RESEARCH PROJECTS

Chemical Contaminants in Wild Caught Fish and Crustaceans – Northern Ireland.

Fera Science Ltd.

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FSA Research and Evidence

This report is part of the 2022-23 wild caught fish survey for the UK and Northern Ireland. For more information on the contaminants monitoring programme for wild caught fish, crustaceans and cephalopods in England and Wales, you can see the corresponding report here.

1. Executive Summary

Sixty-two samples of wild caught fish and crustaceans were collected between April 2022 – March 2023 from the two main fish markets in Northern Ireland and on occasion fish processing establishments and analysed for the contaminants: mercury, lead and cadmium (heavy metals). A sub-set of the 62 samples (n = 15) were tested for dioxins and PCBs:

- 1,2,3,4,6,7,8-HeptaCDD
- 1,2,3,4,6,7,8-HeptaCDF
- 1,2,3,4,7,8,9-HeptaCDF
- 1,2,3,4,7,8-HexaCDD
- 1,2,3,4,7,8-HexaCDF
- 1,2,3,6,7,8-HexaCDD
- 1,2,3,6,7,8-HexaCDF
- 1,2,3,7,8,9-HexaCDD
- 1,2,3,7,8,9-HexaCDF
- 1,2,3,7,8-PentaCDD
- 1,2,3,7,8-PentaCDF
- 2,3,4,6,7,8-HexaCDF
- 2,3,4,7,8-PentaCDF

- 2,3,7,8-TetraCDD
- 2,3,7,8-TetraCDF
- OctaCDD
- OctaCDF

and PCBs (dioxin-like and non-dioxin-like PCBs included for analysis)

- PCB 28 (2,4,4′-Trichlorobiphenyl) *
- PCB 52 (2,2′,5,5′-Tetrachlorobiphenyl) *
- PCB 77 (3,3′,4,4′-Tetrachlorobiphenyl, 3,3′,4,4′-PCB)
- PCB 81 (3,4,4’,5-Tetrachlorobiphenyl)
- PCB 101 (2,2′,4,5,5′-Pentachlorobiphenyl) *
- PCB 105 (2,3,3′,4,4′-Pentachlorobiphenyl)
- PCB 114 (2,3,4,4’,5-Pentachlorobiphenyl)
- PCB 118
- PCB 123
- PCB 126
- PCB 138 (2,2′,3,4,4′,5′-Hexachlorobiphenyl) *
- PCB 153 (2,2′,4,4′,5,5′-Hexachlorobiphenyl) *
- PCB 156 (2,3,3′,4,4′,5-Hexachlorobiphenyl)
- PCB 157
- PCB 167
- PCB 169
- PCB 180 (2,2′,3,4,4′,5,5′-Heptachlorobiphenyl) *
- PCB 189

* non-dioxin-like PCBs.

Taking into account the measurement uncertainty, mercury was detected above the maximum regulatory level of 0.5 mg/kg in one of the Dublin Bay prawn samples at a concentration of:

- 0.68 mg/kg (± 0.14 mg/kg – measurement uncertainty)

Concentrations of lead and cadmium were less than the maximum EU regulatory limits for all samples tested.

Concentrations of dioxins and PCBs were below the EU regulatory limits for these compounds.

2. Introduction

2.1. Background to the study

Eurofins Food Testing Ireland Ltd (Public Analysts) was contracted by the Food Standards Agency (FSA) in Northern Ireland to assess the levels of various chemical contaminants (heavy metals, Dioxins and Polychlorinated Biphenyls (PCBs) in a number of species of wild caught fish and crustaceans landed in Northern Ireland between April 2022 and March 2023.

2.2. Aims and Objectives of the Study

The official control surveillance programme is undertaken to comply with Article 70 of Commission Implementing Regulation (EU) 2019/627 (EU, 2019) which requires a monitoring programme to be established for wild caught fishery products to control compliance with EU legislation on contaminants. Regulation (EC) No. 1881/2006, as amended (EU, 2023), sets down the maximum levels for certain contaminants in food, including fishery products.

The data has the potential to provide support to certifying officers in their attestation of the compliance of wild caught fishery products landed in Northern Ireland with contaminants legislation when signing Export Health Certificates.

The aim of the work was to determine concentrations of defined chemical contaminants in wild caught fishery products to assess whether the levels were within the limits prescribed in Regulation (EC) No. 1881/2006, as amended (EU, 2023), and were safe for placing on the market.

3. Methodology

3.1. Samples

Sixty-two samples of wild caught fish and crustaceans were collected between April 2022 – March 2023 from the two main fish markets in Northern Ireland and on occasion fish processing establishments (Annex A). Sample collection was undertaken by authorised officers from Newry, Mourne and Down District Council. To plan the purchase and collection of samples, FSA in NI shared a list of required products with authorised

officers from Newry Mourne and Down District Council to give, as far as possible, a representative view of the types of products affected by chemical contaminants in NI.

The number of samples of each species collected for analyses were determined based on the quantity of that species landed in NI. The species sampled included:

- nephrops (Dublin Bay Prawn)
- horse mackerel
- mackerel
- haddock
- crab (Brown crab)
- herring
- blue whiting

On receipt at the laboratory each sample was assigned a unique laboratory reference number and the sample details were logged into a database.

3.2. Sample preparation

For fin fish, samples were filleted to collect edible muscle tissue and exclude skin, bones and organs. For crustacea, only the white meat was taken to represent the sample. The selected tissue was homogenised in a blender. The aliquots for either metals or dioxins/PCBs analyses were immediately weighed out and the remaining material was stored in a freezer.

3.3. Metals analysis

Samples were analysed for cadmium, mercury and lead using an in-house (Eurofins WEJ Contaminants GmbH) method based on EN ISO 15763: Determination of trace elements - determination of cadmium, mercury and lead in foodstuffs by Inductively coupled plasma mass spectrometry (ICP-MS) after pressure digestion.

Aliquots of homogenised test sample material were digested in an acid solution using a high-pressure microwave system. The solution was diluted as required before analysis. Quantification of the four elements was by ICP-MS.

The analysis is accredited to ISO 17025, with the inclusion of certified and in-house reference materials and method blanks which were evaluated prior to the reporting of sample data and were used to determine the limits of quantification.

3.4. Dioxin and PCB analysis

Samples were prepared for analysis using a cold extraction method and analysed for dioxins and PCBs using methods by Eurofins Lab Zeeuws-Vlaanderen outlined in Commission Regulation (EU) 2017/644 (EU, 2017). The following analytes were determined:

Dioxins:

- 1,2,3,4,6,7,8-HeptaCDD
- 1,2,3,4,6,7,8-HeptaCDF
- 1,2,3,4,7,8,9-HeptaCDF
- 1,2,3,4,7,8-HexaCDD
- 1,2,3,4,7,8-HexaCDF
- 1,2,3,6,7,8-HexaCDD
- 1,2,3,6,7,8-HexaCDF
- 1,2,3,7,8,9-HexaCDD
- 1,2,3,7,8,9-HexaCDF
- 1,2,3,7,8-PentaCDD
- 1,2,3,7,8-PentaCDF
- 2,3,4,6,7,8-HexaCDF
- 2,3,4,7,8-PentaCDF
- 2,3,7,8-TetraCDD
- 2,3,7,8-TetraCDF
- OctaCDD
- OctaCDF

Dioxin-like PCBs:

- PCB 77 (3,3′,4,4′-Tetrachlorobiphenyl, 3,3′,4,4′-PCB)
- PCB 81 (3,4,4’,5-Tetrachlorobiphenyl)

- PCB 105 (2,3,3′,4,4′-Pentachlorobiphenyl)
- PCB 114 (2,3,4,4′,5-Pentachlorobiphenyl)
- PCB 118
- PCB 123
- PCB 126
- PCB 156 (2,3,3′,4,4′,5-Hexachlorobiphenyl)
- PCB 157
- PCB 167
- PCB 169
- PCB 189

Non-dioxin-like PCBs:

- PCB 28 (2,4,4′-Trichlorobiphenyl)
- PCB 52 (2,2′,5,5′-Tetrachlorobiphenyl)
- PCB 101 (2,2′,4,5,5′-Pentachlorobiphenyl)
- PCB 138 (2,2′,3,4,4′,5′-Hexachlorobiphenyl)
- PCB 153 (2,2′,4,4′,5,5′-Hexachlorobiphenyl)
- PCB 180 (2,2′,3,4,4′,5,5′-Heptachlorobiphenyl)

The value of each congener was multiplied by its World Health Organisation-Toxicity Equivalent Factor (WHO-TEFs). The product was presented as the Toxic Equivalency (TEQ).

- Lower-bound: the concept which requires using zero for the contribution of each congener <Limit of Quantification (LOQ).
- Medium-bound: the concept which requires using half of the limit of quantification calculating the contribution of each congener < LOQ.
- Upper-bound: the concept which requires using the limit of quantification for the contribution of each congener < LOQ.

The analysis is accredited to ISO 17025. Each sample is analysed with the addition of certified standards. The recovery of the standards is checked in each sample against the EU regulation (EU) 2017/644 (EU, 2017). The LOQ is dependent on the LOD, sample weight and sample matrix.

4. Results and Discussion

The concentrations of the contaminants measured in the sixty-two samples were determined by Eurofins and were compared to limits prescribed in Regulation (EC) No. 1881/2006, as amended (EU, 2023).

4.1. Metals analyses

Concentrations of mercury, cadmium and lead are given in Table 1 in Annex B.

Taking into account the measurement uncertainty, mercury was detected above the maximum regulatory level of 0.5 mg/kg in one of the Dublin Bay prawn samples at a concentration of:

- 0.68 mg/kg (± 0.14 mg/kg – measurement uncertainty)

4.2. Dioxin and PCB analysis

Concentrations of dioxins and PCBs were below the regulatory limits for these compounds and are provided in Table 2 in Annex B.

Acknowledgments

Fera Science Ltd.

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- Customer: Food Standards Agency – Northern Ireland
- FSA NI Project Officer: Will Wiltshire
- Report Number: Report FR/002638-57
- Fera Project: Number FR/002638-57
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EU. (2023). *Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs*.

Annexes

Annex A: Sample details

Sample number	Full Product Text Description	Landing date	Method of catch	Fish Market	Catch Area
FSAWF01	Horse Mackerel	22.06.2022	Trawl net	Ardglass Fish Market	FA027VIA
FSAWF02	Dublin Bay Prawns	20.06.2022	Trawl net	Kilkeel Fish Market	FAO27VIIA
FSAWF03	Dublin Bay Prawns	20.06 2022	Trawl net	Kilkeel Fish Market	FAO27VIIA
FSAWF04	Dublin Bay Prawns	20.06.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF05	Mackerel	21.06.2022	Trawl net	Kilkeel Fish Market	FA027VIA
FSAWF06	Mackerel	21.06.2022	Trawl net	Kilkeel Fish Market	FA027VIA
FSAWF07	Mackerel	21.06.2022	Trawl net	Kilkeel Fish Market	FA027VIA
FSAWF08	Mackerel	22.06.2022	Trawl net	Kilkeel Fish Market	FA027VIA
FSAWF09	Haddock	22.06.2022	Trawl net	Kilkeel Fish Market	FAO27VIIA
FSAWF10	Dublin Bay Prawns	16.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF11	Dublin Bay Prawns	10.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF12	Herring	25.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF13	Herring	11.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF14	Herring	10.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF15	Herring	19.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF16	Mackerel	23.09.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF17	Herring	11.08.2022	Trawl net	C&O Milligan	FA027VIIA
FSAWF18	Haddock	26.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF19	Haddock	08.09.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF20	Haddock	09.09.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF21	Blue Whiting	11.11.2022	Trawl net	Ardglass Fish Market	FA027VIIA
FSAWF22	Blue Whiting	11.11.2022	Trawl net	Ardglass Fish Market	FA027VIIA
FSAWF23	Brown Crab	11.11.2022	Crab creel	Dundrum Bay Crab	FA027VIIA
FSAWF24	Haddock	23.09.2022	Trawl net	Kilkeel Fish	FA027VIIA

Sample number	Full Product Text Description	Landing date	Method of catch	Fish Market	Catch Area
				Market	
FSAWF25	Herring	09.10.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF26	Herring	09.10.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF27	Dublin Bay Prawns	17.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF28	Dublin Bay Prawns	17.08.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF29	Herring	01.09.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF30	Herring	01.09.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF31	Dublin Bay Prawns	06.06.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF32	Herring	07.11.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF33	Herring	07.11.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF34	Mackerel	18.01.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF35	Haddock	07.02.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF36	Haddock	07.02.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF37	Mackerel	07.02.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF38	Haddock	09.11.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF39	Mackerel	09.10.2022	Trawl net	Kilkeel Fish Market	FA02VIIA
FSAWF40	Mackerel	11.01.2022	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF41	Mackerel	02.02.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF42	Brown Crab	03.02.2023	Crab Pots	Kilkeel Fish Market	FA027VIIA
FSAWF43	Brown Crab	25.01.2023	Crab Pots	Kilkeel Fish Market	FA027VIIA
FSAWF44	Mackerel	14.02.2023	Trawl net	Kilkeel Kippering Co.	FA027VIIA
FSAWF45	Mackerel	14.02.2023	Trawl net	Kilkeel Kippering Co.	FA027VIIA
FSAWF46	Haddock	13.02.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF47	Haddock	13.2.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF48	Horse Mackerel	14.02.2023	Trawl net	Kilkeel Kippering	FA027VIIA
FSAWF49	Horse Mackerel	14.02.2023	Trawl net	Kilkeel	FA027VIIA

Sample number	Full Product Text Description	Landing date	Method of catch	Fish Market	Catch Area
				Kippering	
FSAWF50	Haddock	16.02.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF51	Haddock	16.02.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF52	Mackerel	02.02.2023	Trawl net	Kilkeel Kippering	FA027VIIA
FSAWF53	Mackerel	02.02.2023	Trawl net	Kilkeel Kippering	FA027VIIA
FSAWF54	Horse Mackerel	02.02.2023	Trawl net	Kilkeel Kippering	FA027VIIA
FSAWF55	Horse Mackerel	02.02.2023	Trawl net	Kilkeel Kippering	FA027VIIA
FSAWF56	Mackerel	14.02.2023	Trawl net	Ardglass Fish Market	FA027VII
FSAWF57	Brown Crab	06.03.2023	Crab pots	Kilkeel Fish Market	FA027VIIA
FSAWF58	Brown Crab	02.03.2023	Crab pots	Kilkeel Fish Market	FA027VIIA
FSAWF59	Brown Crab	28.02.2023	Crab pots	Kilkeel Fish Market	FA027VIIA
FSAWF60	Haddock	22.03.2023	Trawl net	Kilkeel Fish Market	FA027VIIA
FSAWF079	Brown Crab	23.3.2023	Crab Pots	Kilkeel Fish Market	Not given
FSAWF084	Brown Crab	22.3.2023	Crab Pots	Kilkeel Fish Market	Not given

Annex B: Tables

Table 1. Mercury, cadmium and lead concentrations in wild caught fish. Concentrations are not corrected for recovery.

Blue Whiting

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF21	Blue whiting (fillet)	0.06	<0.005	<0.02	FA027VIIA
FSAWF22	Blue whiting (fillet)	<0.005	<0.005	<0.02	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		**0.5**	**0.05**	**0.3**	

Brown Crab

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF42	Brown Crab	0.071	0.018	<0.02	FA027VIIA
FSAWF43	Brown Crab	0.035	0.023	<0.02	FA027VIIA
FSAWF58	Brown Crab	0.049	0.058	0.03	FA027VIIA
FSAWF59	Brown Crab	0.11	0.036	<0.02	FA027VIIA
FSAWF79	Brown Crab	0.16	0.15	<0.02	Not given
FSAWF84	Brown Crab	0.071	0.13	<0.02	Not given
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		0.5	0.5	0.5	

Dublin Bay Prawns

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF02	Dublin Bay Prawns	0.3	0.31	0.04	FA027VIIA
FSAWF10	Dublin Bay Prawns	0.57	0.12	0.06	FA027VIIA
FSAWF27	Dublin Bay Prawns	0.091	0.015	0.03	FA027VIIA
FSAWF31	Dublin Bay Prawns	0.68	0.13	<0.02	FA027VIIA
FSAWF03	Dublin Bay Prawns	0.24	0.017	0.07	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		0.5	0.5	0.5	

Haddock

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF09	Haddock	0.058	<0.005	<0.02	FA027VIIA
FSAWF18	Haddock	0.15	<0.005	<0.02	FA027VIIA
FSAWF20	Haddock	0.08	<0.005	0.02	FA027VIIA
FSAWF35	Haddock	0.26	<0.005	<0.02	FA027VIIA

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF38	Haddock	0.082	<0.005	<0.02	FA027VIIA
FSAWF46	Haddock	0.28	<0.005	<0.02	FA027VIIA
FSAWF47	Haddock	0.36	<0.005	<0.02	FA027VIIA
FSAWF50	Haddock	0.087	<0.005	<0.02	FA027VIIA
FSAWF51	Haddock	0.085	<0.005	<0.02	FA027VIIA
FSAWF60	Haddock	0.14	<0.005	<0.02	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		0.5	0.05	0.3	

Herring

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF25	Herring	0.041	< 0.005	<0.02	FA027VIIA
FSAWF29	Herring	0.039	< 0.005	<0.02	FA027VIIA
FSAWF32	Herring	0.087	0.007	<0.02	FA027VIIA
FSAWF12	Herring	0.04	<0.005	<0.02	FA027VIIA
FSAWF13	Herring	0.028	<0.005	<0.02	FA027VIIA
FSAWF14	Herring	0.036	<0.005	<0.02	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		0.3	0.05	0.3	

Horse mackerel

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF01	Horse Mackerel	0.29	<0.005	<0.02	FA027VIA
FSAWF48	Horse Mackerel	0.11	<0.005	<0.02	FA027VIIA
FSAWF54	Horse Mackerel	0.065	<0.005	<0.02	FA027VIIA
FSAWF55	Horse Mackerel	0.098	0.01	<0.02	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		0.5	0.05	0.3	

Mackerel

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF05	Mackerel	0.04	0.013	<0.02	FA027VIA

FSANI Reference	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Region
FSAWF06	Mackerel	0.05	0.012	<0.02	FA027VIA
FSAWF16	Mackerel	0.022	<0.005	0.02	FA027VIIA
FSAWF34	Mackerel	0.046	0.008	<0.02	FA027VIIA
FSAWF37	Mackerel	0.031	0.006	<0.02	FA027VIIA
FSAWF39	Mackerel	0.05	0.01	<0.02	FA027VIIA
FSAWF41	Mackerel	0.037	0.006	<0.02	FA027VIIA
FSAWF44	Mackerel	0.044	0.005	<0.02	FA027VIIA
FSAWF45	Mackerel	0.031	0.008	<0.02	FA027VIIA
FSAWF49	Mackerel	0.1	<0.005	<0.02	FA027VIIA
FSAWF52	Mackerel	0.25	0.026	<0.02	FA027VIIA
FSAWF53	Mackerel	0.052	0.018	<0.02	FA027VIIA
FSAWF56	Mackerel	0.043	0.008	<0.02	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		0.3	0.1	0.3	

Table 2. Dioxin/PCB WHO-TEQ 2005 and Sum ICES6 Marker PCB results for wild caught fish samples corrected for recovery.

Brown crab

FSA NI Reference	Species	PCDD/F WHO-TEQ upper, ng/kg whole	PCB WHO-TEQ upper, ng/kg whole	PCDD/F + PCB WHO-TEQ upper, ng/kg whole	SUM of ICES 6 upper, µg/kg whole	Region
FSAWF23	Brown Crab	0.0897	0.0421	0.132	0.256	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		3.5		6.5	75	

Dublin Bay Prawns

FSA NI Reference	Species	PCDD/F WHO-TEQ upper, ng/kg whole	PCB WHO-TEQ upper, ng/kg whole	PCDD/F + PCB WHO-TEQ upper, ng/kg whole	SUM of ICES 6 upper, µg/kg whole	Region
FSAWF04	Dublin Bay Prawns	0.22	0.121	0.341	0.754	FA027VIIA
FSAWF11	Dublin Bay Prawns	0.0753	0.102	0.178	1.44	FA027VIIA

FSA NI Reference	Species	PCDD/F WHO-TEQ upper, ng/kg whole	PCB WHO-TEQ upper, ng/kg whole	PCDD/F + PCB WHO-TEQ upper, ng/kg whole	SUM of ICES 6 upper, µg/kg whole	Region
FSAWF28	Dublin Bay Prawns	0.0751	0.0233	0.0984	0.164	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		**3.5**		**6.5**	**75**	

Haddock

FSA NI Reference	Species	PCDD/F WHO-TEQ upper, ng/kg whole	PCB WHO-TEQ upper, ng/kg whole	PCDD/F + PCB WHO-TEQ upper, ng/kg whole	SUM of ICES 6 upper, µg/kg whole	Region
FSAWF19	Haddock	0.268	0.289	0.557	4.45	FA027VIIA
FSAWF24	Haddock	0.0198	0.0106	0.0304	0.0799	FA027VIIA
FSAWF36	Haddock	0.0947	0.0413	0.136	0.282	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		**3.5**		**6.5**	**75**	

Herring

FSA NI Reference	Species	PCDD/F WHO-TEQ upper, ng/kg whole	PCB WHO-TEQ upper, ng/kg whole	PCDD/F + PCB WHO-TEQ upper, ng/kg whole	SUM of ICES 6 upper, µg/kg whole	Region
FSAWF15	Herring	0.24	0.327	0.567	4.52	FA027VIIA
FSAWF17	Herring	0.174	0.331	0.505	4.41	FA027VIIA
FSAWF26	Herring	0.317	0.384	0.702	5.34	FA027VIIA
FSAWF30	Herring	0.244	0.242	0.486	4.66	FA027VIIA
FSAWF33	Herring	0.205	0.245	0.45	4.09	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		**3.5**		**6.5**	**75**	

Mackerel

FSA NI Reference	Species	PCDD/F WHO-TEQ upper, ng/kg whole	PCB WHO-TEQ upper, ng/kg whole	PCDD/F + PCB WHO-TEQ upper, ng/kg whole	SUM of ICES 6 upper, µg/kg whole	Region
FSAWF07	Mackerel	0.125	0.387	0.513	3.37	FA027VIA
FSAWF08	Mackerel	0.0919	0.171	0.263	1.45	FA027VIA
FSAWF40	Mackerel	0.124	0.34	0.464	2.99	FA027VIIA
Maximum levels set out in Commission Regulation (EC) No 1881/2006, as amended		3.5		6.5	75	

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