Statement of advice on the risk to human health from consumption of bivalve molluscs (shellfish) harvested from UK waters associated with marine biotoxins

# Background

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5. Marine biotoxins are natural toxic metabolites produced by marine phytoplankton. They can bioconcentrate in shellfish and along the food chain. If

concentrations of these toxins in shellfish are sufficiently high, consumption of these shellfish can result in human illness.

6. Marine biotoxins have previously been categorised based on clinical signs, but they are increasingly being classified according to chemical structure. The structural toxin groups that are generally considered to be of relevance to shellfish harvested in European waters are:

- Domoic acid group (DA),
- Saxitoxin group (STX),
- Okadaic acid group (OA),
- Pectenotoxin group (PTX),
- Azaspiracid group (AZA),
- Yessotoxin group (YTX),
- Cyclic imine group (CI).

7. Marine biotoxins can also be categorised according to their water solubility, which determines the extraction protocol required for analysis. The DA and STX groups are hydrophilic, while the OA, PTX, AZA, YTX and CI groups are lipophilic. The DA group is associated with amnesic shellfish poisoning (ASP), the STX group with paralytic shellfish poisoning (PSP) and the OA group with diarrhetic shellfish poisoning (DSP).

8. The United Kingdom (UK) and European Union (EU) currently regulate three major biotoxin groups in shellfish. These are subject to statutory testing to protect human health. The biotoxins specified within the Assimilated EU Regulation (EC) No. 853/2004 (E&W, and Scotland) and EU Regulation (EC) No. 853/2004 (NI) are PSP toxins (STX and relevant analogues), the lipophilic toxin group (OA, AZA, PTX and YTX) and ASP toxin (DA).

9. In the UK the Agri-Food and Biosciences Institute (AFBI) is the Great Britain (GB) National Reference Laboratory (NRL) for marine biotoxins. The Centre for Environment, Fisheries and Aquaculture Science (Cefas) is designated as the official laboratory (OL) for marine biotoxins in England, Wales and Scotland. In Northern Ireland the NRL and OL for analysis and reporting of shellfish official controls (OCs) is the Wageningen Food Safety Research (WFSR). A shift from biologically based assays, such as the mouse bioassay, to validated chemical methods for marine biotoxin testing has been implemented in the UK and EU due to the better specificity of chemical methods and ethical concerns over animal use, although biological methods may still be used in limited or exceptional cases.