Seafood Safety Research Publications

These publication summaries have been generated for stakeholders who have an interest in current and past seafood safety research. Each summary states the main finding of the research, and how it impacts the seafood industry. To access the full articles, click on the link below the summary. From there, the PDF can be downloaded. Some articles are not classed as open source, in which case you will need to email the researcher who can provide you with a copy. If you have any questions regarding the research, feel free to email the associated scientist, who will be more than happy to discuss their findings.

Publications from 2020

Publication: Biessy L, Pearman JK, Smith KF, Hawes I, Wood SA. 2020. *Seasonal and spatial variations in microbial communities from tetrodotoxin-bearing and non-tetrodotoxin-bearing clams*. Frontiers in Microbiology. 11: 1860.

Brief Summary: The possibility for *Paphies australis* ('pipi') to accumulate TTX from a dietary source was explored using molecular techniques. Marine cyanobacteria were found in all samples collected from the sites containing the highest amount of TTX. Cyanobacteria produce many marine and freshwater toxins, and this finding warrants further investigation.

To access the article, click here

Contact laura.biessy@cawthron.org.nz and Kirsty.smith@cawthron.org.nz for more information or to discuss this research.

Publication: Murray JS, Nishimura T, Finch SC, Rhodes LL, Puddick J, Harwood DT, Larsson ME, Doblin MA, Leung P, Yan M, Rise F, Wilkins AL, Prinsep MR. 2020. *The role of 44-methylgambierone in ciguatera fish poisoning: Acute toxicity, production by marine microalgae and its potential as a biomarker for Gambierdiscus spp*. Harmful Algae 97: 101853

Brief Summary: Through the analysis of 252 microalgal isolates, spanning 90 species, it was discovered that the production of 44-methylgambierone was ubiquitous to all *Gambierdiscus* species, along with some species of *Coolia* and *Fukuyoa*. However, its low acute toxicity suggested it is unlikely to contribute to ciguatera fish poisoning.

To access the article, click here

Contact sam.murray@cawthron.org.nz for more information or to discuss this research.

Publication: Turnbull A, Malhi N, Seger A, Harwood DT, Jolley J, Fitzgibbon Q, Hallegraeff G. 2020. *Paralytic shellfish toxin uptake, tissue distribution, and depuration in the Southern Rock Lobster Jasus edwardsii Hutton*. Harmful Algae 95: 101818.

Brief Summary: The toxins rapidly accumulated in hepatopancreas of lobster supplied with toxic feed then depurated at a rate of 7% per day once toxic fed was removed. Implications for biotoxin risk monitoring are that lobsters will continue to feed during blooms and that high toxin concentrations can occur in individuals.

To access the article, click here

Contact tim.harwood@cawthron.org.nz for more information or to discuss this research.

Publication: Turnbull AR, Harwood DT, Boundy MJ, Holland PT, Hallegraeff G, Malhi N, Quilliam MA. 2020. *Paralytic shellfish toxins – call for uniform reporting units*. Toxicon 178:59-60

Brief Summary: Paralytic shellfish toxins occasionally contaminate filter feeding shellfish in New Zealand. Due to several reasons, it is challenging to approximate sample toxicity using chemical instrumental methods. This manuscript describes the challenges and provides clear guidance on how PSP should be reported in a clear and consistent way.

To access the article, contact michael.boundy@cawthron.org.nz or tim.harwood@cawthron.org.nz

Publication: Rhodes LL, Smith KF, Murray JS, Nishimura T, Finch SC. 2020. *Ciguatera Fish Poisoning: The Risk from an Aotearoa/New Zealand Perspective.* Toxins 12: 50.

Brief Summary: The warming of the coastal waters around New Zealand is increasing the risk of the epiphytic dinoflagellate *Gambierdiscus* (the organism that causes ciguatera fish poisoning), blooming in New Zealand's northern waters. To this end, the presence of *Gambierdiscus* in New Zealand's coastal and territorial waters has been recorded and the risk will continue to be monitored.

To access the article, click here

Contact lesley.rhodes@cawthron.org.nz for more information or to discuss this research.

Publication: Turner AD, Dhanji-Rapkova M, Fong SY, Hungerford J, McNabb PS, Boundy MJ, Harwood DT. 2020. *Ultrahigh-performance hydrophilic interaction liquid chromatography with tandem mass spectrometry method for the determination of paralytic shellfish toxins and tetrodotoxin in mussels, oysters, clams, cockles, and scallops: Collaborative study*. Journal of AOAC International 103: 533-562

Brief Summary: This manuscript describes an inter-laboratory comparison of an analytical method recently developed at Cawthron. Method performance was excellent across a variety

of shellfish types, toxin profiles and laboratories. This study supports the use of the method for routine regulatory monitoring and international acceptance of the method.

To access the article, click here

Contact michael.boundy@cawthron.org.nz and tim.harwood@cawthron.org.nz for more information or to discuss this research.

Publication: Hallegraeff GM, Schweibold L, Jaffrezic E, Rhodes LL, MacKenzie AL, Hay B, Farrell H. 2020. *Overview of Australian and New Zealand harmful algal species occurrences and their societal impacts in the period 1985 to 2018, including a compilation of historic records*. Harmful Algae (in press).

Brief Summary: Similarities and differences between harmful algal species occurrences in Australia and New Zealand have been compiled and the differences explained. In New Zealand, the predominant seafood toxins reported have been paralytic shellfish poisoning toxins whereas in Australia the major reported seafood toxin syndrome has been ciguatera fish poisoning.

To access the article, click here

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Publication: Angane M, Gupta S, Fletcher GC, Summers G, Hedderley DI, Quek SY. 2020. *Effect of air blast freezing and frozen storage on Escherichia coli survival in and n-3 n-polyunstaturated fatty acids and microstructure of New Zealand Greenshell™ mussels.* Food control 115: 107284

Brief Summary: Non-pathogenic *Escherichia coli* indicate faecal contamination in shellfish growing waters but occasionally shellfish become non-compliant after contamination in processing factories. Experiments showed that frozen storage for 3 months will reduce counts 10-fold, often enough for industry to sell the shellfish with minimal impact on quality or value compared to heat-treating alternatives.

To access the article, click here

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Publication: Cruz CD, Fletcher GC, Paturi G, Hedderley DI. 2020. *Influence of farming methods and seawater depth on Vibrio species in New Zealand Pacific oysters*. International Journal of Food Microbiology 325: 1-7.

Brief Summary: Pathogenic *Vibrio* bacteria naturally grow in seawater and sometimes contaminate shellfish at unacceptable concentrations. This study sought to identify oyster farming methods that would give lower contamination concentrations but there were few statistical differences between the different methods evaluated so none could be recommended above others based on *Vibrio* risk.

To access the article, contact graham.fletcher@plantandfood.co.nz

Publication: Gyawali P, Hewitt J. 2020. *Faecal contamination in bivalve molluscan shellfish: Can the application of microbial source tracking method minimise public health risks?* Current Opinion in Environmental Science and Health 16: 14-21

Brief Summary: Human faecal contamination is the major source of infectious pathogens in shellfish and growing waters. Due to high source specificity and detection sensitivity, the application of microbial source tracking markers helps to identify the sources of faecal contamination in shellfish and waters more accurately than traditional faecal indicators, resulting in formation of a robust management plan for industry and regulators.

To access the article, click here

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Publications from 2019

Publication: Campos CJA, Alves MT, Walker DI. 2019. *Long term reductions of faecal indicator organisms in Chichester Harbour (England) following sewerage infrastructure improvements in the catchment*. Science of the Total Environment 733: 139061.

Brief Summary: The microbiological quality of commercially harvested oysters improved markedly following sewage treatment upgrades in the catchment. The most obvious improvements were detected following the installation of activated sludge and UV disinfection. Long-term monitoring data are needed to demonstrate the effect of sewage treatment upgrades on water quality.

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