competing organisms.

Regulatory standards

Australian regulatory limit for *S. aureus* can be found in Section 1.6.1 of the Australia New Zealand Food Standards Code, available at <http://www.foodstandards.gov.au>.

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

Where can I access more information?

FDA. 2012. *Staphylococcus aureus*. In: Bad Bug Book: Foodborne Pathogenic Microorganisms and Natural Toxins Handbook. 2nd ed. Center for Food Safety and Applied Nutrition (CFSAN) of the Food and Drug Administration (FDA), U.S. Department of Health and Human Services.

FSANZ. 2013. *Staphylococcus aureus*. In: Agents of Foodborne Illness. 2nd ed. Food Standards Australia New Zealand, Canberra.

STEWART, C. M. 2003. *Staphylococcus aureus* and Staphylococcal Enterotoxins. In: HOCKING, A. D. (ed.) Foodborne Microorganisms of Public Health Significance. Sixth ed. New South Wales: Australian Institute of Food Science and Technology Inc.

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

