

# **The Biotoxin and Phytoplankton official control monitoring programmes for England and Wales**

Summary report for 2020

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### **Version control history**

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<b>Final V1</b>	K. Litster	21/06/2021	Added details of pages where FSA results are published and finalised report. Final version, as published June 2021

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This report describes the results of the Official Control Biotoxin Monitoring Programme for England and Wales for the period 1<sup>st</sup> January to 31<sup>st</sup> December 2020.

The laboratory testing for biotoxins in shellfish and potentially harmful phytoplankton in water samples, the co-ordination of the programme and its logistics were conducted by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) on behalf of the Food Standards Agency (FSA), the central competent authority for food safety. The programme aimed at delivering the testing required for the statutory monitoring of marine biotoxins in shellfish from classified production and relaying areas in England and Wales, and for identification and enumeration of potentially harmful micro-algae in selected shellfish harvesting areas, as required by the European Commission (EC) regulations 2017/625 and 2074/2005. The delivery of the 2020 monitoring programme by Cefas continued throughout the Covid-19 pandemic with service maintained and delivered in a COVID secure manner. During lockdown restrictions a few harvesting areas voluntarily ceased harvesting which led to fewer samples being collected and tests delivered.

All results of the FSA monitoring programme were compared to the maximum permitted levels stipulated in EC regulation 853/2004 (Section VII, Chapter V: Health standards for live bivalve molluscs), as summarised in Table 1 below. Toxin test results must not exceed these limits in either whole body or any edible part separately. Please note that for ease of reading, in the text of this report, toxin concentrations are shown as mg/kg or µg/kg, without reference to the toxin parent.

**Table 1: Maximum permitted limits of toxins in shellfish flesh.**

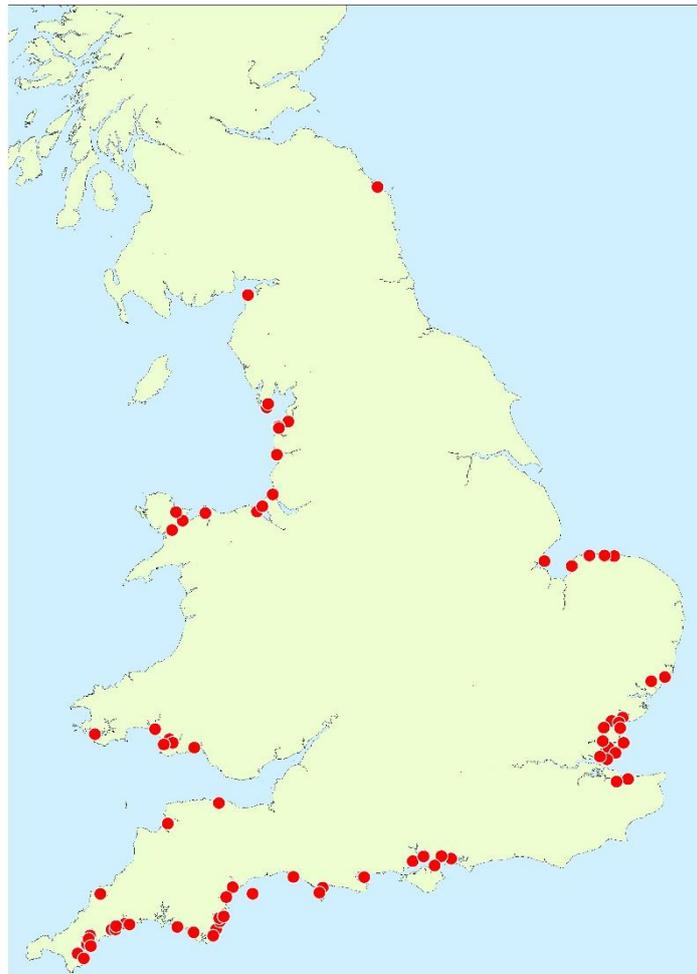
Toxin groups	Maximum permitted limits (MPL)
<b>Amnesic shellfish poisoning (ASP) toxins</b>	20 mg of Domoic/epi-domoic acid per kg of shellfish flesh
<b>Lipophilic toxins (LTs)</b>	For Diarrhetic shellfish poisoning toxins (DSP) and pectenotoxins (PTX) together: 160 µg of okadaic acid (OA) equivalents per kg of shellfish flesh OR  For Yessotoxins (YTX): 3.75 mg of YTX equivalents per kg of shellfish flesh OR  For Azaspiracids (AZA): 160 µg of AZA equivalents per kg of shellfish flesh
<b>Paralytical shellfish poisoning (PSP) toxins</b>	800 µg of saxitoxin (STX) equivalents per kg of shellfish flesh

55 of the 57 classified English and Welsh harvesting and relaying areas were monitored in 2020, giving a coverage rate of 96.5%. The location of the FSA shellfish monitoring points is shown in Figure 1 and that of the phytoplankton monitoring points is shown in Figure 2.

The following classified productions areas were not monitored in the period:

- Chichester Harbour – Cobnor and Dell Quay production areas were both temporarily declassified during the reporting period as they were not commercially active.
- Salcombe, Geese Quarries – production area declassified during the reporting period.

A total of 826 inshore shellfish samples and 906 phytoplankton samples were submitted for analysis in 2020. No samples were submitted in 2020 for the purpose of onshore verification of pectinidae.



**Figure 1: English and Welsh shellfish sampling locations for the 2020 FSA biotoxin monitoring programme.**



**Figure 2: English and Welsh water sampling locations for the 2020 FSA phytoplankton monitoring programme.**

0.85% of the shellfish samples and 2.87% of the water samples submitted to the laboratories were rejected in the reporting period as they were unsuitable for analysis on arrival.

The results of the shellfish and phytoplankton monitoring programme for the 12 months period are summarised below. Please note that all toxin results stated for Paralytic Shellfish Poisoning toxins and Lipophilic toxins refer to the high value calculated from the method uncertainty.

The full list of FSA monitoring results for 2020 are available at the following links:

- Biotxin Results – [FSA Open Data Catalogue](#)
- Phytoplankton Results – [FSA Open Data Catalogue](#)

# 1. Amnesic shellfish poisoning (ASP) toxins summary

A total of 714 inshore shellfish samples were tested for ASP toxins using a high-performance liquid chromatography (HPLC) method. ASP toxins were detected in 41 samples from 22 production areas. The location of these production areas is shown in Figure 3.



**Figure 3: Location of classified production and relaying areas where ASP toxins were detected in 2020.**

The greatest proportion of samples containing ASP toxins originated from the south west of England (18 samples). Shellfish species affected in England and Wales included mussels (7 samples), pacific oysters (16 samples), native oysters (2 samples), cockles (6 samples), manila clams (2 samples) and surf clams (8 samples). None of the shellfish samples tested for ASP in 2020 exceeded the MPL of 20 mg/kg.

In 2020, ASP levels ranged from 1 to 11 mg/kg. Two cockle samples, both collected in July 2020 from the Burry Inlet production area exceeded the trigger level of 10 mg/kg (11 and 10 mg/kg) prompting further monitoring. ASP toxins were recorded in another 4

samples from this production area in 2020 (3 cockles and 1 mussel samples). Also, of note, 8 out of the 10 surf clams collected from the coast of Devon in 2020 and tested for ASP toxins were found to contain toxins between 2.5 and 5.5 mg /kg.

ASP occurrence in 2020 was similar to 2019 when 48 samples containing ASP (1 to 5.8 mg/kg) were recorded in 48 samples from 27 production areas, with the greatest proportion originating from the South West. This is an increase in ASP occurrences since 2018 when 17 shellfish samples from 7 production areas recorded levels of ASP, between 3 and 4.9 mg/kg.

## **2. Paralytic shellfish poisoning (PSP) toxins summary**

A total of 776 inshore shellfish samples were screened for PSP toxins using the HPLC semi-quantitative method. None of shellfish samples tested for PSP in 2020 exceeded the MPL of 800 µg/kg.

PSP toxins were detected in 70 samples from 19 sampling points in 13 production areas. The location of these production areas is shown in Figure 4.

Only one mussel sample from Fal – Ruan Pontoon, Tregothnan required further analysis by the quantitative PSP method. Toxin levels in this sample were 320 µg/kg.

PSP occurrence therefore remained low in 2020 and at levels comparable to 2018 when PSP was detected below the MPL in only 3 samples. This is a decrease in levels recorded in 2019, when 3 samples recorded above MPL results and PSP was detected in 74 samples from 26 sampling points. Overall, there has been a decline in PSP occurrence since its peak in 2011, when PSP toxins were detected in 44 samples.



**Figure 4: Location of classified production and relaying areas where PSP toxins were detected in 2020.**

## **3. Lipophilic toxins (LTs) summary**

A total of 729 inshore samples were analysed for LTs using the Liquid Chromatography - tandem Mass Spectrometry (LC-MS/MS) method. The lipophilic toxins are sub-divided into three regulated groups each with a distinct MPL, as described in Table 1.

### **3.1. Yessotoxins (YTXs)**

YTXs were not detected in samples received in 2020. This is consistent with previous years, having only been detected once in 2014.

### 3.2. Azaspiracid group toxins (AZAs)

AZAs were not detected in samples received in 2020. The detection of this toxin group has varied widely since the LC-MS method was introduced in 2011, with the number of detections ranging from not detected in 2017, 2018 & 2019 to 21 in 2015. However, levels have only rarely exceeded the MPL (3 times in 2015).

### 3.3. Okadaic Acid (OA), Dinophysistoxins (DTX) and Pectenotoxins (PTX)

This group of toxins were detected in 15 samples from 4 production areas, all in Cornwall. The location of these production areas is shown in Figure 5.



**Figure 5: Location of classified production and relaying areas where lipophilic toxins were detected in 2020.**

No results exceeded the MPL in 2020. Toxins were detected in mussel flesh during the months of May to July 2020. All toxin results were recorded below the trigger level of 80  $\mu\text{g}$  OA eq./kg and therefore did not lead to any additional monitoring. Results ranged from

25 to 73 µg OA eq./kg with the highest result recorded at Porthallow, St. Austell Bay in May 2020.

This is the lowest occurrence of this toxin group in inshore shellfish samples in the last seven years. In 2019, 5 mussel samples from 3 production areas (also in Cornwall), contained OA/DTX/PTXs above the MPL and toxins were detected in 60 samples from 10 production areas. In 2018, 64 mussel samples from 6 production areas contained OA/DTX/PTXs above the MPL and toxins were detected in 167 samples from 18 production areas.

## 4. Phytoplankton monitoring summary

The results of the phytoplankton monitoring of classified production and relaying areas in England and Wales for 2020 are summarised below. Where the agreed trigger levels were exceeded, additional flesh and water samples were requested the following week.

- *Alexandrium* species (PSP toxins producers) were recorded in 40 samples from 19 production areas, representing an increase of 100% in the occurrence of this genus compared to last year. Recorded maximum cell density was greater than last year, with a density of 2,800 cells/L recorded from Falmouth: Ruan Pontoon, Tregothnan on 10 August 2020. These levels are comparable to those recorded over the period 2013 to 2015, when annual recorded occurrences did not exceed 55 samples. This is in sharp contrast to 2016 when 107 occurrences were recorded and maximum recorded cell densities was 13,617,000 cells/L.
- *Pseudo-nitzschia* species (ASP toxin producers) were recorded in 478 samples from 45 production areas. The trigger level (set at 150,000 cells/L) was exceeded on 38 occasions from 11 production areas. The highest cell density was recorded in a sample from Mevagissey Bay: Pentewan collected on 13 July (1,132,000 cells/L). The number of samples which exceed the trigger level for *Pseudo-nitzschia* species has fluctuated from year to year. There has been 237% increase in the number of breaches compared to 2019.
- *Dinophysiaceae* (lipophilic toxins producers) were recorded in 101 samples from 22 production areas. The trigger level (set at 100 cells/L) was exceeded by 47 samples from 16 production areas. This is a 142% increase compared to 2019. The maximum cell density recorded in 2020 was 3,100 cells/L from Carmarthenshire: Machynys on 28 July.
- *Prorocentrum lima* (lipophilic toxins producers) were detected in 3 samples from 2 production areas. The trigger level (set at 100 cells/L) was exceeded by all 3 of these occurrences. The highest cell density was 200 cells/L collected from Bournemouth, Poole and Christchurch: West Brownsea 1 on 3 November. These are similar breach values to 2019, but the occurrences have decreased by 75%. *Prorocentrum lima* is considered an epi-benthic species, and it is likely that its detection in the water column is associated with sediment disturbance.

- *Prorocentrum cordatum* were recorded in 64 samples from 26 production areas. These figures show a 128% increase in occurrence, and cell densities have also increased, peaking at 3,914,000, at Swansea PHA: Queens Dock on 8 July compared to 2019, where the peak occurred at Burry Inlet: Machynys at 1,194,000 cells/L in July 2019.
- *Lingulodinium polyedrum* and *Protoceratium reticulatum* were not recorded during 2020. Both are typically recorded at low frequencies and densities in samples from English and Welsh shellfish production areas.



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