# ECsafeSEAFOOD

## Priority environmental contaminants in seafood: safety assessment, impact and public perception

Grant agreement no: 311820

## Deliverable D2.4

## Presence and levels of priority contaminants in seafood

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|---|---|
| **Dissemination Level** | |
| **PU** Public | x |
| **PP** Restricted to other programme participants (**i**ncluding the Commission Services) | |
| **RE** Restricted to a group specified by the consortium (including the Commission Services) | |
| **CO** Confidential, only for members of the consortium (including the Commission Services) | |

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| Species | Sampling site | BPA (µg/kg) | | TBBPA (µg/kg) | |
|---|---|---|---|---|---|
| | | dw | ww | dw | ww |
| Sole large | Goro. IT | - | | - | |
| Mackerel, fresh | Goro. IT | <10.00 | <3.68 | <5.00 | <1.84 |
| Seabream | Other origin | 150.16 | 32.28 | <5.00 | <1.08 |
| Mussels | Goro. IT | <10.00 | <1.79 | <5.00 | <0.90 |
| Plaice, small | North Sea | - | | - | |
| Plaice, large | North Sea | - | | - | |
| Mackerel, fresh | North Sea | <10.00 | <3.58 | <5.00 | <1.79 |
| Mussels | Netherlands | <10.00 | <2.08 | <5.00 | <1.04 |
| Mussels | Ireland | <10.00 | <1.22 | <5.00 | <0.61 |
| Brown crab | Netherlands | <10.00 | <3.95 | <5.00 | <1.97 |
| Mussels | Spain | <10.00 | <1.45 | <5.00 | <0.73 |
| Octopus, small | Mediterranean | - | | - | |
| Octopus, large | Mediterranean | - | | - | |
| Mackerel fresh | Spain | <10.00 | <2.98 | <5.00 | <1.49 |
| Mussels | Limfiord. Denmark | <10.00 | <1.66 | <5.00 | <0.83 |
| Norwegian salmon (farmed) | DanSalmon. Denmark | <10.00 | <4.14 | <5.00 | <2.07 |
| Atlantic Cod | North Sea. Denmark | <10.00 | <1.93 | <5.00 | <0.97 |
| Mackerel | North Sea. Denmark | <10.00 | <4.33 | <5.00 | <2.17 |
| Monkfish, small | Portugal | 30.63 | 5.85 | <5.00 | <0.96 |
| Monkfish, large | Portugal | 20.81 | 4.23 | <5.00 | <1.02 |
| Canned Tuna | Portugal | 20.52 | 8.08 | <5.00 | <1.97 |
| Canned mackerel | Portugal | <10.00 | <4.23 | <5.00 | <2.12 |
| Plaice/Sole, small | Channel | - | | - | |
| Plaice/Sole, large | Channel | - | | - | |
| Mussels | France | <10.00 | | <5.00 | |
| Pacific hake, small | South America | - | | - | |
| Pacific hake, large | South America | - | | - | |
| Atlantic hake, small | South Africa | - | | - | |
| Atlantic hake, large | South Africa | - | | - | |
| Imported Tuna, small | Pacific | 41.98 | 13.16 | <5.00 | <1.57 |
| Imported Tuna, large | Pacific | <10.00 | <3.24 | <5.00 | <1.62 |
| (- not measured) | **LOD** | **5** | | **0.5** | |
| | **LOQ** | **10** | | **5** | |

# 1. Summary

Priority environmental contaminants in seafood are gaining increasing interest by the scientific community and regulatory authorities. These contaminants include brominated flame retardants (BFRs), perfluorinated compounds (PFCs), toxic element species (inorganic arsenic and organic mercury), endocrine disruptors, polycyclic aromatic hydrocarbons, pharmaceutical and personal care products, among others. Some of these contaminants have been associated with marine litter. Because of the persistence, bioactivity and bioaccumulation potential of some substances, concern is increasing about the possible harmful effects on ecosystems and human health. These contaminants are strong candidates for future regulation, depending on their toxicity, potential health effects, public perception, and monitoring data regarding their occurrence.

Knowing that seafood is a major dietary route for human exposure to these widespread contaminants, one of the main purposes of ECSafeSEAFOOD was to monitor priority environmental contaminants in seafood and to assess the effects of industrial and home preparation on contaminant content. The purpose of Deliverable 2.4 is to present the results of the analysis of priority contaminants in seafood.

The priority contaminants (according to WP1 and WP2 decision) monitored in selected commercial species were the following:

- Brominated Flame Retardants (BFRs: HBCD, PBDEs, HBB, DEC602, Metho PBDE, TBBPA, 2,4,6-tribromphenol)
- Endocrine Disruptors (EDCs: Bisphenol A, triclosan, methylparaben, TBEP)
- Inorganic arsenic (iAs)
- Methyl mercury (MeHg)
- Microplastics
- Musks (galaxolide, tonalide, cashmeran)
- Perfluorinated Compounds (PFCs: PFOS, PFOA, PFNA, PFHxS, PFDcA, PFUnA, PFDoA, PFBS, PFPeA, PFHxA)
- Pharmaceuticals (PhACs: diclofenac, sulfamethaxole, sotalol, diazepam, carbamazepine, venlafaxine, citalopram, azithromycin)
- Polycyclic aromatic hydrocarbons (PAHs: oxyPAH, methylPAH)
- UV-filters

The choice of sample origin and the type of seafood was based on a two-step approach. In the first step, a first screening was carried out with sentinel species (i.e. species chosen for their ability to accumulate target contaminants at high levels) that were collected in five potential hotspot areas subjected to strong antropogenic pressure with regard to the target compounds. In the second step, several commercial seafood species were sampled on different seasons and geographic locations. The number of species analysed in the second step was selected according to the consumption relevance, covering a diversity of habitats and taxonomic groups, and taking into account the chances of success for detection and identification of selected priority contaminants (according to WP1 and results from hotspots). To assure that the seasonality was taken into account, several

specimens were collected in two different batches (or seasons; details presented in D2.1). In the first round all selected species were assessed, but not necessarily for all contaminants. In the second round, species with the highest levels of contaminants were sampled and analysed raw and cooked.

The effects of origin, biological and chemical parameters on priority contaminants levels in the same seafood species and among species were targeted, as well as the effect of food processing on priority contaminant levels in seafood.

# 2. Background

Seafood is one of the most important food item consumed worldwide. It has been recognized as a high-quality, healthy and safe food. However, seafood, like other foodstuffs, can also be a source of harmful environmental contaminants like the well-known polychlorinated biphenyls (PCBs), dioxins, pesticides, toxic elements, and also contaminants of emerging concern (Domingo, 2007). Therefore, several governmental and health authorities are increasingly concerned about seafood quality and safety, resulting in increasing regulation for specific contaminants and supporting the development of specific actions regarding major sea-related challenges. The assessment of safety issues related to emerging contaminants (i.e. non-regulated contaminants) and the evaluation of their impact on public health and environment has become mandatory.

An emerging contaminant can be roughly defined as a synthetic or naturally occurring chemical substance, microorganism or material that is not yet properly monitored in the environment, but is characterized by an apparent, potential, or real threat to human health or the environment, or by an absence of acknowledged health standards (EPA, 2012). Nowadays, emerging organic pollutants can vary from pharmaceuticals and hormones to pesticides, surfactants and plasticizers. Simultaneously to the decrease of many regulated persistent organic contaminants (POCs), such as DDT and Polychlorinated biphenyls in Artic marine biota, new contaminants are emerging, like Perfluorinated compounds (PFCs) (Cruz et al., 2015).

The Marine Strategy Framework Directive (MSFD) (Directive 2008/56/EC; ECD, 2008) adopted in 2008, the "Priority Contaminants" concept that embraces all harmful contaminants in seafood that might constitute a risk for human health and for which there is scarce scientific knowledge. It includes substances for which no maximum levels have been laid down yet (in EU legislation or international standards), as well as substances for which maximum levels have been provided but require revision. In 2010, the MSFD group 9 compiled the regulatory levels for some substances, including heavy metals (lead, cadmium and mercury), polycyclic aromatic hydrocarbons, polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, dioxin-like polychlorinated biphenyls (PCBs), and radionuclides, and established seven classes of compounds as chief priority contaminants. These were ordered according to priority: 1) Non-dioxin-like polychlorinated biphenyls (congeners #28, 52, 101, 138, 153 and 180); 2) Brominated flame retardants (BFR); 3) Perfluorinated compounds; 4) Arsenic (total and inorganic); 5) Organotincompounds (tributyltin, triphenyltin, dibutyltin); 6) Organochlorine pesticides (chlordane, dichlorodiphenyltrichloroethane, dicofol, endosulfan, heptachlor, aldrin, dieldrin, endrin, hexachlorocyclohexane, toxaphene, hexachloro-benzene), and 7) Phthalates (benzylbutylphthalate, dibutyl phthalate, di-2-ethylhexyl phthalate, diisodecyl phthalate, diisononyl phthalate, diisobutyl phthalate) (Swartenbroux et al., 2010).

The increasing scientific evidence that seafood can be a source of potentially harmful environmental contaminants, require efficient monitoring programmes to provide supporting data for management and risk assessment purposes.

# 3. Assessment of priority contaminants in seafood

## 3.1 Hotspot sampling

The purpose of the hot spot sampling is to have a proper ruler to decide which compounds should be analyzed in commercial samples. Compounds that have a terrestrial origin (man-made) and are only detected at not significant levels (toxicologically) in hot spot areas are not likely to represent a threat in commercial samples. These samples are caught out in open seas, further away from the source of pollution. Therefore, contaminants at non-significant levels in hotspots are not a priority in commercial seafood samples analysis, with some exceptions like MeHg. This activity was led by IMARES with contributions from twelve partners (IPMA, UGent, NVI, ICRA, DTU, ILVO, ICETA, IRTA, URV, Aeiforia, Hortimare, and Dan Salmon).

**Target species**: clams, mussels, mullet, flounder and macroalgae

**Tissue**: bivalves and macroalgae (all edible content), fish (muscle)

**Sampling period**: September 2013

Sampling areas: Tagus estuary, Ebro Delta, Po Delta, Western Scheldt and vicinities of a fish farm in Norway

**Collection, sample preparation and shipment:** the collection, sample preparation and shipment of samples were performed according to D2.1.

## 3.2 Commercial species sampling

The purpose of sampling of the most relevant seafood species commercially available is to assess the levels of relevant contaminants highlighted in hotspots sampling and to find parameters that influence the respective levels. This activity was led by IMARES with the contributions of twelve partners (IPMA, UGent, NVI, ICRA, DTU, ILVO, ICETA, IRTA, URV, Aeiforia, Hortimare and Dan Salmon).

**Target species**: mussels (from different origins), plaice, tuna (imported fresh, Atlantic fresh and canned), hake (Atlantic and Pacific), monkfish (small and large), Nile perch, pangasius (farmed), cod (Atlantic and Pacific), mackerel (fresh from different origins and canned), brown crab, shrimp (*Penaeus vannamei*; farmed), octopus, salmon (Scottish and Norwegian; farmed), seabream (farmed), macroalgae (*Saccharissima latissima* and *Ulva lactuca*).

**Tissues:** Mussels and macroalgae (all edible content), fish (muscle), shrimp (muscle); brown crab (brown meat); cephalopods (muscle).

**Sampling periods:** Round I – April-June, 2014; Round II – September-January, 2015.

The criteria used for selecting the target species were the following: a) most common species consumed in the study area; b) potential to accumulate high concentrations of chemicals; c) wide geographic distribution; d) easy identification; e) abundance; f) easy to capture; g) large enough to provide adequate tissue for analysis; h) found in different habitats; i) from extra-EU origin or from EU production; and j) from wild and farmed origin.

**Collection, sample preparation and shipment:** the collection, sample preparation and shipment of samples were performed according to D2.1. Briefly, in each site, a minimum of 25 specimens of each species (at least 800 g edible portion) were sampled. Each specimen was divided in 3 portions (except for bivalves and shrimps) to be used for the preparation of samples: one of raw samples (frozen storage), one freeze-dried samples, and one with extra raw frozen samples (for additional analysis if needed). In the second round of commercial species, also cooked samples were prepared. The pooled samples were homogenized. Since the contaminants of interest were not affected by freeze-drying, all samples were freeze-dried (except PAHs, fluorinated and microplastics analysis) before being dispatched to the labs performing the analysis in order to avoid problems with the shipping of fresh products.

## 3.3 Methods

### 3.3.1. Brominated flame retardants (BFRs)

Sample preparation for PBDEs, dechloranes, MeO-PBDEs, HBB, PBEB and DBDPE included a pressurized liquid extraction (PLE), followed by gravimetric determination of lipid content. Then, fat content was dissolved again and purified under an acidic treatment. Finally, a SPE clean-up was carried out with Alumina cartridges.

Instrumental determination of polybrominated flame retardants (PBDEs) and emerging halogenated flame retardants (HFRs) was carried out by GC-MS/MS working in electron ionization mode. Halogenated norbornenes, on the other hand were determined by GC-MS/MS working in negative chemical ionization mode.

The brominated contaminants α-, β-, γ-Hexabromocyclododecane (α-, β-, γ-HBCD); 2,4,6 tribromophenol and tetrabrombisphenol A were determined by LC-MS/MS. The method (FL412.1) is validated at DTU Food and accredited by the Danish accreditation board DANAK. The sample preparation included soxhlet-extraction for 6 hours with 150 ml acetone hexane 1:1. A subsample was taken for lipid determination and the extract was evaporated, dissolved in hexane and cleaned up with concentrated sulphuric acid. Finally the extract was transferred into a methanol phase in HPLC vials. The LC-MS/MS detection was performed a tandem mass spectrometer after separation on a Kinetex C18-HPLC column 2.6 µm, 100 x 2.1 mm using a gradient of methanol and 0.01% acetic acid. The determination is based on MRM transitions of quantification and verification and the ion ratios of the two transitions are compared to those of the calibration standards.

### 3.3.2. Endocrine disruptors (ECDs)

According to Jakimska et al. (2013), 0.5 g of freeze dried sample was extracted in triplicate on QuEChERS (extract tubes AOAC) using ACN in aqueous condition and addition of $MgSO_4$+NaCl. Purification using dSPE (dispersive 15 mL, fatty samples). The samples were dried under nitrogen and 1 mL of MeOH:water (50:50) was added. Injection was performed on Ultra performance liquid chromatography (UPLC) coupled to a QTRAP mass spectrometer.

### 3.3.3. Inorganic Arsenic

Inorganic arsenic was determined following the principles in prEN16802 “Determination of inorganic As in foodstuffs of marine and plant origin” developed at DTU-Food and currently under evaluation

as a new European standard method in CEN TC275. The samples were subjected to microwave-assisted extraction in a heated water bath (90°C, 60 min) using diluted hydrochloric nitric acid and hydrogen peroxide, which solubilised the analytes and oxidised arsenite (As(III)) to arsenate (As(V)). Subsequently, the samples were centrifuged and filtered (0,45µm) and the supernatant was used for the analysis of inorganic arsenic.

The test solutions were analysed by anion-exchange HPLC-ICPMS (1260 HPLC system and 8800 ICP-QQQ-MS, Agilent Technologies, Waldbronn, Germany). Matrix-matched external calibration in the concentration range of 0-20 µg/L was used for the quantification of inorganic As (as arsenate =As(V)).

### 3.3.4. Musk fragrances

The samples were analysed for the target fragrances using the following procedure, which was described in more detail by Vallecillos et al. (2014) and Cunha et al (2015). In summary: i) 0.5 g of freeze-dried sample was blended with 1 g of diatomaceous earth and homogenized. ii) The homogenate was transferred to a 11 mL stainless steel extraction cell that contained 1 g of florisil (in-cell clean-up sorbent) previously conditioned at 400 °C overnight at the bottom and was compacted with 1 g of diatomaceous earth. iii) Then, the extraction was carried out using an accelerated solvent extraction system (ASE 200, Dionex, Sunyvale, CA, USA) with dichloromethane at 60°C and 1500 psi for 5 min (Vallecillos et al., 2014). iv) The sample extract was concentrated to 1 mL on a rotary evaporator (R-114, Büchi, Switzerland) at 30°C and the IS (50 ng/g) was added to the residue before it was reconstituted to 2 mL with ethyl acetate and filtered with a 0.22 µm PTFE syringe filter. The extract was finally analysed by gas chromatography ion trap tandem mass spectrometry (GC-IT-MS/MS).

### 3.3.5. Pharmaceuticals (PhACs)

Pharmaceutical compounds in fish were analysed as described by Huerta et al. (2013). Approximately 1 g of sample was mixed with hydromatrix (diatomaceous earth, ASE prep DE, Dionex) and placed in a 22 mL stainless steel extraction cell containing a glass fiber filter (27 mm diameter, type D28, Dionex) in the cell inlet and outlet. The PLE conditions were as follows: extraction using methanol as solvent at 50 ºC during 4 cycles of 5 min, followed by an extensive Gel permeation chromatography (EnviroPrep, 300 mm × 21.2 mm (10 µm pore size) column coupled to a PLgel Guard column, 50 mm × 7.5 mm) (Agilent Technologies) purification, with dichloromethane/methanol (90:10, v/v) as mobile phase at 5 ml/min flow rate. Final extracts were evaporated to dryness and reconstituted with 1 ml methanol/water (10:90, v/v), and 50 µL of a 1 mg/L mixture containing the internal standards were added and the analysis was performed by ultra-high-performance liquid chromatography coupled to tandem mass spectrometry (UHPLC–MS/MS).

Pharmaceutical compounds in bivalve were analysed as described by Alvarez-Muñoz et al. (2015a). Briefly, 0.5g of freeze dried sample was extracted in triplicate on PLE with MeOH:Water (1:2), 3 cycles of 5 min each at 50°C. Every sample was dissolved in 200 ml of HPLC water and 6 ml of EDTA were added. Purification was done by Solid Phase Extraction (SPE) on Oasis HLB cartridges. The

samples were dried under nitrogen and 1 ml of MeOH:$H_2O$ (10:90) was added. Injection was performed on UHPLC coupled to a QTRAP mass spectrometer.

### 3.3.6. Perfluorinated compounds (PFCs)

Internal standard was added to 2 g of sample in a 15 mL poly propylene (pp) tube. Eight mL of acetonitrile was added, the sample was shaken for 30 min and subsequently centrifuged for 10 min at 4000 rpm. The acetonitrile was transferred to a 50 mL pp tube and the extraction was repeated twice. The extract was concentrated to 10 mL using a TurboVap and 10 mL of hexane was added. The sample was then shaken vigorously for 5 min, centrifuged for 5 min at 4000 rpm and the hexane layer was removed. This was repeated twice and the extract was concentrated to 700 µL. The sample was transferred to a pp Eppendorf, 50 mg of ENVIcarb was added, the sample was vortexed for 1 min and subsequently centrifuged for 5 min at 10000 rpm. The extract was then transferred to a vial and stored at 4°C until analysis by liquid-chromatography-ion trap tandem mass spectrometry (LC-IT-MS/MS).

### 3.3.7. Polycyclic aromatic hydrocarbons (PAHs)

Since PAHs are metabolized by fish, only shellfish samples were analysed. Sample preparation of mussels for PAH analysis was started with chemical drying of 3 g of sample with ca. 9 g of sodium sulfate. Samples were extracted by accelerated solvent extraction (Dionex, ASE350). Cells of 22 mL were filled with the dried sample, 2.5 g of florisil and diatomaceous earth (Sigma Aldrich, Celite 545) and a mixture containing acenaphthene $d_{10}$,anthracene $d_{10}$, pyrene $d_{10}$, benzo(a)-anthracene $d_{12}$, benzo(a)pyrene $d_{12}$ and indeno(123cd)pyrene $d_{12}$ in iso-octane was added as recovery standard. The cells were then extracted with a mixture of hexane:acetone (3:1) at 100 °C. For the extraction, 3 cycles of 5 min static time each were programmed. The extract was evaporated to 1 mL by a Turbovap II evaporator (Zymark) and eluted with 15 mL of hexane on a glass column filled with 2 g of aluminium oxide, deactivated with 10% of type 1 water. A second evaporation step to 1 mL was performed, followed by the extract elution with 10 mL of hexane on a glass column filled with 1 g of silicon oxide. After evaporation and reconstitution to 0.5 mL of iso-octane the samples were transferred to vials for analysis by gas chromatography-mass spectrometry (GC-MS) with chrysene $d_{12}$ in toluene added to the vial as injection standard (more details described in Kwadijk et al., in press).

### 3.3.8. Tetrabromobisphenol (TBBPA) and bisphenol (BPA)

The sample preparation was based on a previously described methodology (Cunha et al., 2015) with some modifications: (i) weight 2 g of freeze-dried sample into a 40 mL glass vial tube, add 100 µL of $TBBPA_{c13}$ (IS, 10 µg/mL) and add 100 µL of $BPA_{d16}$ (IS, 10 µg/mL); (ii) add 7 mL of deionized water and 10 mL of acetonitrile (MeCN), seal the tube, vortex and place it on a wrist action shaker for 10 min; (iii) add 4 g of anhydrous $MgSO_4$ and 1 g of NaCl; (iv) seal the tube and shake vigorously by hand for 5 min; (v) centrifuge the tube at 5000 g for 3 min. After QuEChERS, a liquid-liquid extraction procedure was performed: (vi) transfer 3 mL of the MeCN extract to a 4 mL vial tube and add 7 ml of deionized water; (vii) add 4 mL of hexane: tert-butylmethylether (3:1v/v): (viii) seal the tube and shake gently by hand for 30 s and remove the organic phase; (ix) add 4 mL of hexane:benzene (3:1v/v); (x) combine the organic phase and dry the extract using a gentle nitrogen stream at room temperature.

Finally, re-dissolve the dry extract in ammonium acetate 5 mM/methanol for analysis of by LC-MS/MS (negative mode).

### 3.3.9. Total and organic mercury

Mercury concentrations (total and organic) were quantified by atomic absorption spectrometry, using an automatic Hg analyser (AMA 254, LECO, USA). Briefly, for total Hg determination 10-20 mg of solid samples was placed on a sample boat of the automatic analyser. After drying and combustion, samples enter in a decomposition tube, where they undergo amalgamation at 700 °C, and the dissolved elemental mercury (Hg0) is pre-concentrated, released and detected at a wavelength of 254 nm. Mercury concentrations were calculated from linear calibration with a Hg(II) nitrate standard solution (1000 mg/L, Merck) diluted in nitric acid (0.5 mol/L, Merck) at concentrations ranging between 0.10 and 40 ng of Hg. For the quantification of organic Hg (i.e. MeHg), seafood samples (~150 mg freeze-dried) were hydrolyzed in hydrobromic acid (10 mL, 47% w/w, Merck), followed by MeHg extraction with toluene (35 mL, 99.8% w/w, Merck) and removed from toluene using an aqueous solution of cysteine (1% L-cysteinium chloride in 12.5% anhydrous sodium sulfate and 0.775% sodium acetate) (Scerbo and Barghigiani, 1998). The cysteine extracts containing MeHg were then analysed in the automatic Hg analyser as described above.

### 3.3.10. UV-filters

The sample preparation was based on a previously described methodology (Cunha et al., 2015) with few modifications: (i) weight 3.5 g of freeze-dried sample into a 40 mL glass vial tube and add 50 µL of $BPd_{10}$ (IS, 1000 µg/mL); (ii) add 7 mL of deionized water and 10 mL of acetonitrile (MeCN), seal the tube, vortex and place it on a wrist action shaker for 10 min; (iii) add 4 g of anhydrous $MgSO_4$ and 1 g of NaCl; (iv) seal the tube and shake vigorously by hand for 5 min; (v) centrifuge the tube at 5000 *g* for 3 min. After QuEChERS, a liquid-liquid extraction procedure was performed: (vi) transfer 3 mL of the MeCN extract to a 4 mL vial tube and add 7 ml of deionized water; (vii) add 4 mL of hexane: terbutylmethylether (3:1v/v); (viii) seal the tube, shake gently by hand for 30 s and remove the organic phase (ix) add 4 mL of hexane: benzene (3:1v/v) (x) combine the organic phase and dried the extract using a gentle nitrogen stream at room temperature. Finally, the analytes are silylated: (xii) add 50 µL of BSTFA, derivatize during 5 min in a household microwave (600 watt) and inject 1 µL of the extract in the GC-MS/MS system.

### 3.3.11. Microplastics

Microplastic extraction was based on the principle of wet digestion of tissues using acid. Two acid digestion methods were performed on mussel samples from the hotspots: the Acid mix Method used a combination of nitric acid and perchloric acid according to the protocol of De Witte et al. (2014), being performed at ILVO; and the Nitric acid Method, where only nitric acid is used according to Claessens et al. (2013), being conducted at UGent. Only the Acid mix Method was used for the evaluation of commercial mussels from five different countries. Mussel bodies were analysed as a whole, meaning that the digestive tract (containing potential ingested microplastics) was included in the analysis, as they do also represent a part of the microplastic intake for consumers. As contamination with airborne fibres is a recurring phenomenon in microplastic research (Davison and Asch, 2011; Foekema et al., 2013), rigorous precautions were taken while processing samples using both digestion methods.

ILVO: Acid Mix Method: All required solutions were filtered with a qualitative 10–20 µm filter (VWR, Grade 310) before starting the destruction protocol. All laboratory glassware was cleaned with acetone and filtered type 1 ultrapure water before use, as recommended by Claessens et al. (2013). After opening the shells, the mussel body was rinsed with filtered type 1 ultrapure water to remove the intervalvar water. Extraction of microplastics from the mussel bodies was performed using an acid destruction with a mixture of nitric acid (VWR, 65%) and perchloric acid (VWR, 68%), $HNO_3$:$HClO_4$ (4:1 v:v). For an optimal digestion of the mussel bodies, 500 ml acid solution was used per 100 g tissue. The stronger perchloric acid helps to reduce the remaining greasy tissue fraction after destruction. The mussel body was digested overnight at room temperature in a closed fume hood. The solution was covered with a clock glass to avoid contamination by air. The digest was boiled during 10 min, followed by a 10-fold dilution of the digest with filtered type 1 ultrapure water. The solution was boiled a second time until the tissue was completely digested as observed by visual inspection, followed by a cool down period of 30 min. The acid digest was filtered over a qualitative filter (VWR, Grade 310) and the filter was transferred onto a glass Petri dish for transport and visualization of microplastics under a stereo microscope (Leica M 20:5:1 or M 16:5:1 zoom). Observed microplastics were classified by category (fibre – particle) and colour for each assessed mussel or blank sample. Each plastic fragment was verified as plastic with a hot needle (Hanke et al., 2013). Synthetic polymer types were not identified. One destruction batch was performed for each location, which consisted of 5 mussels and 3 blank analyses. For the blank analysis, the entire procedure was performed without mussel tissue. Microplastics matching the characteristics of the microplastics in the procedural blanks were omitted from analysis in the mussel samples by blank subtraction (more details provided in Vandermeersch et al., 2015).

UGent: Nitric Acid Method. Extensive measures were adopted while handling and processing samples to avoid any (airborne) contamination. A 100% cotton lab coat was worn at all times, all equipment was rinsed three times before use with filtered deionised water (0.8 µm membrane filter, Supor®800, GelmanSciences) and all sample processing was performed in a clean laminar flow cabinet. In order to account for any possible contamination, procedural blanks were included for each acid destruction. Fibres or particles matching the characteristics of the microplastics in the procedural blanks were omitted from analysis in the mussel samples. Mussels were entirely removed from their shell (including the posterior adductor muscle which attaches the shell to the animal) and transferred into a rinsed flask. The soft tissue was left overnight in 69% nitric acid (VWR) (20 mL for three mussels) at room temperature. The flasks were covered with watch glasses to avoid contamination with airborne particles and fibres. This solution was then boiled for 2 hours, after which the digest was 10-fold diluted with warm (~80° C) filtered deionised water (0.8 µm membrane filter, Supor®800, GelmanSciences). This warm solution was subsequently filtered over a 5 µm cellulose nitrate membrane filter (Whatman AE98). After filtration, filters were placed in a petri dish and dried at 40°C for 24 h. After drying, the filters were visually analysed for the presence of microplastics using a microscope (Olympus BX41 at magnification 200x). Observed microplastics were classified according to type: fibres or particles (fragments and spheres) were identified. Per location, one destruction batch, consisting of 12 replicates (each with three mussels) and 3 blank analyses, was performed.

## 3.4 Results in samples from hotspots

### 3.4.1 Brominated flame retardants (BFRs)

Table 1- BFRs content (µg/kg dry weight - dw and lipid weight - lw) obtained in the samples from hotspots.

| Sample Type | Sample Location | % lipid weight | BDE28 | | BDE47 | | BDE100 | | BDE99 | | BDE154 | | BDE153 | | BDE209 | | ∑PBDEs | | HBB | | PBEB | | DBDPE | | Dec 602 | | Dec 603 | | *syn*-DP | | *anti*-DP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw |
| Flounder | Western Scheldt | 5.14 | n. q. | n. q. | 2.1 | 40.7 | 1.34 | 26 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | **3.43** | **66.8** | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | 0.004 | 0.09 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. |
| Mussel | Tagus Estuary | 1.25 | 0.43 | 34.6 | 5.05 | 403 | 4.58 | 366 | 5.99 | 478 | 3.19 | 255 | 1.65 | 132 | 2.19 | 175 | **23.1** | **1845** | 4.43 | 354 | n. q. | n. q. | n. d. | n. d. | 0.027 | 2.19 | n. d. | n. d. | n. q. | n. q. | n. d. | n. d. |
| Mussel | Po Delta | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mullet | Tagus Estuary | 4.71 | 0.38 | 8.12 | 5.08 | 108 | 4.37 | 92.7 | 2.48 | 52.7 | 2.65 | 56.3 | 0.67 | 14.2 | n. d. | n. d. | **15.6** | **332** | n. d. | n. d. | n. q. | n. q | n. d. | n. d. | 0.026 | 0.55 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. |
| Mullet | Tagus Estuary | 7.29 | n. q. | n. q. | n. q. | n. q. | 2.02 | 27.8 | n. q. | n. q. | 0.92 | 12.6 | n. d. | n. d. | n. q. | n. q. | **2.94** | **40.3** | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | 0.008 | 0.11 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. |
| Mussel | Ebro Delta | 8.8 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | **n. q.** | **n. q.** | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | 0.013 | 0.15 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. |
| Clam | Ebro Delta | 4.86 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | **n. q.** | **n. q.** | n. d. | n. d. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | | n. d. | | n. q. | | 13.2 | | n. d. | | n. d. | | n. q. | | n. d. | |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | | n. d. | | n. d. | | 3.83 | | n. q. | | n. d. | | n. q. | | n. d. | |
| (- not meseaured) | | **LOD** | 0.04 | | 0.05 | | 0.2 | | 0.29 | | 0.43 | | 0.64 | | 10.6 | | | | 0.2 | | 0.18 | | 9.66 | | 0.021 | | 0.007 | | 0.006 | | 0.002 | |
| (n.d. not detected; n.q. not quantified) | | **LOQ** | 0.12 | | 0.18 | | 0.67 | | 0.97 | | 1.42 | | 2.13 | | 35.4 | | | | 0.67 | | 0.61 | | 32.2 | | 0.07 | | 0.024 | | 0.018 | | 0.008 | |

(cont. Table 1 ).

| Sample Type | Sample Location | % lipid weight | 2-MBDE-68 | | 6-MBDE-47 | | 5-MBDE-47 | | 4-MBDE-99 | | 5-MBDE-100 | | 4-MBDE-100 | | 5-MBDE-99 | | 4-MBDE-101 | | ∑MeO-PBDEs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw | dw | lw |
| Flounder | Western Scheldt | 5.14 | n. q. | n. q. | 0.29 | 5.62 | n. q. | n. q. | n. d. | n. d. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. d. | n. d. | **0.29** | **5.62** |
| Mussel | Tagus Estuary | 1.25 | 0.3 | 24.4 | 3.22 | 257 | 0.59 | 47 | 0.11 | 8.5 | 1.69 | 135 | 0.16 | 12.9 | 0.63 | 50.3 | n. d. | n. d. | **6.69** | **535** |
| Mussel | Po Delta | - | | | | | | | | | | | | | | | | | | |
| Mullet | Tagus Estuary | 4.71 | n. q. | n. q. | 3.11 | 66 | 0.79 | 16.7 | n. d. | n. d. | n. d. | n. d. | n. q. | n. q. | n. q. | n. q. | n. d. | n. d. | **3.89** | **82.7** |
| Mullet | Tagus Estuary | 7.29 | n. q. | n. q. | 2.71 | 37 | n. q. | n. q. | n. d. | n. d. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. d. | n. d. | **2.71** | **37.2** |
| Mussel | Ebro Delta | 8.8 | n. d. | n. d. | 0.35 | 3.94 | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | n. d. | **0.35** | **3.94** |
| Clam | Ebro Delta | 4.86 | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | n. d. | n. d. | n. q. | n. q. | n. q. | n. q. | **n. q.** | **n. q.** |
| L. Digitata | Norwegian fish farm | - | n. d. | | n. d. | | n. q. | | n. d. | | n. d. | | n. d. | | n. d. | | n. d. | | **n. q.** | |
| S. Latissima | Norwegian fish farm | - | n. d. | | n. q. | | n. d. | | n. d. | | n. d. | | n. d. | | n. d. | | n. d. | | **n. q.** | |
| (- not meseaured) | | **LOD** | 1.06 | | 0.43 | | 0.43 | | 2.13 | | 1.99 | | 2.2 | | 3.75 | | 3.19 | | | |
| (n.d. not detected; n.q. not quantified) | | **LOQ** | 3.54 | | 1.42 | | 1.42 | | 7.09 | | 6.64 | | 7.33 | | 12.5 | | 10.6 | | | |

### 3.4.2 Endocrine disruptors (ECDs)

Table 2- ECDs content (µg/kg dry weight - dw and wet weight - ww) obtained in the samples from hotspots.

| Sample Type | Sample Location | 1H-benzotriazole | | Tolytriazole | | Caffeine | | TCEP | | TBEP | | TCPP | | Progesterone | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | <LOD | <LOD | <LOD | <LOD | 26.49±2.4 | 5.99±0.5 | 2.93±0.6 | 0.66±0.1 | 94.88±9.1 | 21.46±2.0 | <LOD | <LOD | <LOD | <LOD |
| Mussel | Tagus Estuary | <LOD | <LOD | <LOD | <LOD | 11.12±0.6 | 2.72±0.2 | <LOQ | <LOQ | 22.83±2.7 | 5.59±0.6 | <LOD | <LOD | <LOD | <LOD |
| Mussel | Po Delta | <LOD | <LOD | <LOD | <LOD | 11.70±1.5 | 3.47±0.4 | <LOQ | <LOQ | 39.40±6.2 | 11.73±1.9 | <LOD | <LOD | <LOD | <LOD |
| Mullet | Tagus Estuary | <LOD | <LOD | <LOD | <LOD | 1.59±0.5 | 0.37±0.1 | 2.45±0.5 | 0.58±0.1 | 98.44±10.5 | 23.32±2.5 | <LOD | <LOD | <LOD | <LOD |
| Mullet | Tagus Estuary | <LOD | <LOD | <LOD | <LOD | 3.30±0.9 | 0.78±0.2 | <LOQ | <LOQ | 86.06±2.6 | 20.39±0.6 | <LOD | <LOD | <LOD | <LOD |
| Mussel | Ebro Delta | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 3.18±1.3 | 0.44±0.2 | <LOD | <LOD | 2.59±1.1 | 0.38±0.2 |
| Clam | Ebro Delta | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 7.07±2.2 | 1.37±0.4 | <LOD | <LOD | 1.48±0.6 | 0.28±0.1 |
| L. Digitata | Norwegian fish farm | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| S. Latissima | Norwegian fish farm | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| (- not meseaured) | **LOD** | 0.04-0.10 | | 0.09-0.15 | | 0.03-0.17 | | 0.13-0.25 | | 0.02-0.45 | | 0.09-0.50 | | 0.35-0.50 | |
| (n.d. not detected; n.q. not quantified) | **LOQ** | 0.11-0.30 | | 0.28-0.45 | | 0.08-0.51 | | 0.30-0.75 | | 0.05-1.35 | | 0.28-1.50 | | 1.06-1.50 | |

(cont Table2).

| Sample Type | Sample Location | Levonorgestrel | | Estrone | | 17β-Estradiol | | Estriol | | 17α-Ethinylestradiol | | Estrone-3-sulfate | | Bisphenol A | | Triclosan | | Methylparaben | | Ethylparaben | | Propylparaben | | Benzylparaben | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 8.73±2.0 | 1.97±0.4 | <LOQ | <LOQ | 1.29±0.4 | 0.29±0.09 | 0.03±0.01 | 0.006±0.00 | 0.47±0.05 | 0.10±0.01 | <LOD | <LOD |
| Mussel | Tagus Estuary | 15.04±1.8 | 3.68±0.4 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 12.49±1.1 | 3.06±0.2 | <LOQ | <LOQ | 4.47±0.3 | 1.09±0.08 | 0.30±0.06 | 0.08±0.01 | 0.89±0.05 | 0.22±0.01 | <LOD | <LOD |
| Mussel | Po Delta | 6.50±1.6 | 1.92±0.4 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 6.30±1.3 | 1.88±0.5 | <LOQ | <LOQ | 11.30±0.7 | 3.37±0.2 | 0.30±0.02 | 0.09±0.01 | 2.80±0.1 | 0.82±0.03 | <LOD | <LOD |
| Mullet | Tagus Estuary | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 9.14±1.7 | 2.16±0.4 | <LOQ | <LOQ | 9.68±0.8 | 2.29±0.2 | 0.36±0.03 | 0.08±0.01 | 1.55±0.08 | 0.37±0.02 | <LOD | <LOD |
| Mullet | Tagus Estuary | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 5.63±0.7 | 1.33±0.1 | <LOQ | <LOQ | 16.40±1.7 | 3.88±0.4 | 0.14±0.02 | 0.03±0.00 | 0.93±0.2 | 0.22±0.04 | <LOD | <LOD |
| Mussel | Ebro Delta | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 1.51±0.2 | 0.23±0.01 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD |
| Clam | Ebro Delta | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 1.77±0.3 | 0.34±0.05 | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD |
| L. Digitata | Norwegian fish farm | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| S. Latissima | Norwegian fish farm | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| (- not meseaured) | **LOD** | 0.33-0.64 | | 0.06-0.35 | | 0.34-3.09 | | 2.0-3.0 | | 0.60-0.81 | | 0.01-0.03 | | 0.003-0.01 | | 0.25-0.30 | | 0.005-0.04 | | 0.004-0.05 | | 0.002-0.01 | | 0.003-0.02 | |
| (n.d. not detected; n.q. not quantified) | **LOQ** | 0.99-1.02 | | 0.18-1.04 | | 1.80-2.44 | | 6.0-9.0 | | 1.80-2.44 | | 0.02-0.09 | | 0.008-0.04 | | 0.75-0.90 | | 0.01-0.12 | | 0.01-0.14 | | 0.005-0.02 | | 0.01-0.06 | |

### 3.4.3 Inorganic Arsenic

Table 3 – Inorganic arsenic content (mg/kg dw and mg/kg ww) obtained in the samples from hotspots.

| Sample Type | Sample Location | iAS | | TAs |
|---|---|---|---|---|
| | | dw | ww | dw |
| Flounder | Western Scheldt | <0.01 | <0.002 | 32 |
| Mussel | Tagus Estuary | 0.31 | 0.086 | 8.8 |
| Mussel | Po Delta | 0.51 | 0.105 | 8.1 |
| Mullet | Tagus Estuary | <0.01 | <0.002 | 1.2 |
| Mullet | Tagus Estuary | <0.01 | <0.002 | 1.4 |
| Mussel | Ebro Delta | 0.38 | | 16 |
| Clam | Ebro Delta | 0.36 | | 23 |
| L. Digitata | Norwegian fish farm | 20 | | 41 |
| S. Latissima | Norwegian fish farm | 0.39 | | 43 |

(- not meseaured)
(n.d. not detected;
n.q. not quantified)

### 3.4.4 Musk fragrances

Table 4- Musk fragrances content (µg/kg dw and ww) obtained in the samples from hotspots. [LOD1 -Determined in Mussel (*Mytilus galloprovincialis*); LOD2-Determined in *Mullus surmuletus*]

| Sample Type | Sample Location | Cashmeran (DPMI) | | Celestolide (ADBI) | | Phantolide (AHMI) | | Traseolide (ATII) | | Galaxolide | | Tonalide (AHTN) | | Musk xylene (MX) | | Musk Moskene (MM) | | Musk Ketone (MK) | | HHCB-Lactone | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | 0.091 | 0.021 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 0.056 | 0.013 | 0.035 | 0.008 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mussel | Tagus Estuary | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | n.d. | n.d. | 0.133 | 0.029 | 0.084 | 0.018 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mussel | Po Delta | <LOQ | <LOQ | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 0.345 | 0.059 | 0.13 | 0.022 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 0.635 | 0.635 |
| Mullet | Tagus Estuary | 0.077 | 0.018 | <LOQ | <LOQ | n.d. | n.d. | n.d. | n.d. | 0.109 | 0.026 | 0.057 | 0.014 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mullet | Tagus Estuary | 0.061 | 0.014 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 0.117 | 0.027 | 0.036 | 0.008 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mussel | Ebro Delta | <LOQ | <LOQ | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 0.087 | 0.012 | 0.07 | 0.01 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Clam | Ebro Delta | <LOQ | <LOQ | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 0.33 | 0.064 | <LOQ | <LOQ | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| L. Digitata | Norwegian fish farm | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | <LOQ | <LOQ | <LOQ | <LOQ | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | <LOQ | <LOQ |
| S. Latissima | Norwegian fish farm | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 0.031 | | <LOQ | <LOQ | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | <LOQ | <LOQ |
| (- not meseaured) | **LOD1** | 0.01 | | 0.02 | | 0.05 | | 0.02 | | 0.01 | | 0.01 | | 0.1 | | 0.1 | | 0.1 | | 0.05 | |
| (n.d. not detected; | **LOD2** | 0.01 | | 0.005 | | 0.005 | | 0.01 | | 0.005 | | 0.005 | | 0.1 | | 0.1 | | 0.1 | | 0.01 | |
| n.q. not quantified) | | | | | | | | | | | | | | | | | | | | | |

### 3.4.5. Pharmaceuticals (PhACs)

Table 5- PhACs content (µg/kg dw and ww) obtained in samples from hotspots.

| Sample Type | Sample Location | Atenolol | | Carazolol | | Metroprolol | | Nadolol | | Propanolol | | Sotalol | | Carbamazepine | | EpoxyCBZ | | HydroxyCBZ | | Citalopram | | Diazepam | | Lorazepam | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD |
| Mussel | Tagus Estuary | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD |
| Mussel | Po Delta | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD |
| Mullet | Tagus Estuary | - | - | - | - | - | - | - | - | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | - | - | - | - |
| Mullet | Tagus Estuary | - | - | - | - | - | - | - | - | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 20.59±0.20 | 6.13±0.06 | - | - | - | - |
| Mussel | Ebro Delta | - | - | - | - | - | - | - | - | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | - | - | - | - |
| Clam | Ebro Delta | - | - | - | - | - | - | - | - | - | - | - | - | <LOQ | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOQ | <LOQ | - | - | - | - |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (- not meseaured) | **LOD** | 0.05-0.12 | | 0.03-0.09 | | 0.18-0.36 | | 0.03-0.13 | | 0.09-0.36 | | 0.07-0.26 | | 0.01-0.08 | | 0.09-0.19 | | 0.05-0.17 | | 0.05-0.12 | | 0.08-0.12 | | 0.42-0.77 | |
| (n.d. not detected; | **LOQ** | 0.17-0.41 | | 0.10-0.31 | | 0.60-1.19 | | 0.10-0.42 | | 0.29-1.21 | | 0.24-0.88 | | 0.04-0.25 | | 0.30-0.62 | | 0.17-0.57 | | 0.16-0.41 | | 0.25-0.41 | | 1.42-2.58 | |
| n.q. not quantified) | | | | | | | | | | | | | | | | | | | | | | | | | |

| Sample Type | Sample Location | Sertraline | | Venlanfaxine | | Clopidrogel | | Codeine | | Diclofenac | | Levamisole | | Salbutamol | | Hydrochloro-thiazide | | Ronidazole | | Metronidazole | | Dimetridazole | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | - | - | - | - | - | - |
| Mussel | Tagus Estuary | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | - | - | - | - | - | - |
| Mussel | Po Delta | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | - | - | - | - | - | - |
| Mullet | Tagus Estuary | - | - | 7.72±1.5 | 1.89±0.3 | - | - | <LOD | <LOD | - | - | - | - | - | - | - | - | <LOD | <LOD | <LOD | <LOD | 7.73±2.5 | 1.89±0.6 |
| Mullet | Tagus Estuary | - | - | 36.09±4.0 | 10.74±1.2 | - | - | <LOD | <LOD | - | - | - | - | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mussel | Ebro Delta | - | - | 2.71 ± 0.2 | 0.37 ± 0.02 | - | - | <LOD | <LOD | - | - | - | - | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Clam | Ebro Delta | - | - | 2.13 ± 1.3 | 0.41 ± 0.2 | - | - | <LOD | <LOD | - | - | - | - | - | - | - | - | 1.01 ± 0.7 | 0.19 ± 0.1 | <LOD | <LOD | <LOD | <LOD |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (- not meseaured) | **LOD** | 0.18-0.98 | | 0.01 | | 0.04-0.26 | | 0-06-0.13 | | 0.19-0.65 | | 0.02-0.29 | | 0.07-0.24 | | 0.05-0.17 | | 0.01-0.10 | | 0.15-0.80 | | 0.05-0.32 | |
| (n.d. not detected; | **LOQ** | 0.61-3.28 | | 0.03-0.04 | | 0.13-0.87 | | 0.18-0.40 | | 0.62-2.16 | | 0.08-0.97 | | 0.25-0.78 | | 0.17-0.57 | | 0.03-0.33 | | 0.50-2.66 | | 0.71-1.07 | |
| n.q. not quantified) | | | | | | | | | | | | | | | | | | | | | | | |

| Sample Type | Sample Location | Sulfamethoxazole | | N-acetyl-sulfamethoxazole | | Azythromycin | | Erythromycin | | O-demethyl-venlafaxine | | Alprazolam | | Phenazone | | Propyphenazone | | Piroxicam | | Azaperone | | Azaperol | | Diltiazem | | Hydrochlorothiazide | | Tamsulosin | | Iopromide | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussel | Tagus Estuary | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussel | Po Delta | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mullet | Tagus Estuary | <LOD | <LOD | <LOD | <LOD | 11.83±0.2 | 2.90±0.04 | <LOD | <LOD | 4.36±0.1 | 1.07±0.02 | <LOD | <LOD | 2.90±0.6 | 0.71±0.1 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 2.98±0.1 | 0.73±0.02 | <LOD | <LOD |
| Mullet | Tagus Estuary | <LOD | <LOD | <LOD | <LOD | 13.30±0.3 | 3.95±0.09 | <LOD | <LOD | 4.86±0.1 | 1.43±0.02 | <LOD | <LOD | 1.35±0.7 | 0.40±0.2 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 3.03±0.02 | 0.90±0.00 | <LOD | <LOD |
| Mussel | Ebro Delta | <LOD | <LOD | <LOD | <LOD | 2.91 ± 0.2 | 0.40 ± 0.02 | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD |
| Clam | Ebro Delta | <LOQ | <LOQ | <LOD | <LOD | 1.28 ± 0.1 | 0.25± 0.01 | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (- not meseaured) | **LOD** | 0.01-0.03 | | 0.02-0.06 | | 0.01 | | 0.01-1.11 | | 0.02-0.06 | | 0.01-0.02 | | 0.02 | | 0.05-0.10 | | 0.01-0.04 | | 0.03-0.06 | | 0.01-0.67 | | 0.02-0.03 | | 0.01-0.03 | | 0.02 | | 0.03-0.12 | |
| (n.d. not detected; | **LOQ** | 0.02-0.09 | | 0.06-0.18 | | 0.02-0.03 | | 0.04-3.70 | | 0.07-0.18 | | 0.03-0.08 | | 0.06-0.08 | | 0.17-0.32 | | 0.02-0.15 | | 0.11-0.20 | | 0.02-2.23 | | 0.06-0.10 | | 0.03-0.,09 | | 0.05-0.07 | | 0.10-0.39 | |
| n.q. not quantified) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

### 3.4.6. Perfluorinated substances (PFCs)

Table 6- PFCs content (µg/kg dw and ww) obtained in samples from hotspots.

| Sample Type | Sample Location | PFBA | | PFPA | | PFHxA | | PFHpA | | PFOA | | PFNA | | PFDcA | | PFUnA | | PFDoA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | <1.7 | <1.7 | <1.0 | <1.0 | <0.09 | <0.09 | <1.0 | <1.0 | 0.7 | 0.2 | 11 | 2.4 | 7.1 | 1.6 | 37 | 8.3 | 5.6 | 1.3 |
| Mussel | Tagus Estuary | <2.0 | <2.0 | <1.1 | <1.1 | <0.1 | <0.1 | <1.1 | <1.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <1.1 | <1.1 |
| Mussel | Po Delta | <10 | <10 | <5.7 | <5.7 | <0.5 | <0.5 | <5.7 | <5.7 | 1.2 | 0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5.7 | <5.7 |
| Mullet | Tagus Estuary | <1.3 | <1.3 | <0.8 | <0.8 | <0.07 | <0.07 | <0.8 | <0.8 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | <0.07 | 2.7 | 0.6 | <0.8 | <0.8 |
| Mullet | Tagus Estuary | <1.7 | <1.7 | <0.9 | <0.9 | <0.08 | <0.08 | <0.9 | <0.9 | 0.8 | 0.2 | <0.08 | <0.08 | 2.9 | 0.7 | 1.9 | 0.5 | <0.9 | <0.9 |
| Mussel | Ebro Delta | <2.3 | <2.3 | <1.3 | <1.3 | <0.1 | <0.1 | <1.3 | <1.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.5 | 0.07 |
| Clam | Ebro Delta | <2.5 | <2.5 | <1.4 | <1.4 | <0.1 | <0.1 | <1.4 | <1.4 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.3 | 0.06 |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

(- not meseaured)
(n.d. not detected;
n.q. not quantified)

(cont. Table 6)

| Sample Type | Sample Location | PFTrA | | *PFTeA** | | PFBS | | PFHxS | | PFHpS | | PFOS | | PFDS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Flounder | Western Scheldt | 28 | 6.3 | *14* | *3.1* | <0.7 | <0.7 | 2.8 | 0.6 | <0.7 | <0.7 | 110 | 24 | <0.7 | <0.7 |
| Mussel | Tagus Estuary | <1.1 | <1.1 | *<1.1* | *<1.1* | <0.8 | <0.8 | <0.8 | <0.8 | <0.8 | <0.8 | <0.09 | <0.09 | <0.8 | <0.8 |
| Mussel | Po Delta | <5.7 | <5.7 | *9.1* | *1.6* | <3.8 | <3.8 | <4.0 | <4.0 | <4.1 | <4.1 | <0.5 | <0.5 | <4.1 | <4.1 |
| Mullet | Tagus Estuary | <0.8 | <0.8 | *4.2* | *1* | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 14 | 3.3 | <0.5 | <0.5 |
| Mullet | Tagus Estuary | <0.9 | <0.9 | *<0.9* | *<0.9* | <0.6 | <0.6 | <0.7 | <0.7 | <0.7 | <0.7 | 18 | 4.4 | <0.7 | <0.7 |
| Mussel | Ebro Delta | <1.3 | <1.3 | *1.4* | *0.2* | <0.9 | <0.9 | <0.9 | <0.9 | <0.9 | <0.9 | <0.1 | <0.1 | <1.0 | <1.0 |
| Clam | Ebro Delta | <1.4 | <1.4 | *<1.4* | *<1.4* | <0.9 | <0.9 | <1.0 | <1.0 | <1.0 | <1.0 | 8.4 | 1.6 | <1.0 | <1.0 |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

(- not meseaured)
(n.d. not detected;
n.q. not quantified)

### 3.4.7. Polycyclic aromatic hydrocarbons (PAHs)

Table 7 - PFCs content (µg/kg ww) obtained in samples from hotspots.

| Sample Type | Sample Location | Acenaphtylene ww | Acenaphtene ww | Fluorene ww | Phenanthrene ww | Anthracene ww | Fluoranthene ww | Pyrene ww | Benzo(a)-anthracene ww | Chrysene ww | Benzo(b)fluor-anthene ww | Benzo(k)fluor-anthene ww | Benzo(j)fluoranthene ww | Benzo(e)-pyrene ww | Benzo(a)-pyrene ww | Indeno(123cd)-pyrene ww | Dibenzo(ah)-anthracene ww | Benzo(ghi)-perylene ww |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flounder | Western Scheldt | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussel | Tagus Estuary | <0.17 | 0.66 | <0.17 | 4.15 | 0.26 | 4.11 | 4.17 | 1.65 | 1.97 | 1.45 | 0.81 | 0.88 | 1.75 | 0.98 | 0.6 | <0.17 | 0.8 |
| Mussel | Po Delta | <0.13 | <0.13 | 0.35 | 1.25 | <0.13 | 1.26 | 1.68 | 0.52 | 0.67 | 0.36 | 0.19 | 0.14 | 0.32 | 0.31 | <0.13 | <0.13 | <0.13 |
| Mullet | Tagus Estuary | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mullet | Tagus Estuary | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussel | Ebro Delta | <0.13 | 0.43 | 0.3 | 5.61 | 0.14 | 3.78 | 1.9 | 0.67 | 1.72 | 0.32 | 0.18 | 0.2 | 0.21 | 0.25 | <0.13 | <0.13 | <0.13 |
| Clam | Ebro Delta | <0.15 | <0.15 | 1.03 | 0.63 | <0.15 | 0.36 | 0.34 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

(- not meseaured)

### 3.4.8. UV-filters

Table 8 - UV-filters content (µg/kg dw) obtained in samples from hotspots.

(EHS-2-Ethylhexyl salicylate; HS- 3,3,5-Trimethylcyclohexylsalicylate; IMC - Isoamyl-4 methoxycinnamate; 4-MBC- 3-(4-Methylbenzylidene)camphor; BP3- benzophenone 3; BP1- benzophenone 1; DHMB - 2,2′-Dihydroxy-4,4′-dimethoxybenzophenone; EPABA- 2-Ethylhexyl 4-(dimethylamino)benzoate; THB -2,3,4-Trihydroxybenzophenone; EHMC- 2-Ethylhexyl 4-methoxycinnamate; OC –Octocrylene; DBENZO -Hexyl 2-[4-(diethylamino)-2-hydroxybenzoyl]benzoate

| Sample Type | Sample Location | EHS dw | HS dw | IMC dw | 4-MBC dw | BP3 dw | DHB dw | DHMB dw | EPABA dw | OMC dw | OC dw | THB dw | DBENZO dw |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flounder | Western Scheldt | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mussel | Tagus Estuary | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mussel | Po Delta | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mullet | Tagus Estuary | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mullet | Tagus Estuary | n.d. | n.d. | n.d. | n.d. | 2<L<5 | n.d. | 6<L<20 | n.d. | n.d. | n.d. | n.d. | n.d. |
| Mussel | Ebro Delta | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 2<L<5 | 3<L<10 | n.d. | n.d. |
| Clam | Ebro Delta | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 2<L<5 | 3<L<10 | n.d. | n.d. |
| L. Digitata | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - |
| S. Latissima | Norwegian fish farm | - | - | - | - | - | - | - | - | - | - | - | - |
| (- not meseaured) | **LOD** | 6 | 2 | 6 | 6 | 2 | 3 | 6 | 6 | 2 | 3 | 23 | 30 |
| (n.d. not detected; n.q. not quantified) | **LOQ** | 20 | 5 | 20 | 20 | 5 | 10 | 20 | 20 | 5 | 10 | 75 | 100 |

### 3.4.9. Total and organic mercury

Table 9 - Total and organic mercury content (mg/kg) obtained in samples from hotspots.

| Sample Type | Sample Location | Total Hg | | Methyl-Hg | | % Methyl-Hg |
|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | |
| Flounder | Western Scheldt | 0.86 | 0.20 ± 0.01 | 0.68 ± 0.03 | 0.15 ± 0.01 | 79 |
| Mussel | Tagus Estuary | 0.13 | 0.03 ± 0.00 | 0.03 ± 0.00 | 0.01 ± 0.00 | 23.8 |
| Mussel | Po Delta | 0.07 | 0.02 ± 0.00 | 0.03 ± 0.01 | 0.01 ± 0.00 | 40.3 |
| Mullet | Tagus Estuary | 0.12 | 0.03 ± 0.00 | 0.08 ± 0.01 | 0.02 ± 0.00 | 70.5 |
| Mullet | Tagus Estuary | 0.11 | 0.03 ± 0.00 | 0.08 ± 0.00 | 0.02 ± 0.00 | 71.2 |
| Mussel | Ebro Delta | 0.22 | 0.03 ± 0.00 | 0.08 ± 0.00 | 0.01 ± 0.00 | 36.3 |
| Clam | Ebro Delta | 0.1 | 0.02 ± 0.00 | 0.02 ± 0.00 | 0.00 ± 0.00 | 16.2 |
| L. Digitata | Norwegian fish farm | 0.02 | | <LOD | | - |
| S. Latissima | Norwegian fish farm | 0.03 | | <LOD | | - |

(- not meseaured)
(n.d. not detected; n.q. not quantified)

### 3.4.11. Microplastics

Table 10 - Results of microplastic assessment in hotspot (*Mytillus galloprovincialis*). Values represent the mean number of microplastics in subsamples (fibres and particles separately) detected per gram of tissue (w.w.). Values in parentheses represent the standard deviation of subsamples. nm: not measured.

| Species | Location | Country | Average Size | Average weight | Method | N | Fibres | Particles | Total microplastics |
|---|---|---|---|---|---|---|---|---|---|
| *M. galloprovincialis* | Tagus Estuary | Portugal | 4.8 ± 0.5 cm | 3.5 ± 0.7 g | Acid Mix | 5 | 0.29 (0.36) | 0.06 (0.12) | 0.34 (0.33) |
| | | | | | Nitric Acid | 12 | 0.00 (0.00) | 0.08 (0.09) | 0.08 (0.09) |
| *M. galloprovincialis* | Po Estuary | Italy | 4.9 ± 0.5 cm | 5.3 ± 1.4 g | Acid Mix | 5 | 0.00 (0.00) | 0.05 (0.11) | 0.05 (0.11) |
| | | | | | Nitric Acid | 12 | 0.00 (0.00) | 0.16 (0.11) | 0.16 (0.11) |
| *M. galloprovincialis* | Ebro Delta | Spain | 5.0 ± 0.3 cm | 3.7 ± 1.1 g | Acid Mix | 5 | 0.15 (0.33) | 0.00 (0.00) | 0.15 (0.33) |
| | | | | | Nitric Acid | 12 | 0.00 (0.00) | 0.11 (0.12) | 0.11 (0.12) |

From the data of hotspots it is possible to highlight the following results:

**Brominated flame retardants**: The highest levels of ∑PBDEs were detected in mussels followed by mullet, both from Tagus estuary. DEC 602 was the only halogenated norbornenes detected among the four compounds analysed (DEC 602, DEC603, *syn*-DP, *anti*-DP), the highest level was found in mussels from Tagus estuary. The highest ∑MeO-PBDEs level were detected in mussels followed by mullet.

**Endocrine disruptors:** EDCs were not detected in macroalgae samples. In bivalves, the analysis revealed the presence of 10 compounds out of 19 included in the analytical method. The EDCs present in bivalve samples were caffeine, tris(2-chloroethyl) phosphate (TCEP), tris(2-butoxyethyl)phosphate (TBEP), progesterone, levonorgestrel, bisphenol A, triclosan, methylparaben, ethylparaben, and propylparaben. Regarding the analysis of EDCs in fish samples a similar pattern as in bivalves was observed. The same compounds were detected with the exception of the two hormones (progesterone and levonorgestrel). Concentrations ranged between the limit of quantification and 98.4 ng/g dw for TBEP in mullet from Tagus estuary (Álvarez-Muñoz et al. 2015b).

**Inorganic and total arsenic**: The highest contents of Total As were found in macroalgae species, with similar values of 41 and 43 mg/kg in the two species. However, the inorganic As concentration varied, with low content in *S. latissima* (0.39 mg/kg) and relatively high in *Laminaria dIgitata* (20 mg/kg). Inorganic As levels in *S. latissima* were statistically higher than levels in the other analysed seafood samples, whereas *L. digitata* was only significantly different from mullet and mussels from all locations. Total As widely varied within the three fish samples analysed by more than one order of magnitude (from 1.2 to 32 mg/ kg), with the highest level registered in flounder, whereas in bivalves the highest values were observed in specimens from Ebro delta (around 16 mg/kg in mussels and 23 mg/kg in clams) (Maulvault et al., 2015). In fish samples, inorganic arsenic was < LOQ in all cases, whereas for mussels and clams detectable levels in the range 0.31-0.51 mg/kg were found.

**Musks**: The banned nitro musks were not detected in any sample. The polycyclic musks HHCB and AHTN were quantified in most seafood species collected in hotspots. The higher levels of HHCB were registered in mussels from Po estuary and clams from Ebro Delta, with respective values of 34.52 and 33.10 ng/g (d.w.). Lower values of HHCB were quantified in mussels in samples from Tagus estuary and Ebro delta. AHTN was similarly distributed in the same species, but at lower concentrations. One sample of algae (*L. digitata*) showed levels of HHCB up to 3.12 ng/g (d.w.). DPMI was detected in all samples with the exception of macroalgae, while in mussels and clams DPMI was below the MQL of 2.5 ng/g (d.w.). In contrast, in flounder and mullet DPMI was found at concentrations ranging between 6.10 and 9.11 ng/g (d.w.). A higher concentration of HHCB (34.52 ng/g d.w.), was registered in mussels from Po estuary (Cunha et al. 2015).

**Perfluorinated substances**: PFCs were detected in all fish samples from the Western Scheldt and Tagus estuary, as well as in mussel from the Po delta, and in one of the shellfish samples from the Ebro delta. Overall, PFOS was the predominant PFAS detected.

**Pharmaceuticals**: The analysis of macroalgae samples collected in Norway revealed the presence of 4 PhACs. Metroprolol, diazepam and azithromycin were detected in both species (*S. latissimi* and *L. digitata*), while propranolol was only found in *L. digitata*. Nonetheless, the levels of the 4 compounds were below the method quantification limit in both species. The analysis of bivalve samples revealed the occurrence of 16 PhACs. In this case, only two samples were detected at

concentrations below the method quantification limit (sulfamethoxazole and hydrochlorothiazide). The remaining 14 compounds (ronidazole, dimetridazole, azithromycin, velanfaxine, o-demethyl-velanfaxine, carbamazepine, 10,11-epoxycarbamazepine, 2-hydroxycarbamazepine, citalopram, alprazolam, phenazone, azaperone, diltiazem, and tamsulosin) were quantifiable and the concentrations ranged between 0.8 ng/g dw for alprazolam in oysters from Ebro delta, and 36.1 ng/g dw of velanfaxine in mussels from Po delta. Concerning the analysis of PhACs in fish samples 10 out of 20 compounds included in the analytical methodology were detected in samples of mullet (*Liza aurata*) and flounder (*Plathychthys flesus*) collected from Tagus and Scheldt estuaries, respectively. The compounds were all found at concentrations below the method quantification limit in at least one of the locations monitored. These compounds were β-blockers like atenolol, carazolol, metroprolol, propranolol, and sotalol, psychiatric drugs such as carbamazepine, citalopram and venlafaxine, the anti-inflammatory diclofenac, and the diuretic hydrochlorothiazide (Álvarez-Muñoz et al. 2015b).

**Polycyclic aromatic hydrocarbons**: PAHs were detected in all shellfish samples. In clams from Ebro estuary, only 4 PAHs (fluorene, phenanthrene, fluoranthene and pyrene) were above the limit of detection (<0.15 ng/g ww), while in mussels from the same location only 4 PAHs (acenaphthylene, indeno(123cd)pyrene, dibenzo(ah)anthracene and benzo(ghi)perylene) were below the limit of detection (<0.13 ng/g ww). The sum of the concentrations of the 15 EPA PAHs in mussels was lower in the sample from Po estuary and higher in samples from Tagus estuary with approximate 3-fold difference. The PAH levels in mussels from the Ebro delta were intermediate (6.59, 21.61 and 15.30 ng/g ww respectively). A similar result was obtained for the sum of the 4 PAH used for legislation criteria (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene) (6.05, 1.86 and 2.96 ng/g ww respectively). Phenanthrene, anthracene and pyrene accounted for over 50% of the total PAHs in all samples.

**UV-filters**: Four (BP3, DHMB, OMC, OC) of the 12 UV-filters studied were detected in three samples (mussels, mullets, and clams), but all below the method limit of quantification. The compounds EHMC and OC showed a high frequency of detection, reaching 30% (Cunha et al., 2015).

**Total and organic mercury**: Flounder registered the highest Hg level (0.86mg/kg), being mostly in the organic form (79% MeHg), whereas the lowest values (below detection limit) were observed in both macroalgae species. Even though Hg levels are usually higher in fish species than in bivalves, the levels obtained in mussels from Ebro delta were similar to those found in mullet from Tagus estuary, and significantly higher than those found in other bivalves. The lower THg levels found in mullet specimens are likely related to the detritivorous behaviour of this species, which feeds mostly on algae, sediments and grazing, unlike the predator and carnivorous flounder (Maulvault et al., 2015).

**Microplastics**: The acid extraction of microplastics from mussels was subjected to background contamination by airborne microscopic synthetic fibres. Blank samples of the Acid mix Method were completely free of plastic particles, while on average 1 fibre per blank was observed. Blue and black fibres were the predominant fibres (82.6%) that appeared in blank samples of the Acid mix Method. In contrast, blanks of the Nitric acid Method contained on average 1.4 fibres per blank, being only black, blue and red fibres. The blank results of both methods are consistent with contamination in analyses described by De Witte et al. (2014) and Devriese et al. (2015). Therefore, results were

corrected for blank contamination by omitting particles or fibres matching the characteristics of fragments found in blanks.

When comparing the microplastic contamination in hotspot mussels using both extraction methods, it is striking that no fibres (with another colour than black, blue and red) were detected with the Nitric acid Method, while synthetic fibres are the dominant class of microplastics in mussels from Tagus and Ebro estuary observed via the Acid mix Method (Table 1). According to the Acid mix Method, concentrations of 0.29 fibres/g w.w. were observed for Tagus estuary mussels and 0.15 fibres/g w.w. for Ebro estuary organisms. An absolute difference between the two methods was thus detected based on fibre assessment. Concerning plastic particles, a discrepancy between both methods was observed as well. Average particle concentrations were higher than zero in all samples, except for Ebro estuary sample analysed with the Acid mix Method. The highest amount of particles was found in Po estuary mussels with 0.16 particles.g-1 w.w. (Nitric acid Method). Comparing both methods, the application of the Acid mix Method resulted in lower concentrations (Table 1; Figure 2) with an average of 0.04 ± 0.03 particles./g w.w. for the Acid mix Method and 0.12 ± 0.04 particles/g w.w. for the Nitric acid Method. In conclusion, when analysing the absolute results, we can state that the Acid mix Method detects a higher fibre content and a lower particle content than the Nitric acid Method. Although the different methodologies that lead to differences in the absolute number of particles/fibres, we can state that level of particles/fibres in mussels from the hotspot areas is very low.

The main conclusions can be summarized as follows: i) the levels of the studied regulated contaminants in marine biota were below regulatory food safety limits in all hotspot locations. This indicates that levels in marine biota from open seas, which are expected to be lower, will also meet these criteria; ii) the concentrations and frequencies of detection of contaminants in the analysed hotspot samples allowed to list a number of priority compounds that will be monitored in the commercial samples.

# 3.5 Results in commercial samples from Round I

## 3.5.1 Brominated flame retardants (BFRs)

Table 11- BFRs content (µg/kg dw and µg/kg ww) obtained in raw samples from Round I.

| Species | Sampling site | BDE28 | | BDE47 | | BDE100 | | BDE99 | | BDE154 | | BDE153 | | BDE209 | | ∑PBDEs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Monkfish Small | Portugal | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Monkfish Large | Portugal | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Canned tuna | Portugal | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Canned sardine | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cod Pacific | Pacific | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Pacific hake Small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake Large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific Tuna Small | Mediterranean | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Pacific Tuna Large | Mediterranean | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Nile Perch | Lake Victoria | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Farmed Pangasius | Vietnam | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Farmed Shrimp (vannamei) | Asia | <LOD | <0.0013 | <LOD | <0.0019 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **n. d.** | |
| Mussels | Spain | <LOD | <0.0013 | 0.13 | 0.03 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **0.13** | **0.02911** |
| Octopus Small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus Large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Spain | <LOD | <0.0013 | 0.86 | 0.27 | 1.10 | 0.35 | 0.76 | 0.24 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **2.72** | **0.86646** |
| Sole large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| sole small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Italy | 0.37 | 0.09 | 2.85 | 0.72 | 3.94 | 1.00 | 3.20 | 0.81 | 2.27 | 0.57 | <LOD | <0.0230 | <LOD | <0.3832 | **12.60** | **3.18553** |
| Farmed seabream | Mediterranean | <LOD | <0.0013 | 0.17 | 0.04 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **0.17** | **0.04077** |
| Mussels | Italy | <LOD | <0.0013 | 1.21 | 0.17 | 1.96 | 0.27 | 3.39 | 0.48 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **6.58** | **0.92061** |
| Plaice Small | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North sea | 0.35 | 0.08 | 3.37 | 0.82 | 5.76 | 1.40 | 3.17 | 0.77 | 3.59 | 0.8718 | <LOD | <0.0230 | <LOD | <0.3832 | **16.20** | **3.9439** |
| Scottish farmed salmon | Netherlands | 0.44 | 0.19 | 2.42 | 1.03 | 2.28 | 0.96 | 1.04 | 0.44 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **6.19** | **2.61754** |
| Mussel | Netherlands | <LOD | <0.0013 | 0.39 | 0.0728 | 0.85 | 0.1603 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **1.24** | **0.23308** |
| Northsea Crab (Brown meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Northsea Crab (White meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Denmark | <LOQ | <0.0044 | 0.62 | 0.22 | 0.50 | 0.17 | 0.58 | 0.20 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **1.71** | **0.5893** |
| Atlantic Cod | North sea | <LOD | <0.0013 | 0.09 | 0.02 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **0.09** | **0.01729** |
| Norwegian farmed salmon | Denmark | <LOQ | <0.0044 | 1.08 | 0.44 | 0.62 | 0.25 | <LOQ | <0.0350 | <LOQ | <0.0511 | <LOD | <0.0230 | <LOD | <0.3832 | **1.70** | **0.69087** |
| Mussel | Denmark | <LOD | <0.0013 | 0.24 | 0.03 | <LOD | <0.0072 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **0.24** | **0.03362** |
| Plaice Small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Channel | <LOD | <0.0013 | 0.92 | 0.30 | 0.28 | 0.09 | <LOD | <0.0105 | <LOD | <0.0153 | <LOD | <0.0230 | <LOD | <0.3832 | **1.20** | **0.38791** |
| French Mussel | France | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Scotland (Sound of kerrera) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Ireland (Cleggan bay) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Ulva lactuca* | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ( - not measured) | **LOD** | 0.005148 | 0.001314 | 0.00757684 | 0.001934 | 0.028241 | 0.007207 | 0.041136 | 0.010498 | 0.060059 | 0.015327 | 0.090089 | 0.022991 | 1.501478 | 0.383185 | | |
| | **LOQ** | 0.01716 | 0.004379 | 0.02525614 | 0.006445 | 0.094137 | 0.024024 | 0.137121 | 0.034994 | 0.200197 | 0.051091 | 0.300296 | 0.076637 | 5.004925 | 1.277282 | | |

(cont Table 11)

| Species | Sampling site | HBB | | PBEB | | DBDPE | | Dec 602 | | Dec 603 | | Dec 604 | | syn-DP | | anti-DP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Monkfish Small | Portugal | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Monkfish Large | Portugal | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Canned tuna | Portugal | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Canned sardine | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cod Pacific | Pacific | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Pacific hake Small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake Large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific Tuna Small | Mediterranean | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Pacific Tuna Large | Mediterranean | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Nile Perch | Lake Victoria | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Farmed Pangasius | Vietnam | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Farmed Shrimp (vannamei) | Asia | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Mussels | Spain | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | 0.02 | 0.005 | <LOD | <0.0003 | <LOD | <0.0003 | 0.08 | 0.02 | <LOD | <0.0001 |
| Octopus Small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus Large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Spain | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOQ | <0.0018 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Sole large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| sole small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Italy | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | 0.01 | 0.005 | 0.15 | 0.05 | <LOD | <0.0003 | <LOD | <0.0002 | 0.06 | 0.02 |
| Farmed seabream | Mediterranean | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Mussels | Italy | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | 0.01 | 0.002 | <LOD | <0.0003 | <LOD | <0.0003 | 0.07 | 0.01 | <LOD | <0.0001 |
| Plaice Small | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North sea | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | 0.01 | 0.003 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Scottish farmed salmon | Netherlands | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOQ | <0.0018 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Mussel | Netherlands | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | <LOD | <0.0003 | <LOD | <0.0003 | <LOD | <0.0002 | 0.08 | 0.0159 |
| Northsea Crab (Brown meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Northsea Crab (White meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Denmark | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOQ | 0.007 | <LOD | <0.0003 | <LOD | <0.0003 | 2.45 | 0.85 | 7.47 | 2.58 |
| Atlantic Cod | North sea | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | 0.16 | 0.03 | <LOD | <0.0003 | 1.08 | 0.20 | 2.40 | 0.44 |
| Norwegian farmed salmon | Denmark | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | 0.03 | 0.013 | 0.38 | 0.15 | <LOD | <0.0003 | <LOD | <0.0002 | <LOD | <0.0001 |
| Mussel | Denmark | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | <LOD | <0.0008 | 0.71 | 0.10 | 0.01 | 0.00 | 4.66 | 0.64 | 11.67 | 1.6 |
| Plaice Small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Channel | <LOD | <0.0072 | <LOD | <0.0066 | <LOD | <0.3483 | 0.03 | 0.009 | <LOD | <0.0003 | <LOD | <0.0003 | 6.12 | 1.98 | 17.09 | 5.5 |
| French Mussel | France | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | ɔtland (Sound of kerre | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Ireland (Cleggan bay) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Ulva lactuca* | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ( - not measured) | | 0.02833 | 0.00723 | 0.02574 | 0.006569 | 1.36498 | 0.3483496 | 0.002966 | 0.000757 | 0.001031 | 0.000263 | 0.000989 | 0.000263 | 0.000777 | 0.000198 | 0.000325 | 8.29E-05 |
| | | 0.094433 | 0.0241 | 0.085799 | 0.021896 | 4.549932 | 1.1611653 | 0.009888 | 0.001751 | 0.00339 | 0.000865 | 0.00339 | 0.000865 | 0.002543 | 0.000649 | 0.001088 | 0.000278 |

.(cont. Table 11)

| Species | Sampling site | 2-MBDE-68 | | 6-MBDE-47 | | 5-MBDE-47 | | 4-MBDE-99 | | 5-MBDE-100 | | 4-MBDE-100 | | 5-MBDE-99 | | 4-MBDE-101 | | ∑MeO-PBDEs | | α-HBCD | | β-HBCD | | γ-HBCD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <LOD | <0.1277 | <LOD | <0.0153 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **n. d.** | | <LOD | <0.0036 | <LOD | <0.0361 | <LOQ | <0.0108 |
| Monkfish Small | Portugal | <LOD | <0.0383 | <LOD | <0.0153 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **n. d.** | | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Monkfish Large | Portugal | <LOD | <0.0383 | <LOQ | <0.0511 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **n. q.** | | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Canned tuna | Portugal | <LOQ | 0.34 | 0.78 | 0.29 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.78** | **0.6298** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Canned sardine | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cod Pacific | Pacific | <LOD | <0.0383 | <LOD | <0.0153 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **n. d.** | | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Pacific hake Small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake Large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific Tuna Small | Mediterranean | 2.14 | 0.63 | 1.32 | 0.39 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **3.46** | **1.0241** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Pacific Tuna Large | Mediterranean | 3.80 | 0.84 | 2.22 | 0.49 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **6.03** | **1.3256** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Nile Perch | Lake Victoria | <LOQ | <0.1277 | <LOD | <0.0153 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **n. q.** | | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Farmed Pangasius | Vietnam | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Farmed Shrimp (vannamei) | Asia | <LOD | <0.0383 | <LOD | <0.0153 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **n. d.** | | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Mussels | Spain | <LOD | <0.0383 | 0.50 | 0.11 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.50** | **0.1084** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Octopus Small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus Large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Spain | <LOD | <0.0383 | 1.07 | 0.34 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **1.07** | **0.3391** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Sole large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| sole small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Italy | <LOD | <0.0383 | 0.52 | 0.13 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.52** | **0.1303** | 2.90 | 5.37 | <LOD | <0.0361 | <LOD | <0.0036 |
| Farmed seabream | Mediterranean | <LOD | <0.0383 | 0.13 | 0.03 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.13** | **0.0324** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Mussels | Italy | <LOD | <0.0383 | 0.23 | 0.03 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.23** | **0.0318** | 5.74 | 7.36 | <LOD | <0.0361 | <LOQ | <0.0108 |
| Plaice Small | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North sea | <LOD | <0.0383 | 1.77 | 0.43 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **1.77** | **0.4292** | 20.85 | 58.7225 | <LOD | <0.0361 | <LOD | <0.0036 |
| Scottish farmed salmon | Netherlands | <LOD | <0.0383 | 1.78 | 0.75 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **1.78** | **0.752** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Mussel | Netherlands | <LOQ | <0.1277 | 0.34 | 0.06 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.34** | **0.0645** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Northsea Crab (Brown meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Northsea Crab (White meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Denmark | <LOD | 0.08 | 7.03 | 2.43 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **7.03** | **2.5106** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Atlantic Cod | North sea | <LOD | <0.0383 | 0.11 | 0.02 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.11** | **0.0208** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Norwegian farmed salmon | Denmark | <LOD | <0.0383 | 5.48 | 2.23 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **5.48** | **2.2294** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| Mussel | Denmark | <LOD | <0.0383 | 0.55 | 0.08 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **0.55** | **0.0759** | 0.28 | 15.77 | <LOD | <0.0361 | <LOD | <0.0036 |
| Plaice Small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Channel | 1.20 | 0.39 | 10.43 | 3.4 | <LOD | <0.0153 | <LOD | <0.0766 | <LOD | <0.0718 | <LOD | <0.0793 | <LOD | <0.1352 | <LOD | <0.1150 | **11.60** | **3.7652** | <LOD | <0.0036 | <LOD | <0.0361 | <LOD | <0.0036 |
| French Mussel | France | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | ıtland (Sound of kerre | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Ireland (Cleggan bay) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ulva lactuca | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ( - not measured) | | 0.150148 | 0.038318 | 0.060059 | 0.015327 | 0.060059 | 0.015327 | 0.300296 | 0.076637 | 0.281527 | 0.071847 | 0.310651 | 0.07928 | 0.529933 | 0.135242 | 0.450443 | 0.114955 | | | 0.014126 | 0.003605 | 0.141259 | 0.03605 | 0.014126 | 0.003605 |
| | | 0.500493 | 0.127728 | 0.200197 | 0.051091 | 0.200197 | 0.051091 | 1.000985 | 0.255456 | 0.938423 | 0.23949 | 1.035502 | 0.264265 | 1.766444 | 0.450805 | 1.501478 | 0.383185 | | | 0.028252 | 0.00721 | 0.466155 | 0.118965 | 0.042378 | 0.010815 |

### 3.5.2 Endocrine disruptors (ECDs)

Table 12- ECDs content (µg/kgdw) obtained in raw samples from Round I (TBEP- tris-(2-butoxyethyl)-phosphate)

| Species | Sampling site | Triclosan (µg/kg) | | Methylparaben (µg/kg) | | TBEP (µg/kg) | | BPA(µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 36.29 | 14.64 |
| Monkfish Small | Portugal | - | - | - | - | - | - | | |
| Monkfish Large | Portugal | - | - | - | - | - | - | | |
| Canned tuna | Portugal | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 17.17 | 6.73 |
| Canned sardine | Portugal | - | | | | | | | |
| Cod Pacific | Pacific | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <MQL | <MQL |
| Pacific hake Small | South America | - | - | - | - | - | - | | |
| Pacific hake Large | South America | - | - | - | - | - | - | | |
| Atlantic hake Small | South Africa | - | - | - | - | - | - | | |
| Atlantic hake Large | South Africa | - | - | - | - | - | - | | |
| Pacific Tuna Small | Mediterranean | 1.49 | 0.44 | <LOD | <LOD | <LOQ | <LOQ | <MDL | <MDL |
| Pacific Tuna Large | Mediterranean | 1.21 | 0.27 | <LOD | <LOD | <LOQ | <LOQ | <MDL | <MDL |
| Nile Perch | Lake Victoria | 0.77 | 0.17 | <LOD | <LOD | <LOQ | <LOQ | <MQL | <MQL |
| Farmed Pangasius | Vietnam | 3.69 | 0.49 | <LOD | <LOD | <LOQ | <LOQ | 9.16 | 1.22 |
| Farmed Shrimp (vannamei) | Asia | 1.19 | 0.25 | <LOD | <LOD | <LOQ | <LOQ | <MQL | <MQL |
| Mussels | Spain | <LOD | <LOD | 4.4 | 0.95 | <LOQ | <LOQ | <MDL | <MDL |
| Octopus Small | Mediterranean | - | - | - | - | - | - | | |
| Octopus Large | Mediterranean | - | - | - | - | - | - | | |
| Mackerel | Spain | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <MDL | <MDL |
| Sole large | Mediterranean | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <MQL | <MQL |
| sole small | Mediterranean | <LOQ | <LOQ | 2.34 | 0.8 | <LOQ | <LOQ | <MQL | <MQL |
| Mackerel | Italy | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <MDL | <MDL |
| Farmed seabream | Mediterranean | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <MQL | <MQL |
| Mussels | Italy | <LOD | <LOD | 4.8 | 0.67 | <LOQ | <LOQ | <MDL | <MDL |
| Plaice Small | North sea | 142.4 | 27.8 | 1.47 | 0.3 | <LOQ | <LOQ | <MQL | <MQL |
| Plaice Large | North sea | 183.8 | 36 | 1.68 | 0.3 | <LOQ | <LOQ | <MQL | <MQL |
| Mackerel | North sea | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <MDL | <MDL |
| Scottish farmed salmon | Netherlands | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <MQL | <MQL |
| Mussel | Netherlands | 6.5 | 1.2 | 5.9 | 1.1 | <LOQ | <LOQ | <MDL | <MDL |
| Northsea Crab (Brown meat) | Netherlands | - | - | - | - | - | - | | |
| Northsea Crab (White meat) | Netherlands | - | - | - | - | - | - | | |
| Mackerel | Denmark | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <MDL | <MDL |
| Atlantic Cod | North sea | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <MQL | <MQL |
| Norwegian farmed salmon | Denmark | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <MQL | <MQL |
| Mussel | Denmark | <LOD | <LOD | 3.7 | 3.7 | <LOD | <LOD | <MDL | <MDL |
| Plaice Small | Channel | <LOQ | <LOQ | 1.27 | 0.28 | <LOQ | <LOQ | <MQL | <MQL |
| Plaice Large | Channel | <LOQ | <LOQ | 3.87 | 0.84 | <LOQ | <LOQ | <MQL | <MQL |
| Mackerel | Channel | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <MDL | <MDL |
| French Mussel | France | <LOD | <LOD | 3.1 | 0.72 | <LOD | <LOD | <MDL | <MDL |
| (- not measured) | **LOD** | 0.25-0.30 | 0.001-0.01 | 0.005-0.04 | 0.001-0.004 | 0.02-0.45 | 0.001-0.006 | 0.008-0.06 | 0.002-0.01 |
| | **LOQ** | 0.75-0.90 | 0.001-0.03 | 0.01-0.12 | 0.001-0.01 | 0.05-1.35 | 0.001-0.02 | 0.03-0.2 | 0.004-0.05 |

### 3.5.3 Inorganic Arsenic

Table 13 – Inorganic arsenic content (mg/kg dw and mg/kg ww) obtained in raw samples from Round I

| Species | Sampling site | iAs | |
|---|---|---|---|
| | | dw | ww |
| Canned Mackerel | Portugal | <0.01 | <0.002 |
| Monkfish Small | Portugal | <0.01 | <0.002 |
| Monkfish Large | Portugal | <0.01 | <0.002 |
| Canned tuna | Portugal | <0.01 | <0.002 |
| Canned sardine | Portugal | <0.01 | <0.002 |
| Cod Pacific | Pacific | <0.01 | <0.002 |
| Pacific hake Small | South America | <0.01 | <0.002 |
| Pacific hake Large | South America | <0.01 | <0.002 |
| Atlantic hake Small | South Africa | <0.01 | <0.002 |
| Atlantic hake Large | South Africa | <0.01 | <0.002 |
| Pacific Tuna Small | Mediterranean | <0.01 | <0.002 |
| Pacific Tuna Large | Mediterranean | <0.01 | <0.002 |
| Nile Perch | Lake Victoria | <0.01 | <0.002 |
| Farmed Pangasius | Vietnam | <0.01 | <0.002 |
| Farmed Shrimp (vannamei) | Asia | <0.01 | <0.002 |
| Mussels | Spain | 0.10 | 0.03 |
| Octopus Small | Mediterranean | <0.01 | <0.002 |
| Octopus Large | Mediterranean | <0.01 | <0.002 |
| Mackerel | Spain | <0.01 | <0.002 |
| Sole large | Mediterranean | <0.01 | <0.002 |
| Sole small | Mediterranean | <0.01 | <0.002 |
| Mackerel | Italy | <0.01 | <0.002 |
| Farmed seabream | Mediterranean | <0.01 | <0.002 |
| Mussels | Italy | 0.06 | 0.01 |
| Plaice Small | North sea | <0.01 | <0.002 |
| Plaice Large | North sea | <0.01 | <0.002 |
| Mackerel | North sea | <0.01 | <0.002 |
| Scottish farmed salmon | Netherlands | <0.01 | <0.002 |
| Mussel | Netherlands | 0.75 | 0.14 |
| Northsea Crab (Brown meat) | Netherlands | 0.05 | 0.02 |
| Northsea Crab (White meat) | Netherlands | <0.01 | <0.002 |
| Mackerel | Denmark | <0.01 | <0.003 |
| Atlantic Cod | North sea | <0.01 | <0.002 |
| Norwegian farmed salmon | Denmark | <0.01 | <0.004 |
| Mussel | Denmark | 0.13 | 0.02 |
| Plaice Small | Channel | <0.01 | <0.002 |
| Plaice Large | Channel | <0.01 | <0.002 |
| Mackerel | Channel | <0.01 | <0.002 |
| French Mussel | France | 0.12 | 0.03 |
| S. latissima | Netherlands | 0.17 | <0.002 |
| S. latissima | Scotland (Sound of kerrera) | 0.47 | <0.002 |
| S. latissima | Ireland (Cleggan bay) | 0.09 | <0.002 |
| S. latissima | Netherlands | 0.13 | <0.002 |
| S. latissima | Netherlands | 0.48 | <0.002 |
| *Ulva lactuca* | Netherlands | 0.03 | <0.002 |
| | **LOD** | **<0.01** | **<0.002** |
| | **LOQ** | **<0.03** | **<0.006** |

### 3.5.4 Musk fragrances

Table 14 - Musk fragrances content (µg/kg dw) obtained in raw samples from Round I.

(DPMI- 6,7-dihydro-1,1,2,3,3-pentamethyl-4(5H)-indanone; ADBI- 4-acetyl-1,1-dimethyl-6-tert-butylindane; AHMI-6-acetyl-1,1,2,3,3,5-hexamethylindane; ATII- 5-acetyl-1,1,2,6-tetramethyl-3-isopropylindane; HHCB-1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-(g)-2-benzopyran); AHTN- 7-acetyl-1,1,3,4,4,6-hexamethyl-1,2,3,4-tetrahydronaphthalene; HHCB-lactone- 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethylcyclopenta-(g)-2-benzopyran-1-one; MX -2,4,6-trinitro-1,3-dimethyl-5-tert-butylbenzene; MM-1,1,3,3,5-pentamethyl-4,6-dinitroindane); ); MX 1-(4-tert-butyl-2,6-dimethyl-3,5-dinitrophenyl)ethanone

| Species | Sampling site | DPMI (µg/kg) | | ADBI (µg/kg) | | AHMI (µg/kg) | | ATII (µg/kg) | | HHCB (µg/kg) | | AHTN (µg/kg) | | MX (µg/kg) | | MM (µg/kg) | | MK (µg/kg) | | HHCB-Lactone (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Monkfish Small | Portugal | 4.7 | 1.00 | <LOD | <LOD | <LOD | <LOD | 4.5 | 1.00 | 38.7 | 8.39 | 7.5 | 1.60 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 64.3 | 13.92 |
| Monkfish Large | Portugal | 7.6 | 1.4 | <LOQ | <LOQ | <LOD | <LOD | 5.6 | 1 | 37.3 | 6.70 | 8.4 | 1.5 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 47.3 | 8.49 |
| Canned tuna | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned sardine | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cod Pacific | Pacific | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | 2.9 | 15.3 | <LOQ | 7.6 | 1.4 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Pacific hake Small | South America | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 15.5 | 2.94 | 29.3 | 5.57 | 6.6 | 1.2 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 37.3 | 7.09 |
| Pacific hake Large | South America | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 17.1 | 3.49 | 5.8 | 1.2 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Atlantic hake Small | South Africa | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | 14.7 | <LOQ | 5.7 | 1.1 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Atlantic hake Large | South Africa | 6.1 | 1.2 | <LOD | <LOD | <LOD | <LOD | 10.3 | 2 | 15.2 | 2.88 | 6.3 | 1.2 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Pacific Tuna Small | Mediterranean | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 16.7 | 4.94 | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 55.5 | 16.43 |
| Pacific Tuna Large | Mediterranean | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 9.0 | 1.98 | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 57.6 | 12.67 |
| Nile Perch | Lake Victoria | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 22.4 | 5.00 | 7.2 | 1.6 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Farmed Pangasius | Vietnam | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 27.2 | 3.61 | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 75.3 | 10.01 |
| Farmed Shrimp (vannamei) | Asia | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 10.9 | 2.3 | 25.5 | 5.31 | 7.1 | 1.5 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 58.1 | 12.09 |
| Mussels | Spain | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 19.9 | 4.27 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Octopus Small | Mediterranean | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 66.2 | 9.53 | 12.2 | 1.7 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 74.5 | 10.73 |
| Octopus Large | Mediterranean | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 41.5 | 7.14 | 6.6 | 1.1 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 36.5 | 6.27 |
| Mackerel | Spain | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 22.5 | 6.93 | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 225.5 | 69.44 |
| Sole large | Mediterranean | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 20.9 | 4.44 | 6.6 | 1.4 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| sole small | Mediterranean | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | 12.3 | <LOQ | 6.1 | 1.3 | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD |
| Mackerel | Italy | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 12.9 | 3.19 | 6.4 | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 228.5 | 56.69 |
| Farmed seabream | Mediterranean | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 11.6 | 2.83 | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mussels | Italy | 14.9 | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 109.8 | 17.96 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Small | North sea | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | 12.4 | 2.42 | 6.2 | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Large | North sea | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 14.8 | 2.90 | 5.9 | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOD | <LOD |
| Mackerel | North sea | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Scottish farmed salmon | Netherlands | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 17.8 | 7.51 | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mussel | Netherlands | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Northsea Crab (Brown meat) | Netherlands | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 12.32 | <LOD | 8.94 | <LOD | 4.39 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Northsea Crab (White meat) | Netherlands | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 39.6 | - | 28.8 | - | 14.1 | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mackerel | Denmark | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Atlantic Cod | North sea | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 4.6 | 0.85 | 18.5 | 3.38 | 6.3 | 1.1 | <LOQ | <LOQ | <LOD | <LOD | 11.4 | 2.1 | 16.3 | 2.99 |
| Norwegian farmed salmon | Denmark | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 23.2 | 9.36 | 5.5 | 2.23 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mussel | Denmark | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Small | Channel | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 414.4 | 90.58 | 6.4 | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Large | Channel | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOQ | <LOQ | 14.5 | 3.21 | 6.0 | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mackerel | Channel | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 9.5 | 3.07 | 6.3 | 2.03 | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 102.9 | 33.27 |
| French Mussel | France | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Scotland (Sound of kerrera) | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Ireland (Cleggan bay) | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | |
| *Ulva lactuca* | Netherlands | | | | | | | | | | | | | | | | | | | | |
| (<LOD not detected) | **White fish LOD** | **2** | **1** | **2** | **1** | **2** | **1** | **2** | **1** | **1** | **1** | **1** | **1** | **5** | **3** | **5** | **3** | **5** | **3** | **2** | **1** |
| (- not measured) | **White fish LOQ** | **5** | **3** | **5** | **3** | **5** | **3** | **5** | **3** | **5** | **3** | **5** | **3** | **20** | **11** | **20** | **11** | **50** | **11** | **5** | **3** |
| | **Fatty fish LOD** | **4** | **1** | **2** | **0.7** | **2** | **0.7** | **2** | **0.7** | **1** | **0.3** | **1** | **0.3** | **5** | **2** | **5** | **2** | **5** | **2** | **4** | **1** |
| | **Fatty Fish LOQ** | **10** | **3** | **5** | **2** | **5** | **2** | **5** | **2** | **5** | **2** | **5** | **2** | **20** | **7** | **20** | **7** | **20** | **7** | **10** | **3** |
| | **Mussels LOD** | **4** | **2** | **4** | **2** | **4** | **2** | **2** | **0.8** | **1** | **0.4** | **1** | **0.4** | **10** | **4** | **10** | **4** | **10** | **4** | **5** | **2** |
| | **Mussels LOQ** | **10** | **4** | **10** | **4** | **10** | **4** | **5** | **2** | **5** | **2** | **5** | **2** | **30** | **12** | **30** | **12** | **30** | **12** | **15** | **6** |

### 3.5.5. Pharmaceuticals (PhACs)

Table 15- PhACs content (µg/kg dw) obtained in raw samples from Round I.

| Species | Sampling site | Diclofenac (µg/kg) | | Azithromycin (µg/kg) | | Sulfamethoxazole (µg/kg) | | Sotalol (µg/kg) | | Diazepam (µg/kg) | | Carbamazepine (µg/kg) | | Venlafaxine (µg/kg) | | Citalopram (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | 1.36 | 0.55 | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD |
| Monkfish Small | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish Large | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned tuna | Portugal | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD |
| Canned sardine | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cod Pacific | Pacific | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Pacific hake Small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake Large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific Tuna Small | Mediterranean | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | 2.25 | 0.6 | 2.05 | 0.6 | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD |
| Pacific Tuna Large | Mediterranean | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | 1.04 | 0.2 | 0.95 | 0.2 | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD |
| Nile Perch | Lake Victoria | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD |
| Farmed Pangasius | Vietnam | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD |
| Farmed Shrimp (vannamei) | Asia | <LOQ | <LOQ | <LOD | <LOD | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOQ | <LOD | <LOD |
| Mussels | Spain | - | - | <LOQ | <LOQ | <LOQ | <LOQ | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Octopus Small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus Large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Spain | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Sole large | Mediterranean | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| sole small | Mediterranean | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mackerel | Italy | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Farmed seabream | Mediterranean | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mussels | Italy | - | - | <LOQ | <LOQ | <LOD | <LOD | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Small | North sea | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Large | North sea | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mackerel | North sea | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Scottish farmed salmon | Netherlands | <LOD | <LOD | <LOQ | <LOQ | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mussel | Netherlands | - | - | <LOQ | <LOQ | 11.72 | 2.2 | - | - | - | - | <LOD | <LOD | 2.76 | 0.5 | <LOD | <LOD |
| Northsea Crab (Brown meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Northsea Crab (White meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Denmark | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Atlantic Cod | North sea | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Norwegian farmed salmon | Denmark | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mussel | Denmark | - | - | <LOQ | <LOQ | <LOD | <LOD | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Small | Channel | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Plaice Large | Channel | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| Mackerel | Channel | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| French Mussel | France | - | - | <LOD | <LOD | <LOD | <LOD | - | - | - | - | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | |
| S. latissima | Scotland (Sound of kerrera) | | | | | | | | | | | | | | | | |
| S. latissima | Ireland (Cleggan bay) | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | |
| *Ulva lactuca* | Netherlands | | | | | | | | | | | | | | | | |
| (<LOD- Limit of detection) | LOD | 0.19-0.65 | 0.003-0.009 | 0.01 | 0.001-0.009 | 0.01-0.03 | 0.001-0.070 | 0.07-0.26 | 0.002-0.006 | 0.08-0.12 | 0.001-0.004 | 0.01-0.08 | 0.004-0,01 | 0.04-0.40 | 0.001-0.09 | 0.05-0.12 | 0.001-0.09 |
| (-not measured) | LOQ | 0.62-2.16 | 0.01-0.05 | 0.02-0.03 | 0.003-0.03 | 0.02-0.09 | 0.003-0.23 | 0.24-0.88 | 0.005-0.02 | 0.25-0.41 | 0.001-0.004 | 0.04-0.25 | 0.01-0.04 | 0.15-1.33 | 0.004-0.29 | 0.16-0.41 | 0.001-0.30 |

## 3.5.6. Perfluorinated substances (PFCs)

Table 16 - PFCs content (µg/kg dw) obtained in raw samples from Round I.

| Species | Sampling site | PFBA (µg/kg) | | PFPeA (µg/kg) | | PFHxA (µg/kg) | | PFHpA (µg/kg) | | PFOA (µg/kg) | | PFNA (µg/kg) | | FDcA (µg/kg) | | PFUnA (µg/kg) | | PFDoA (µg/kg) | | PFTrA (µg/kg) | | PFTeA (µg/kg) | | PFBS (µg/kg) | | PFHxS (µg/kg) | | PFHpS (µg/kg) | | PFOS (µg/kg) | | PFDS (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.06 | <0.2 | <0.07 | <0.2 | <0.07 | 1.0 | 0.4 | <0.2 | <0.07 |
| Monkfish Small | Portugal | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 |
| Monkfish Large | Portugal | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | 1.5 | 0.2 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 |
| Canned tuna | Portugal | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.09 | <0.2 | <0.07 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 | <0.2 | <0.08 |
| Canned sardine | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cod Pacific | Pacific | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 |
| Pacific hake Small | South America | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 |
| Pacific hake Large | South America | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 |
| Atlantic hake Small | South Africa | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 |
| Atlantic hake Large | South Africa | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | 2.1 | 0.4 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 |
| Pacific Tuna Small | Mediterranean | <0.2 | <0.06 | <0.2 | <0.06 | <0.2 | <0.06 | <0.2 | <0.06 | 2.8 | 0.8 | 0.3 | 0.08 | <0.2 | <0.06 | <0.2 | <0.06 | <0.2 | <0.06 | <0.2 | <0.06 | <0.2 | <0.06 | <0.2 | <0.05 | <0.2 | <0.05 | <0.2 | <0.05 | <0.2 | <0.05 | <0.2 | <0.05 |
| Pacific Tuna Large | Mediterranean | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 |
| Nile Perch | Lake Victoria | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | 4.3 | 1.0 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 |
| Farmed Pangasius | Vietnam | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.03 | <0.2 | <0.02 | <0.2 | <0.02 | <0.2 | <0.02 | <0.2 | <0.02 | <0.2 | <0.02 |
| Farmed Shrimp (vannamei) | Asia | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 | <0.2 | <0.04 |
| Mussels | Spain | <0.4 | <0.1 | <0.4 | <0.1 | <0.4 | <0.1 | <0.4 | <0.1 | 1.3 | 0.4 | 0.5 | 0.2 | <0.4 | <0.1 | 1.0 | 0.3 | 1.0 | 0.3 | <0.4 | <0.1 | <0.4 | <0.1 | <0.3 | <0.09 | <0.3 | <0.10 | <0.3 | <0.10 | 4.8 | 1.5 | <0.3 | <0.10 |
| Octopus Small | Mediterranean | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | 0.6 | 0.1 | <0.3 | <0.07 | <0.3 | <0.07 | 0.2 | 0.05 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.06 | <0.3 | <0.06 | <0.3 | <0.06 | <0.3 | <0.06 | <0.3 | <0.06 |
| Octopus Large | Mediterranean | <0.3 | <0.06 | <0.3 | <0.06 | <0.3 | <0.06 | <0.3 | <0.06 | 0.8 | 0.1 | <0.3 | <0.06 | 0.3 | 0.04 | 2.9 | 0.5 | 2.9 | 0.5 | 6.8 | 1.2 | 1.2 | 0.2 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | 1.4 | 0.2 | <0.3 | <0.05 |
| Mackerel | Spain | <0.4 | <0.06 | <0.4 | <0.06 | <0.4 | <0.06 | <0.4 | <0.06 | 0.7 | 0.1 | 0.6 | 0.09 | 0.4 | 0.06 | 6.2 | 0.9 | 5.7 | 0.8 | 9.2 | 1.3 | 2.0 | 0.3 | <0.3 | <0.05 | 0.1 | 0.02 | <0.4 | <0.05 | 2.4 | 0.4 | <0.4 | <0.05 |
| Sole large | Mediterranean | <0.4 | <0.09 | <0.4 | <0.09 | <0.4 | <0.09 | <0.4 | <0.09 | 0.5 | 0.1 | 0.2 | 0.05 | 0.2 | 0.05 | 0.3 | 0.08 | 0.9 | 0.2 | 0.3 | 0.06 | <0.4 | <0.09 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.4 | <0.08 |
| sole small | Mediterranean | <0.4 | <0.09 | <0.4 | <0.09 | <0.4 | <0.09 | <0.4 | <0.09 | 0.9 | 0.2 | <0.4 | <0.09 | 0.6 | 0.1 | 0.6 | 0.1 | <0.4 | <0.09 | 0.4 | 0.1 | <0.4 | <0.09 | <0.3 | <0.08 | <0.4 | <0.09 | <0.4 | <0.09 | <0.4 | <0.09 | <0.4 | <0.09 |
| Mackerel | Italy | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | 0.8 | 0.2 | <0.3 | <0.07 | <0.3 | <0.07 | 0.3 | 0.1 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | <0.2 | <0.06 | <0.2 | <0.06 | <0.2 | <0.06 | 0.7 | 0.2 | <0.2 | <0.06 |
| Farmed seabream | Mediterranean | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | 0.2 | 0.04 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 | <0.3 | <0.07 |
| Mussels | Italy | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | 0.7 | 0.1 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.04 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 | <0.3 | <0.05 |
| Plaice Small | North sea | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.7 | <0.3 | <1.4 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 |
| Plaice Large | North sea | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.3 | <0.3 | <1.4 | <0.3 | <1.4 | <0.3 | 2.1 | 0.4 | <1.4 | <0.3 |
| Mackerel | North sea | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.5 | <0.4 | <1.6 | <0.4 | <1.6 | <0.4 | <1.6 | <0.4 | <1.6 | <0.4 |
| Scottish farmed salmon | Netherlands | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.6 | <0.7 | <1.3 | <0.6 | <1.4 | <0.6 | <1.4 | <0.6 | <1.4 | <0.6 | <1.5 | <0.6 |
| Mussel | Netherlands | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | 6.5 | 1.2 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.6 | <0.3 | <1.4 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 |
| Northsea Crab (Brown meat) | Netherlands | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.9 | <0.6 | <1.5 | <0.5 | <1.6 | <0.5 | <1.6 | <0.5 | 2.4 | 0.7 | <1.7 | <0.5 |
| Northsea Crab (White meat) | Netherlands | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.4 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 | <1.5 | <0.3 |
| Mackerel | Denmark | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.7 | <0.6 | <1.4 | <0.5 | <1.5 | <0.5 | <1.5 | <0.5 | <1.5 | <0.5 | <1.6 | <0.5 |
| Atlantic Cod | North sea | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.3 | <0.4 | <2.0 | <0.4 | <2.1 | <0.4 | <2.1 | <0.4 | <2.1 | <0.4 | <2.2 | <0.4 |
| Norwegian farmed salmon | Denmark | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <2.1 | <0.8 | <1.8 | <0.7 | <1.9 | <0.8 | <1.9 | <0.8 | <1.9 | <0.8 | <1.9 | <0.8 |
| Mussel | Denmark | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <2.2 | <0.8 | <1.9 | <0.7 | <2.0 | <0.8 | <2.0 | <0.8 | <2.0 | <0.8 | <2.1 | <0.8 |
| Plaice Small | Channel | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.5 | <0.3 | <1.6 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 | <1.7 | <0.4 |
| Plaice Large | Channel | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.8 | <0.4 | <1.5 | <0.3 | <1.6 | <0.4 | <1.6 | <0.4 | <1.6 | <0.4 | <1.6 | <0.4 |
| Mackerel | Channel | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.8 | <0.6 | <1.5 | <0.5 | <1.6 | <0.5 | <1.6 | <0.5 | <1.6 | <0.5 | <1.6 | <0.5 |
| French Mussel | France | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.9 | <0.5 | <1.6 | <0.4 | <1.7 | <0.5 | <1.7 | <0.5 | <1.7 | <0.5 | <1.7 | <0.5 |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Scotland (Sound of kerrera) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Ireland (Cleggan bay) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ulva lactuca* | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (- not measured) | **LOD** | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | |
| | **LOQ** | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.03 | | <0.03 | | <0.03 | | <0.03 | | <0.03 | |

## 3.5.7. Polycyclic aromatic hydrocarbons (PAHs)

Table 17 - PAHs content (µg/kg dw) obtained in raw samples from Round I.

| Species | Sampling site | acenapthylene (µg/kg) | | acenapthene (µg/kg) | | fluorene (µg/kg) | | phenanthrene (µg/kg) | | anthracene (µg/kg) | | fluoranthene (µg/kg) | | pyrene (µg/kg) | | benzo(a)anthracene (µg/kg) | | chrysene (µg/kg) | | benzo(b)fluoranthene (µg/kg) | | benzo(k)fluoranthene (µg/kg) | | benzo(j)fluoranthene (µg/kg) | | benzo(e)pyrene (µg/kg) | | benzo(a)pyrene (µg/kg) | | indeno(123cd) pyrene (µg/kg) | | dibenzo(ah)anthrace ne (µg/kg) | | benzo(ghi)perylene (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish Small | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish Large | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned tuna | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned sardine | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cod Pacific | Pacific | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake Small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake Large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific Tuna Small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific Tuna Large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nile Perch | Lake Victoria | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Farmed Pangasius | Vietnam | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Farmed Shrimp (vannamei) | Asia | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Spain | <0.49 | <0.12 | 3.98 | 0.97 | 4.06 | 0.99 | 7.19 | 1.75 | <0.49 | <0.12 | 4.32 | 1.05 | 3.58 | 0.87 | 0.89 | 0.22 | 2.18 | 0.53 | 0.87 | 0.21 | 0.51 | 0.12 | 0.67 | 0.16 | 0.94 | 0.23 | <0.49 | <0.12 | 0.55 | 0.13 | <0.49 | <0,12 | 0.69 | 0.17 |
| Octopus Small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus Large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Spain | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Sole large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| sole small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Italy | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Farmed seabream | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Italy | < 0.74 | <0.11 | 3.31 | 0.49 | 5.05 | 0.75 | 10.75 | 1.60 | < 0.74 | <0.11 | 3.16 | 0.47 | 6.66 | 0.99 | 1.12 | 0.17 | 2.19 | 0.33 | < 0.74 | <0,11 | < 0.75 | <0.11 | 0.81 | 0.12 | 1.18 | 0.18 | < 0.74 | <0.11 | < 0.74 | <0.11 | < 0.74 | <0.11 | 1.04 | 0.15 |
| Plaice Small | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Scottish farmed salmon | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussel | Netherlands | < 0.65 | <0.11 | 2.83 | 0.48 | 2.92 | 0.49 | 6.37 | 1.08 | < 0.65 | <0.11 | 7.07 | 1.19 | 2.77 | 0.47 | 3.86 | 0.65 | 6.57 | 1.11 | 2.69 | 0.45 | 1.56 | 0.26 | 2.05 | 0.35 | 5.09 | 0.86 | 1.90 | 0.32 | 3.67 | 0.62 | < 0.65 | <0,11 | 11.00 | 1.86 |
| Northsea Crab (Brown meat) | Netherlands | < 0.51 | <0.16 | 2.04 | 0.65 | 7.39 | 2.34 | 4.83 | 1.53 | < 0.51 | <0.16 | 1.29 | 0.41 | 4.27 | 1.35 | 0.55 | 0.18 | < 0.51 | <0.16 | < 0.51 | <0.16 | < 0.51 | <0.16 | < 0.51 | <0.16 | < 0.51 | <0.16 | < 0.51 | <0.16 | < 0.51 | <0.16 | < 0.51 | <0,16 | < 0.51 | <0.16 |
| Northsea Crab (White meat) | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic Cod | North sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Norwegian farmed salmon | Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussel | Denmark | - | <0.15 | - | 0.412 | - | 0.278 | - | 0.750 | - | <0.15 | - | 0.288 | - | 1.365 | - | 0.212 | - | <0.15 | - | <0.15 | - | <0.15 | - | 0.163 | - | <0.15 | - | <0.15 | - | <0.15 | - | <0,15 | - | 0.223 |
| Plaice Small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice Large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| French Mussel | France | <0.45 | <0.11 | 2.19 | 0.53 | 3.32 | 0.80 | 8.66 | 2.10 | <0.45 | <0.11 | 2.13 | 0.52 | 4.29 | 1.04 | 0.64 | 0.16 | 1.33 | 0.32 | 0.70 | 0.17 | 0.46 | 0.11 | 0.65 | 0.16 | 0.69 | 0.17 | <0.45 | <0.11 | 0.69 | 0.17 | <0.45 | <0,11 | 1.01 | 0.24 |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Scotland (Sound of kerrera) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Ireland (Cleggan bay) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. latissima | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Ulva lactuca* | Netherlands | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (- not measured) | LOD | | 0.01 | | 0.03 | | 0.22 | | 0.06 | | 0.01 | | 0.05 | | 0.23 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 |
| | LOQ | | 0.15 | | 0.15 | | 0.43 | | 0.15 | | 0.15 | | 0.15 | | 0.47 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 |

### 3.5.8 Tetrabromobisphenol (TBBPA) and bisphenol (BPA)

Table 18- TBBPA and BPA content (µg/kg dw) obtained in raw samples from Round I.

| Species | Sampling site | BPA | | TBBPA | |
|---|---|---|---|---|---|
| | | dw | ww | dw | ww |
| Canned Mackerel | Portugal | 37.80 | 15.25 | <5.00 | <2.02 |
| Monkfish Small | Portugal | 178.80 | 38.55 | <5.00 | <1.08 |
| Monkfish Large | Portugal | <10.00 | <0.18 | <5.00 | <0.90 |
| Canned tuna | Portugal | 63.08 | 23.93 | 13.35 | 5.18 |
| Canned sardine | Portugal | <10.00 | <0.42 | <5.00 | <2.12 |
| Cod Pacific | Pacific | <10.00 | <0.18 | <5.00 | <0.90 |
| Pacific hake Small | South America | | - | | - |
| Pacific hake Large | South America | | - | | - |
| Atlantic hake Small | South Africa | | - | | - |
| Atlantic hake Large | South Africa | | - | | - |
| Pacific Tuna Small | Mediterranean | <10.00 | <0.30 | <5.00 | <1.48 |
| Pacific Tuna Large | Mediterranean | <10.00 | <0.22 | <5.00 | <1.10 |
| Nile Perch | Lake Victoria | <10.00 | <0.23 | <5.00 | <1.12 |
| Farmed Pangasius | Vietnam | <10.00 | <0.13 | 43.00 | 5.71 |
| Farmed Shrimp (vannamei) | Asia | <10.00 | <0.21 | <5.00 | <1.04 |
| Mussels | Spain | <10.00 | <0.22 | <5.00 | <1.08 |
| Octopus Small | Mediterranean | <10.00 | <0.17 | <5.00 | <0.86 |
| Octopus Large | Mediterranean | <10.00 | <0.14 | <5.00 | <0.72 |
| Mackerel | Spain | <10.00 | <0.31 | 31.15 | 9.59 |
| Sole large | Mediterranean | <10.00 | <0.24 | <5.00 | <1.20 |
| sole small | Mediterranean | <10.00 | <0.24 | <5.00 | <1.21 |
| Mackerel | Italy | <10.00 | <0.28 | <5.00 | <1.42 |
| Farmed seabream | Mediterranean | <10.00 | <0.25 | <5.00 | <1.23 |
| Mussels | Italy | <10.00 | <0.14 | <5.00 | <0.71 |
| Plaice Small | North sea | <10.00 | <0.20 | <5.00 | <0.98 |
| Plaice Large | North sea | <10.00 | <0.20 | <5.00 | <0.99 |
| Mackerel | North sea | <10.00 | <0.24 | <5.00 | <0.98 |
| Scottish farmed salmon | Netherlands | <10.00 | <0.42 | <5.00 | <2.12 |
| Mussel | Netherlands | <10.00 | 0.19 | <5.00 | <0.94 |
| Northsea Crab (Brown meat) | Netherlands | <10.00 | <0.31 | <5.00 | <1.56 |
| Northsea Crab (White meat) | Netherlands | <10.00 | <0.23 | <5.00 | <1.15 |
| Mackerel | Denmark | <10.00 | <0.35 | <5.00 | <1.73 |
| Atlantic Cod | North sea | <10.00 | <0.18 | <5.00 | <0.92 |
| Norwegian farmed salmon | Denmark | <10.00 | <0.41 | <5.00 | <2.04 |
| Mussel | Denmark | <10.00 | <0.77 | <5.00 | <3.84 |
| Plaice Small | Channel | <10.00 | <0.22 | <5.00 | <1.11 |
| Plaice Large | Channel | <10.00 | <0.22 | <5.00 | <1.09 |
| Mackerel | Channel | <10.00 | <0.32 | <5.00 | <1.62 |
| French Mussel | France | <10.00 | <0.26 | <5.00 | <1.32 |
| (- not measured) | | **LOD** | **5** | **0.5** | |
| | | **LOQ** | **10** | **5** | |

### 3.5.9 Total and organic mercury

Table 19 - Total and organic mercury content (µg/kg) obtained in raw samples from Round I.

| Species | Sampling site | MeHg | | T-MeHg | |
|---|---|---|---|---|---|
| | | dw | ww | dw | ww |
| Canned Mackerel | Portugal | 78 | 29 | 106 | 40 |
| Monkfish Small | Portugal | 1033 | 171 | 1391 | 229 |
| Monkfish Large | Portugal | 1490 | 237 | 2002 | 318 |
| Canned tuna | Portugal | 96 | 35 | 97 | 39 |
| Canned sardine | Portugal | - | - | - | - |
| Cod Pacific | Pacific | 266 | 24 | 348 | 61 |
| Pacific hake Small | South America | 531 | 99 | 769 | 143 |
| Pacific hake Large | South America | 891 | 182 | 1236 | 251 |
| Atlantic hake Small | South Africa | 540 | 101 | 700 | 131 |
| Atlantic hake Large | South Africa | 696 | 132 | 886 | 168 |
| Pacific Tuna Small | Mediterranean | 491 | 145 | 641 | 187 |
| Pacific Tuna Large | Mediterranean | 638 | 140 | 902 | 199 |
| Nile Perch | Lake Victoria | 374 | 83 | 491 | 113 |
| Farmed Pangasius | Vietnam | <5.00 | < LOQ | 16 | 2 |
| Farmed Shrimp (vannamei) | Asia | 41 | 9 | 56 | 12 |
| Mussels | Spain | - | - | - | - |
| Octopus Small | Mediterranean | 1008 | 175 | 1265 | 221 |
| Octopus Large | Mediterranean | 1282 | 191 | 1677 | 240 |
| Mackerel | Spain | 96 | 31 | 116 | 36 |
| Sole large | Mediterranean | 89 | 19 | 113 | 24 |
| Sole small | Mediterranean | 98 | 21 | 124 | 28 |
| Mackerel | Italy | 512 | 135 | 679 | 180 |
| Farmed seabream | Mediterranean | 166 | 42 | 195 | 48 |
| Mussels | Italy | - | - | - | - |
| Plaice Small | North sea | 261 | 51 | 335 | 65 |
| Plaice Large | North sea | 202 | 40 | 258 | 51 |
| Mackerel | North sea | 228 | 55 | 311 | 73 |
| Scottish farmed salmon | Netherlands | 74 | 25 | 93 | 31 |
| Mussel | Netherlands | - | - | - | - |
| Northsea Crab (Brown meat) | Netherlands | - | - | - | - |
| Northsea Crab (White meat) | Netherlands | - | - | - | - |
| Mackerel | Denmark | 68 | 24 | 74 | 26 |
| Atlantic Cod | North sea | 341 | 62 | 446 | 83 |
| Norwegian farmed salmon | Denmark | 30 | 12 | 36 | 15 |
| Mussel | Denmark | - | - | - | - |
| Plaice Small | Channel | 318 | 70 | 416 | 94 |
| Plaice Large | Channel | 245 | 54 | 335 | 71 |
| Mackerel | Channel | 90 | 29 | 115 | 38 |
| French Mussel | France | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - |
| S. latissima | Scotland (Sound of kerrera) | - | - | - | - |
| S. latissima | Ireland (Cleggan bay) | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - |
| Ulva lactuca | Netherlands | - | - | - | - |
| (- not measured) | **LOD** | **5** | **0.5-2** | **5** | **0.5-2** |
| | **LOQ** | **10** | **1-4** | **10** | **1-4** |

## 3.5.10 UV-filters

Table 20 - UV-filter content (µg/kg dw) obtained in raw samples from Round I.

(EHS-2-Ethylhexyl salicylate; HS- 3,3,5-Trimethylcyclohexylsalicylate; IMC - Isoamyl-4 methoxycinnamate; 4-MBC- 3-(4-Methylbenzylidene)camphor; BP3- benzophenone 3; BP1- benzophenone 1; DHMB - 2,2'-Dihydroxy-4,4'-dimethoxybenzophenone; EPABA- 2-Ethylhexyl 4-(dimethylamino)benzoate; THB -2,3,4-Trihydroxybenzophenone; EHMC- 2-Ethylhexyl 4-methoxycinnamate; OC –Octocrylene; DBENZO - Hexyl 2-[4-(diethylamino)-2-hydroxybenzoyl]benzoate)

| Species | Sampling site | EHS (µg/kg) | | HS (µg/kg) | | IMC(µg/kg) | | 4-MBC (µg/kg) | | BP3 (µg/kg) | | BP1 (µg/kg) | | DHMB (µg/kg) | | EPABA (µg/kg) | | THB (µg/kg) | | EHMC (µg/kg) | | OC (µg/kg) | | DBENZO (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Canned Mackerel | Portugal | <6.00 | <2.42 | <2.00 | <0.81 | 43.90 | 17.71 | 17.54 | 7.08 | <2.00 | <0.81 | 41.78 | 16.85 | <6.00 | <2.42 | <6.00 | <2.42 | <23.00 | <9.28 | <2.00 | <0.81 | <3.00 | <1.21 | <20.00 | <8.07 |
| Monkfish Small | Portugal | <6.00 | <1.30 | 29.30 | 6.35 | <6.00 | <1.30 | <6.00 | <1.30 | 58.74 | 12.72 | 36.10 | 7.82 | <6.00 | <1.30 | <6.00 | <1.30 | <23.00 | <4.98 | 31.45 | 6.81 | <3.00 | <0.65 | <20.00 | <4.33 |
| Monkfish Large | Portugal | <6.00 | <1.08 | 53.97 | 9.70 | <6.00 | <1.08 | 20.40 | 3.67 | 98.74 | 17.74 | <3.00 | <0.54 | <6.00 | <1.08 | <6.00 | <1.08 | <23.00 | <4.13 | 74.36 | 13.36 | <3.00 | <0.54 | <20.00 | <3.59 |
| Canned tuna | Portugal | <6.00 | <2.28 | <2.00 | <0.76 | <6.00 | <2.28 | <6.00 | <2.28 | <2.00 | <0.76 | 38.95 | 14.78 | <6.00 | <2.28 | <6.00 | <2.28 | <23.00 | <8.73 | <2.00 | <0.76 | <3.00 | <1.14 | <20.00 | <7.59 |
| Canned sardine | Portugal | <6.00 | <2.54 | <2.00 | <0.85 | <6.00 | <2.54 | 14.09 | 5.96 | 55.72 | 23.57 | <3.00 | <1.27 | <6.00 | <2.54 | <6.00 | <2.54 | <23.00 | <9.73 | <2.00 | <0.85 | <3.00 | <1.27 | <20.00 | <8.46 |
| Cod Pacific | Pacific | <6.00 | <1.08 | <2.00 | <0.36 | <6.00 | <1.08 | <6.00 | <1.08 | <2.00 | <0.36 | <3.00 | <0.54 | <6.00 | <1.08 | <6.00 | <1.08 | <23.00 | <4.14 | <2.00 | <0.36 | <3.00 | <0.54 | <20.00 | <3.60 |
| Pacific hake Small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake Large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake Large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific Tuna Small | Mediterranean | <6.00 | <1.78 | <2.00 | <0.59 | <6.00 | <1.78 | <6.00 | <1.78 | <2.00 | <0.59 | 19.40 | 5.74 | <6.00 | <1.78 | <6.00 | <1.78 | <23.00 | <6.81 | <2.00 | <0.59 | <3.00 | <0.89 | <20.00 | <5.92 |
| Pacific Tuna Large | Mediterranean | <6.00 | <1.32 | <2.00 | <0.44 | <6.00 | <1.32 | <6.00 | <1.32 | <2.00 | <0.44 | 34.22 | 7.53 | <6.00 | <1.32 | <6.00 | <1.32 | <23.00 | <5.06 | <2.00 | <0.44 | <3.00 | <0.66 | <20.00 | <4.40 |
| Nile Perch | Lake Victoria | <6.00 | <1.34 | <2.00 | <0.45 | <6.00 | <1.34 | <6.00 | <1.34 | 32.34 | 7.21 | 17.19 | 3.83 | <6.00 | <1.34 | <6.00 | <1.34 | <23.00 | <5.13 | <2.00 | <0.45 | <3.00 | <0.67 | <20.00 | <4.46 |
| Farmed Pangasius | Vietnam | 13.60 | <1.81 | <2.00 | <0.27 | <6.00 | <0.80 | <6.00 | <0.80 | <2.00 | <0.27 | <3.00 | <0.40 | <6.00 | <0.80 | <6.00 | <0.80 | <23.00 | <3.06 | <2.00 | <0.27 | <3.00 | <0.40 | <20.00 | <2.66 |
| Farmed Shrimp (vannamei) | Asia | 37.12 | 7.72 | <2.00 | <0.42 | <6.00 | <1.25 | 43.93 | 9.14 | 14.74 | 3.07 | 23.80 | 4.95 | <6.00 | <1.25 | <6.00 | <1.25 | <23.00 | <4.78 | <2.00 | <0.42 | <3.00 | <0.62 | <20.00 | <4.16 |
| Mussels | Spain | 18.93 | 4.07 | <2.00 | <0.43 | <6.00 | <1.29 | 43.75 | 9.41 | 85.50 | 18.38 | 78.27 | 16.83 | <6.00 | <1.29 | <6.00 | <1.29 | <23.00 | <4.95 | <2.00 | <0.43 | <3.00 | <0.65 | <20.00 | <4.30 |
| Octopus Small | Mediterranean | <6.00 | <1.03 | <2.00 | <0.34 | <6.00 | <1.03 | <6.00 | <1.03 | <2.00 | <0.34 | <3.00 | <0.52 | <6.00 | <1.03 | <6.00 | <1.03 | <23.00 | <3.96 | 61.96 | 10.66 | <3.00 | <0.52 | <20.00 | <5.16 |
| Octopus Large | Mediterranean | <6.00 | <0.86 | <2.00 | <0.29 | <6.00 | <0.86 | <6.00 | <0.86 | <2.00 | <0.29 | <3.00 | <0.43 | <6.00 | <0.86 | <6.00 | <0.86 | <23.00 | <3.31 | <2.00 | <0.29 | <3.00 | <0.43 | <20.00 | <4.32 |
| Mackerel | Spain | 49.10 | 15.12 | <2.00 | <0.62 | <6.00 | <1.85 | <6.00 | <1.85 | 46.50 | 14.32 | <3.00 | <0.92 | <6.00 | <1.85 | <6.00 | <1.85 | <23.00 | <7.08 | 28.70 | 8.84 | <3.00 | <0.92 | <20.00 | <6.16 |
| Sole large | Mediterranean | <6.00 | <1.43 | <2.00 | <0.48 | <6.00 | <1.43 | <6.00 | <1.43 | <2.00 | <0.48 | <3.00 | <0.72 | <6.00 | <1.43 | <6.00 | <1.43 | <23.00 | <5.50 | <2.00 | <0.48 | <3.00 | <0.72 | <20.00 | <4.78 |
| sole small | Mediterranean | <6.00 | <1.45 | <2.00 | <0.48 | <6.00 | <1.45 | <6.00 | <1.45 | <2.00 | <0.48 | <3.00 | <0.72 | <6.00 | <1.45 | <6.00 | <1.45 | <23.00 | <5.54 | <2.00 | <0.48 | <3.00 | <0.72 | <20.00 | <4.82 |
| Mackerel | Italy | <6.00 | <1.70 | <2.00 | <0.57 | 55.47 | 15.70 | 15.73 | 4.45 | 2.83 | 0.80 | <3.00 | <0.85 | <6.00 | <1.70 | <6.00 | <1.70 | <23.00 | <6.51 | <2.00 | <0.57 | <3.00 | <0.85 | <20.00 | <5.66 |
| Farmed seabream | Mediterranean | <6.00 | <1.47 | <2.00 | <0.49 | 66.70 | 16.34 | <6.00 | <1.47 | 3.48 | 0.85 | <3.00 | <0.74 | <6.00 | <1.47 | <6.00 | <1.47 | <23.00 | <5.64 | <2.00 | <0.49 | 29.98 | 7.35 | <20.00 | <4.90 |
| Mussels | Italy | <6.00 | <0.85 | <2.00 | <0.28 | 37.30 | 5.26 | 56.19 | 7.92 | <2.00 | <0.28 | <3.00 | <0.42 | <6.00 | <0.85 | <6.00 | <0.85 | <23.00 | <3.24 | <2.00 | <0.28 | <3.00 | <0.42 | <20.00 | <2.82 |
| Plaice Small | North sea | <6.00 | <1.17 | <2.00 | <0.39 | <6.00 | <1.17 | <6.00 | <1.17 | <2.00 | <0.39 | <3.00 | <0.59 | <6.00 | <1.17 | <6.00 | <1.17 | <23.00 | <4.49 | <2.00 | <0.39 | <3.00 | <0.59 | <20.00 | <3.90 |
| Plaice Large | North sea | <6.00 | <1.18 | <2.00 | <0.39 | <6.00 | <1.18 | <6.00 | <1.18 | <2.00 | <0.39 | <3.00 | <0.59 | <6.00 | <1.18 | <6.00 | <1.18 | <23.00 | <4.51 | <2.00 | <0.39 | <3.00 | <0.59 | <20.00 | <3.92 |
| Mackerel | North sea | <6.00 | <1.46 | <2.00 | <0.49 | <6.00 | <1.46 | <6.00 | <1.46 | <2.00 | <0.49 | <3.00 | <0.73 | <6.00 | <1.46 | <6.00 | <1.46 | <23.00 | <5.59 | <2.00 | <0.49 | <3.00 | <0.73 | <20.00 | <4.86 |
| Scottish farmed salmon | Netherlands | <6.00 | <2.54 | <2.00 | <0.85 | <6.00 | <2.54 | <6.00 | <2.54 | <2.00 | <0.85 | <3.00 | <1.27 | <6.00 | <2.54 | <6.00 | <2.54 | <23.00 | <9.73 | <2.00 | <0.85 | <3.00 | <1.27 | <20.00 | <8.46 |
| Mussel | Netherlands | 25.77 | 4.84 | <2.00 | <0.38 | <6.00 | <1.13 | <6.00 | <1.13 | <2.00 | <0.38 | 94.15 | 17.70 | <6.00 | <1.13 | <6.00 | <1.13 | <23.00 | <4.32 | <2.00 | <0.38 | <3.00 | 0.56 | <20.00 | <3.76 |
| Northsea Crab (Brown meat) | Netherlands | <6.00 | <1.87 | <2.00 | <0.62 | <6.00 | <1.87 | <6.00 | <1.87 | <2.00 | <0.62 | <3.00 | <0.93 | <6.00 | <1.87 | <6.00 | <1.87 | <23.00 | <7.15 | <2.00 | <0.62 | <3.00 | <0.93 | <20.00 | <6.22 |
| Northsea Crab (White meat) | Netherlands | <6.00 | <1.37 | <2.00 | <0.46 | <6.00 | <1.37 | <6.00 | <1.37 | <2.00 | <0.46 | <3.00 | <0.69 | <6.00 | <1.37 | <6.00 | <1.37 | <23.00 | <5.27 | <2.00 | <0.46 | <3.00 | <0.69 | <20.00 | <4.58 |
| Mackerel | Denmark | <6.00 | <2.07 | <2.00 | <0.69 | <6.00 | <2.07 | <6.00 | <2.07 | <2.00 | <0.69 | <3.00 | <1.04 | <6.00 | <2.07 | <6.00 | <2.07 | <23.00 | <7.94 | <2.00 | <0.69 | <3.00 | <1.04 | <20.00 | <6.90 |
| Atlantic Cod | North sea | <6.00 | <1.10 | <2.00 | <0.37 | <6.00 | <1.10 | <6.00 | <1.10 | <2.00 | <0.37 | <3.00 | <0.55 | <6.00 | <1.10 | <6.00 | <1.10 | <23.00 | <4.21 | <2.00 | <0.37 | <3.00 | <0.55 | <20.00 | <3.66 |
| Norwegian farmed salmon | Denmark | <6.00 | <2.44 | <2.00 | <0.81 | <6.00 | <2.44 | <6.00 | <2.44 | <2.00 | <0.81 | <3.00 | <1.22 | <6.00 | <2.44 | <6.00 | <2.44 | <23.00 | <9.36 | <2.00 | <0.81 | <3.00 | <1.22 | <20.00 | <8.14 |
| Mussel | Denmark | <6.00 | <4.61 | <2.00 | <1.54 | <6.00 | <4.61 | <6.00 | <4.61 | <2.00 | <1.54 | 33.44 | 25.68 | <6.00 | <4.61 | <6.00 | <4.61 | <23.00 | <17.66 | 34.16 | 26.23 | 36.62 | 28.12 | <20.00 | <15.36 |
| Plaice Small | Channel | <6.00 | <1.33 | <2.00 | <0.44 | <6.00 | <1.33 | <6.00 | <1.33 | <2.00 | <0.44 | <3.00 | <0.67 | <6.00 | <1.33 | <6.00 | <1.33 | <23.00 | <5.10 | <2.00 | <0.44 | <3.00 | <0.67 | <20.00 | <4.44 |
| Plaice Large | Channel | <6.00 | <1.31 | <2.00 | <0.45 | <6.00 | <1.31 | <6.00 | <1.31 | <2.00 | <0.45 | <3.00 | <0.66 | <6.00 | <1.31 | <6.00 | <1.31 | <23.00 | <5.03 | <2.00 | <0.45 | <3.00 | <0.66 | <20.00 | <4.37 |
| Mackerel | Channel | <6.00 | <1.94 | <2.00 | <0.65 | <6.00 | <1.94 | <6.00 | <1.94 | 82.23 | 26.58 | <3.00 | <0.97 | <6.00 | <1.94 | 6.53 | 2.11 | <23.00 | <7.43 | <2.00 | <0.65 | <3.00 | <0.97 | <20.00 | <6.46 |
| French Mussel | France | 72.15 | 18.98 | <2.00 | <0.53 | <6.00 | <1.58 | <6.00 | 1.58 | <2.00 | <0.53 | <3.00 | <0.79 | <6.00 | <1.58 | <6.00 | 1.58 | <23.00 | <6.05 | <2.00 | <0.53 | <3.00 | <0.79 | <20.00 | <5.26 |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Scotland (Sound of kerrera) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Ireland (Cleggan bay) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S. latissima | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Ulva lactuca* | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (- not mesured) | LOD | 6 | 0.45 | 2 | 0.30 | 6 | 0.45 | 6 | 0.30 | 2 | 0.38 | 3 | 0.36 | 6 | 1.00 | 6 | 0.30 | 23 | 5 | 2 | 0.30 | 3 | 0.74 | 30 | 1.52 |
| | LOQ | 20 | 1.50 | 5 | 1.00 | 20 | 1.50 | 20 | 1.00 | 5 | 1.25 | 10 | 1.20 | 20 | 2.50 | 20 | 1.00 | 75 | 20 | 5 | 1.00 | 10 | 2.45 | 100 | 5.00 |

### 3.5.11. Microplastics

Table 21 - Results of microplastic assessment in commercial mussels (*Mytilus edulis* and *Mytillus galloprovincialis*). Values represent the mean number of microplastics in subsamples (fibres and particles separately) detected per gram of tissue (w.w.). Values in parentheses represent standard deviation of the subsamples. nm: not measured

| Species | Location | Country | Average Size | Average weight | Method | N | Fibres | Particles | Total microplastics |
|---|---|---|---|---|---|---|---|---|---|
| *M. edulis* | Baie de Saint Brieux | France | 4.9 ± 0.5 cm | 3.5 ± 1.2 g | Acid Mix | 5 | 0.06 (0.13) | 0.00 (0.00) | 0.06 (0.13) |
| *M. galloprovincialis* | Goro | Italy | 6.9 ± 0.6 cm | 5.9 ± 1.7 g | Acid Mix | 5 | 0.12 (0.20) | 0.13 (0.12) | 0.25 (0.26) |
| *M. edulis* | Løgstør Bredning, Limfjorden | Denmark | nm | 4.4 ± 0.2 g | Acid Mix | 5 | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| *M. galloprovincialis* | Amposta, Ebro delta | Spain | 7.1 ± 0.6 cm | 5.0 ± 2.0 g | Acid Mix | 5 | 0.04 (0.09) | 0.00 (0.00) | 0.04 (0.09) |
| *M. edulis* | Inschot | The Netherlands | 5.4 ± 0.5 cm | 4.1 ± 1.4 g | Acid Mix | 5 | 0.29 (0.08) | 0.04 (0.08) | 0.32 (0.22) |

From the data of Round I, the following results are highlighted:

**Brominated flame retardants**: PBDEs, dechloranes, MeO-PBDEs, HBB, PBEB, DBDPE and HBCD were analysed in twenty two samples from fifteen species. No detectable contamination level was observed for HBB, PBEB, DBDPE and HBCD groups. Detectable contamination levels were observed for PBDEs, dechlorane and MeO-PBDEs groups. BDE-28, BDE-47, BDE-100 and BDE-99 were the prevalent PBDEs detected in positive samples. Among the samples analysed, mackerel was the species mostly contaminated with PBDEs. The presence of detectable contamination levels of PBDEs in mackerel was verified in all locations (Italy, North Sea, Denmark and Channel) with the North Sea presenting the highest level (∑PBDEs 16.23 µg/kg d.w.). Mussels, independently of origin were also frequently contaminated with PBDEs. In mackerel and mussels, the presence of detectable contamination levels of dechlorane (DEC 602, 603, 604, syn-DP, anti-DP), particularly syn-DP was also observed. 6-MBDE-47 was the predominant MeO-PBDE in the positive samples. Overall mackerel was the most contaminated species followed by mussels and tuna.

**Endocrine disruptors**: triclosan, methylparaben and TBEP were analysed in twenty eight samples from sixteen species. In all of them the levels found for TBEP were either below the method quantification or detection limits. Triclosan was detected in 7 species (plaice, *S. latissima,* mussel, shrimp, fresh tuna, pangasius and nile perch), being the highest level quantified in large plaice (183.8 µg/kg d.w.). Methylparaben was detected in 4 species (mussel, sole, plaice, *S. latissima*) being the mussel sample from Netherlands the most contaminated (5.9 µg/kg d.w.). In terms of locations, samples from North Sea were more contaminated than samples coming from other locations. BPA was detected in two canned seafood products (tuna and mackerel).

**Inorganic arsenic**: iAs was analysed in 45 samples of fish, shellfish, bivalves and seaweed. In fish samples, the level of iAs was low (<0.01 mg/kg in all cases). Detectable contamination levels were found in three analysed species (mussel, crab and seaweeds) with the highest levels detected in mussels. Contamination of this species seemed to be independent of location, although in this study samples from The Netherlands contained the highest levels.

**Musks**: ten different musks were analysed in thirty seven samples from eighteen species. No detectable contamination levels were observed for celestolide (ADBI), phantolide (AHMI), Musk xylene (MX), Musk moskene (MM) and Musk ketone (MK). In contrast, detectable contamination levels of cashmeran (DPMI) were observed for three species: monkfish, Atlantic hake and mussels. Traseolide (ATII) was detected in monkfish, Atlantic hake, mussels, shrimp, plaice and brown crab. Detectable contamination levels were also observed for galaxolide (HHCB), tonalide (AHTN) and HHCB-Lactone (a transformation product of HHCB) for most samples analysed. HHCB was detected in 30 out of 37 samples analysed, with the highest level value being observed in small plaice from the Channel (414.4 µg/kg d.w.) followed by mussels from Italy (109.8 µg/kg d.w.). Apparently, the location had no influence on HHCB levels found. AHTN levels ranged from 5.5 to 14.1 µg/kg d.w., being the highest value quantified in brown crab from The Netherlands. The higher levels of HHCB-Lactone were detected in mackerel from Italy, Spain and Channel.

**Pharmaceuticals**: eight different pharmaceuticals were analysed in 28 samples from 15 species. The levels observed for diclofenac, azithromycin, carbamazepine and citalopram were either below the quantification or detection limits. Sotalol was only quantified in fresh tuna from the Mediterranean, whereas diazepam was quantified in canned mackerel and fresh tuna from the Mediterranean. In

mussels from The Netherlands, sulfamethoxazole and venlafaxine were quantified, reaching a maximum level of 11.72 µg/kg d.w. of sulfamethoxazole.

**Perfluorinated substances**: sixteen different perfluorinated contaminants were analysed in 38 samples of 20 species. No detectable contamination levels were observed for PFBA, PFPeA, PFHxA, PFHpA, PFBS, PFHpS and PFDS. Detectable contamination levels were observed for PFOA in most samples collected in the Mediterranean. PFNA was measured in 7 out of 38 samples analysed, being the highest level found in mussels (6.5 µg/kg d.w) from The Netherlands. The highest detectable level of PFNA was observed in Nile perch from Lake Victoria. PFOS was quantified in 7 samples, being the highest level found in mussels from Spain (4.8 µg/kg d.w). For PFDcA, PFTrA, PFTeA, PFHxS, PFUnA, PFDoA intermediate contamination levels were observed for few samples.

**Polycyclic aromatic hydrocarbons**: seventeen different compounds were analysed in 6 samples of 2 species. No detectable contamination levels were observed for acenapthylene, anthracene and dibenzo(ah)anthracene. Among the measured compounds detected, phenanthrene presented the highest levels in most samples analysed. Considering the sum of all PAHs, the highest level of contamination was observed in mussels from The Netherlands.

**Tetrabromobisphenol A and bisphenol A:** TBBPA and BPA were analysed in 35 samples of 19 species. TBBPA was found in fresh mackerel, farmed pangasius and canned tuna, whereas BPA was measured in three species: small monkfish, canned mackerel and canned tuna.

**Total and organic mercury**: Methyl mercury was analysed in 44 samples from 17 species. A detectable contamination level was measured in 16 out of the 17 species analysed. The highest levels of MeHg and T-Hg were measured in large monkfish and large octopus, with 1490 and 1282 µg/kg d.w, respectively.

**UV-filters**: Twelve different compounds were measured in 35 samples from 19 species. No detectable contamination levels were observed for DHMB, EPABA, THB and DBENZO. HS and OC were measured in two samples in levels ranging from 29 to 54 µg/kg d.w. Detectable contamination levels of EHS (2-Ethylhexyl salicylate), IMC (Isoamyl-4 methoxycinnamate), 4-MBC (3-(4-Methylbenzylidenecamphor), BP3 (benzophenone 3), BP1 (benzophenone 1) and EHMC (2-Ethylhexyl 4-methoxycinnamate) were detected in a wide range of samples. Among the samples analysed monkfish, shrimp and mussels were the most contaminated with UV-filters.

**Microplastics**: Microplastic contamination of commercial mussels was evaluated using the Acid mix Method. Mussels originated from 5 different countries and belonging to 2 different species: *M. edulis* (France, Denmark, The Netherlands) and *M. galloprovincialis* (Italy, Spain). Blank samples contained on average 1.2 fibres, while no plastic particles were detected in blanks. The predominant colours found in the procedural blank samples were blue and black (83.3%). These blank results of the commercial part are consistent with the contamination found in hotspots samples. For the correction of background (airborne) contamination, results were again evaluated after omitting particles or fibres matching the characteristics of fragments found in blanks. Fibres were detected in commercial mussel samples, ranging from 0.00 fibres/g w.w. in Danish mussels to 0.29 fibres/g w.w. in Dutch mussels. Particles were only found at low concentrations in Italian and Dutch mussel samples, with 0.13 and 0.04 particles/g w.w., respectively. For the commercial mussels, an average of 0.13 ± 0.14 total microplastics/g w.w. was established. An average concentrations of 0.13 and 0.14 total microplastics/g w.w. were reported for *M. edulis* and *M. galloprovincialis*, respectively.

When comparing the results of both species, no significant differences could be observed based on fibres (T-test, p=0.78), particles (T-test, p=0.38) and total microplastics (T-test, p=0.92).

In general, we can state that the levels of particles/fibres in mussels are very low, both in hotspot and in commercial samples. Because of the very low levels of microplastics found in hotspot samples and commercial round 1 samples, it was decided not to perform further analysis of microplastics in processed samples, neither in round 2-commercial samples.

## 3.6. Results in commercial samples from Round II

### 3.6.1 Brominated flame retardants (BFRs)

Table 22 - BFRs content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | BDE28 | | BDE47 | | BDE100 | | BDE99 | | BDE154 | | BDE153 | | BDE183 | | BDE209 | | ∑PBDEs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | Goro. IT | <0.11 | <0.04 | <0.11 | <0.04 | <0.01 | <0.004 | 15 | 5.68 | 27 | 9.97 | 5 | 1.66 | <0.04 | <0.03 | <0.09 | <0.01 | **47.10** | **17.32** |
| Seabream | Other origin | 13 | 2.81 | 31 | 6.77 | <0.01 | <0.002 | <0.03 | <0.01 | <0.09 | <0.02 | 4 | 0.87 | <0.04 | <0.06 | <0.27 | <0.01 | **48.6** | **10.46** |
| Mussels | Goro. IT | <0.04 | <0.01 | <0.11 | <0.02 | <0.01 | <0.002 | 12 | 2.07 | <0.09 | <0.02 | <0.04 | <0.01 | <0.04 | <0.05 | <0.27 | <0.01 | **11.6** | **2.07** |
| Plaice, small | North Sea | 0.2 | 0.04 | 2 | 0.35 | <0.01 | <0.002 | 0.2 | 0.04 | <0.09 | <0.02 | <0.11 | <0.02 | <0.04 | <0.02 | <0.09 | <0.01 | **2.3** | **0.44** |
| Plaice, large | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | North Sea | 1.0 | 0.36 | 2.4 | 0.86 | <0.01 | <0.004 | 0.2 | 0.07 | 5 | 1.79 | 0.3 | 0.11 | <0.11 | 0.54 | 1.5 | <0.04 | **10.4** | **3.72** |
| Mussels | Netherlands | 0.34 | 0.07 | 1 | 0.20 | <0.01 | <0.002 | 0.2 | 0.05 | <0.09 | <0.02 | <0.11 | <0.02 | <0.04 | <0.02 | <0.09 | <0.01 | **1.5** | **0.32** |
| Mussels | Ireland | 0.4 | 0.04 | 1 | 0.11 | <0.01 | <0.001 | 0.2 | 0.03 | <0.09 | <0.01 | <0.11 | <0.01 | <0.04 | <0.01 | <0.09 | <0.005 | **1.5** | **0.18** |
| Brown crab | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Spain | 0.4 | 0.06 | 3 | 0.38 | <0.01 | <0.001 | 0.5 | 0.07 | <0.09 | <0.01 | <0.11 | <0.02 | <0.04 | 0.21 | 1.4 | <0.01 | **4.9** | **0.71** |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | <0.11 | <0.03 | <0.11 | <0.03 | <0.01 | <0.003 | 12 | 3.59 | <0.27 | <0.08 | 7 | 2.01 | <0.11 | <0.03 | <0.09 | <0.03 | **18.8** | **5.60** |
| Mussels | Limfiord. Denmark | 0.2 | 0.03 | 0.7 | 0.11 | <0.01 | <0.002 | 0.2 | 0.03 | <0.09 | <0.01 | <0.11 | <0.02 | <0.04 | <0.01 | <0.09 | <0.01 | **1.1** | **0.17** |
| Norwegian salmon (farmed) | DanSalmon. Denmark | 0.2 | 0.08 | 4 | 1.63 | <0.01 | <0.004 | 0.2 | 0.08 | <0.09 | <0.04 | <0.11 | <0.04 | <0.04 | <0.04 | <0.09 | <0.02 | **4.4** | **1.79** |
| Atlantic Cod | North Sea. Denmark | 0.2 | 0.04 | 0.6 | 0.11 | <0.01 | <0.002 | 0.2 | 0.04 | <0.09 | <0.02 | <0.11 | <0.02 | <0.04 | 0.57 | 3 | <0.01 | **4.0** | **0.76** |
| Mackerel | North Sea. Denmark | 0.2 | 0.09 | 21 | 9.01 | <0.01 | <0.004 | 0.2 | 0.09 | <0.09 | <0.04 | <0.11 | <0.05 | <0.04 | <0.04 | <0.09 | <0.02 | **21.4** | **9.18** |
| Monkfish, small | Portugal | 0.2 | 0.05 | 0.5 | 0.10 | <0.01 | <0.002 | 0.2 | 0.05 | <0.09 | <0.02 | <0.11 | <0.02 | <0.04 | <0.02 | <0.09 | <0.01 | **1.0** | **0.19** |
| Monkfish, large | Portugal | 0.3 | 0.06 | 0.8 | 0.16 | <0.01 | <0.002 | 0.2 | 0.04 | <0.09 | <0.02 | <0.11 | <0.02 | <0.04 | <0.02 | <0.09 | <0.01 | **1.3** | **0.26** |
| Canned Tuna | Portugal | 0.2 | 0.11 | 0.7 | 0.30 | <0.01 | <0.005 | 0.3 | 0.12 | <0.09 | <0.04 | <0.11 | <0.05 | <0.04 | <0.04 | <0.09 | <0.02 | **1.2** | **0.53** |
| Canned mackerel | Portugal | 0.4 | 0.17 | 0.6 | 0.25 | <0.01 | <0.004 | 0.2 | 0.08 | <0.09 | <0.04 | <0.11 | <0.05 | <0.04 | <0.04 | <0.09 | <0.02 | **1.2** | **0.51** |
| Plaice/Sole, small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | France | 0.3 | 0.07 | 0.6 | 0.15 | <0.01 | <0.002 | 0.2 | 0.05 | <0.09 | <0.02 | <0.11 | <0.03 | <0.04 | 2.71 | 11 | <0.01 | **12.1** | **2.98** |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | 0.3 | 0.10 | 2 | 0.52 | <0.01 | <0.003 | 0.2 | 0.07 | <0.09 | <0.03 | <0.11 | <0.03 | <0.04 | <0.03 | <0.09 | <0.01 | **2.2** | **0.70** |
| Imported Tuna, large | Pacific | 0.5 | 0.17 | 2 | 0.68 | <0.01 | <0.003 | 0.2 | 0.07 | <0.09 | <0.03 | <0.11 | <0.04 | <0.04 | <0.03 | <0.09 | <0.01 | **2.9** | **0.92** |
| Nile Perch | Lake Victoria | | | | | | | | | | | | | | | | | | |
| Pangasius | Vietnam | | | | | | | | | | | | | | | | | | |
| Shrimp vannamei | Asia | | | | | | | | | | | | | | | | | | |
| (- not measured) | **LOD** | 0.01 | 0.00 | 0.01 | 0.00 | 0.03 | 0.01 | 0.04 | 0.01 | 0.06 | 0.02 | 0.09 | 0.02 | | | 1.50 | | | 0.38 |
| | **LOQ** | 0.02 | 0.00 | 0.03 | 0.01 | 0.09 | 0.02 | 0.14 | 0.03 | 0.20 | 0.05 | 0.30 | 0.08 | | | 5.00 | | | 1.28 |

(Cont. Table 22)

| Species | Sampling site | HBB | | PBEB | | DBDPE | | Dec 602 | | Dec 603 | | Dec 604 | | syn-DP | | anti-DP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | Goro. IT | 18 | 6.62 | <0.09 | <0.03 | <0.03 | <0.01 | 0.04 | 0.020 | <0.001 | <0.0003 | <0.001 | <0.0003 | <0.001 | <0.0002 | <0.0003 | <0.0001 |
| Seabream | Other origin | 18 | 3.86 | <0.09 | <0.02 | <0.03 | <0.01 | <0.003 | <0.0008 | <0.001 | <0.0003 | <0.001 | <0.0003 | <0.001 | <0.0002 | <0.0003 | <0.0001 |
| Mussels | Goro. IT | 18 | 3.21 | <0.09 | <0.02 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Plaice, small | North Sea | 0.4 | 0.07 | <0.09 | <0.02 | <0.03 | <0.01 | <0.003 | <0.0008 | <0.001 | <0.0003 | <0.001 | <0.0003 | <0.001 | <0.0002 | <0.0003 | <0.0001 |
| Plaice, large | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | North Sea | 0.4 | 0.14 | <0.09 | <0.03 | <0.03 | <0.01 | <0.003 | <0.0008 | 2.33 | 0.84 | <0.001 | <0.0003 | 2.00 | 0.72 | 0.38 | 0.14 |
| Mussels | Netherlands | 0.4 | 0.07 | <0.09 | <0.02 | <0.03 | <0.01 | <0.003 | <0.0008 | 1.81 | 0.38 | <0.001 | <0.0003 | <0.001 | <0.0002 | 0.08 | 0.02 |
| Mussels | Ireland | 0.4 | 0.04 | <0.09 | <0.01 | <0.03 | <0.004 | <0.003 | <0.0008 | 1.88 | 0.23 | <0.001 | <0.0003 | <0.001 | <0.0002 | 0.37 | 0.04 |
| Brown crab | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Spain | 0.4 | 0.05 | <0.09 | <0.01 | <0.03 | <0.004 | <0.003 | <0.0008 | <0.001 | <0.0003 | <0.001 | <0.0003 | <0.001 | <0.0002 | <0.0003 | <0.0001 |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | 19 | 5.56 | <0.09 | <0.03 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Mussels | Limfiord. Denmark | 0.4 | 0.06 | <0.09 | <0.01 | <0.03 | <0.005 | - | - | - | - | - | - | - | - | - | - |
| Norwegian salmon (farmed) | DanSalmon. Denmark | <0.09 | <0.04 | <0.09 | <0.04 | 30 | 12.21 | - | - | - | - | - | - | - | - | - | - |
| Atlantic Cod | North Sea. Denmark | 0.4 | 0.08 | <0.09 | <0.02 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North Sea. Denmark | <0.09 | <0.04 | <0.09 | <0.04 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Monkfish, small | Portugal | 0.4 | 0.07 | <0.09 | <0.02 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Monkfish, large | Portugal | 0.4 | 0.07 | <0.09 | <0.02 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Canned Tuna | Portugal | 0.4 | 0.16 | <0.09 | <0.04 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Canned mackerel | Portugal | 0.4 | 0.17 | <0.09 | <0.04 | <0.03 | <0.01 | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | France | 0.4 | 0.10 | <0.09 | <0.02 | <0.03 | <0.01 | | | | | | | | | | |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | 0.4 | 0.11 | <0.09 | <0.03 | <0.03 | <0.01 | <0.003 | <0.0008 | <0.001 | <0.0003 | <0.001 | <0.0003 | <0.001 | <0.0002 | <0.0003 | <0.0001 |
| Imported Tuna, large | Pacific | 0.4 | 0.12 | <0.09 | <0.03 | <0.03 | <0.01 | | | | | | | | | | |
| Nile Perch | Lake Victoria | | | | | | | | | | | | | | | | |
| Pangasius | Vietnam | | | | | | | | | | | | | | | | |
| Shrimp vannamei | Asia | | | | | | | <0.003 | <0.0008 | <0.001 | <0.0003 | <0.001 | <0.0003 | <0.001 | <0.0002 | 0.42 | 0.15 |
| (- not measured) | **LOD** | 0.0283 | 0.0072 | 0.0257 | 0.0066 | 1.3650 | 0.3483 | 0.0030 | 0.0008 | 0.0010 | 0.0003 | 0.0010 | 0.0003 | 0.0008 | 0.0002 | 0.0003 | 0.0001 |
| | **LOQ** | 0.0944 | 0.0241 | 0.0858 | 0.0219 | 4.5499 | 1.1612 | 0.0099 | 0.0018 | 0.0034 | 0.0009 | 0.0034 | 0.0009 | 0.0025 | 0.0006 | 0.0011 | 0.0003 |

(Cont. Table 22)

| Species | Sampling site | 2-MBDE-68 | | 6-MBDE-47 | | 5-MBDE-47 | | 4-MBDE-99 | | 5-MBDE-100 | | 4-MBDE-100 | | 5-MBDE-99 | | 4-MBDE-101 | | ∑MeO-PBDEs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | Goro. IT | <0.04 | <0.01 | <1.33 | <0.49 | <0.09 | <0.03 | <0.04 | <0.01 | 9 | 3.30 | <0.01 | <0.004 | <0.22 | <0.08 | <0.11 | <0.04 | **9.0** | **3.30** |
| Seabream | Other origin | <0.11 | <0.02 | 11 | 2.27 | <0.09 | <0.02 | <0.04 | <0.01 | 9 | 1.96 | <0.01 | <0.002 | <0.22 | <0.05 | <0.04 | <0.01 | **19.7** | **4.23** |
| Mussels | Goro. IT | <0.04 | <<0.01 | <0.44 | <0.08 | <0.09 | <0.02 | <0.04 | <0.01 | 9 | 1.60 | <0.01 | <0.002 | <0.22 | <0.04 | <0.04 | <0.01 | **8.9** | **1.60** |
| Plaice, small | North Sea | <0.04 | <0.01 | <0.44 | <0.08 | <0.09 | <0.02 | <0.04 | <0.01 | <0.27 | <0.05 | <0.01 | <0.002 | <0.22 | <0.04 | <0.04 | <0.01 | **0.0** | **0.00** |
| Plaice, large | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | North Sea | 4 | 1.43 | 5 | 1.79 | <0.09 | <0.03 | <0.04 | <0.01 | 0.3 | 0.11 | 11 | 3.94 | <0.22 | <0.08 | <0.04 | <0.01 | **20.3** | **7.27** |
| Mussels | Netherlands | 4 | 0.85 | <0.44 | <0.09 | <0.09 | <0.02 | <0.04 | <0.01 | <0.27 | <0.06 | <0.01 | <0.002 | <0.22 | <0.05 | <0.04 | <0.01 | **4.1** | **0.85** |
| Mussels | Ireland | <0.11 | <0.01 | <0.44 | <0.05 | <0.09 | <0.01 | <0.04 | <0.005 | <0.27 | <0.03 | <0.01 | <0.001 | <0.22 | <0.03 | <0.04 | <0.005 | **0.0** | **0.00** |
| Brown crab | Netherlands | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Spain | <0.11 | <0.02 | <1.33 | <0.20 | <0.27 | <0.04 | <0.04 | <0.01 | 0.2 | 0.03 | <0.01 | <0.001 | <0.22 | <0.03 | <0.04 | <0.01 | **0.2** | **0.03** |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | <0.11 | <0.03 | <0.44 | <0.13 | <0.09 | <0.03 | <0.04 | <0.01 | 9 | 2.67 | <0.01 | <0.003 | <0.22 | <0.07 | <0.04 | <0.01 | **9.0** | **2.67** |
| Mussels | Limfiord. Denmark | 0.4 | 0.06 | 1.4 | 0.21 | <0.09 | <0.01 | <0.04 | <0.01 | <0.27 | <0.04 | <0.01 | <0.002 | <0.22 | <0.03 | <0.04 | <0.01 | **1.8** | **0.27** |
| Norwegian salmon (farmed) | DanSalmon. Denmark | <0.11 | <0.04 | <1.33 | <0.54 | <0.09 | <0.04 | <0.04 | <0.02 | <0.09 | <0.04 | <0.01 | <0.004 | <0.22 | <0.09 | <0.04 | <0.02 | **0.0** | **0.00** |
| Atlantic Cod | North Sea. Denmark | <0.04 | <0.01 | <0.44 | <0.08 | <0.09 | <0.02 | <0.04 | <0.01 | <0.27 | <0.05 | <0.01 | <0.002 | <0.22 | <0.04 | <0.04 | <0.01 | **0.0** | **0.00** |
| Mackerel | North Sea. Denmark | <0.04 | <0.02 | <0.44 | <0.19 | <0.09 | <0.04 | <0.04 | <0.02 | <0.09 | <0.04 | <0.01 | <0.004 | <0.22 | <0.09 | <0.04 | <0.02 | **0.0** | **0.00** |
| Monkfish, small | Portugal | <0.04 | <0.01 | <0.44 | <0.09 | <0.09 | <0.02 | <0.04 | <0.01 | <0.27 | <0.05 | <0.01 | <0.002 | <0.22 | <0.04 | <0.04 | <0.01 | **0.0** | **0.00** |
| Monkfish, large | Portugal | <0.04 | <0.01 | <1.33 | <0.25 | <0.09 | <0.02 | <0.04 | <0.01 | <0.27 | <0.05 | <0.01 | <0.002 | <0.22 | <0.04 | <0.04 | <0.01 | **0.0** | **0.00** |
| Canned Tuna | Portugal | <0.11 | <0.05 | 23 | 10.49 | <0.27 | <0.12 | <0.04 | <0.02 | <0.27 | <0.12 | <0.01 | <0.005 | <0.22 | <0.10 | <0.04 | <0.02 | **23.3** | **10.49** |
| Canned mackerel | Portugal | <0.04 | <0.02 | <1.33 | <0.56 | <0.09 | <0.04 | <0.04 | <0.02 | <0.27 | <0.11 | <0.01 | <0.004 | <0.22 | <0.09 | <0.04 | <0.02 | **0.0** | **0.00** |
| Plaice/Sole, small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | France | <0.11 | <0.03 | <1.33 | <0.33 | <0.09 | <0.02 | <0.04 | <0.01 | <0.27 | <0.07 | <0.01 | <0.002 | <0.22 | <0.05 | <0.04 | <0.01 | **0.0** | **0.00** |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | <0.11 | <0.03 | 2.7 | 0.85 | <0.09 | <0.03 | <0.04 | <0.01 | <0.27 | <0.08 | <0.01 | <0.003 | <0.22 | <0.07 | <0.04 | <0.01 | **2.7** | **0.85** |
| Imported Tuna, large | Pacific | 7 | 2.38 | <0.44 | <0.14 | <0.09 | <0.03 | <0.04 | <0.01 | <0.27 | <0.09 | <0.01 | <0.003 | <0.22 | <0.07 | <0.04 | <0.01 | **7.4** | **2.38** |
| Nile Perch | Lake Victoria | | | | | | | | | | | | | | | | | | |
| Pangasius | Vietnam | | | | | | | | | | | | | | | | | | |
| Shrimp vannamei | Asia | | | | | | | | | | | | | | | | | | |
| (- not measured) | **LOD** | 0.1501 | 0.0383 | 0.0601 | 0.0153 | 0.0601 | 0.0153 | 0.3003 | 0.0766 | 0.2815 | 0.0718 | 0.3107 | 0.0793 | 0.5299 | 0.1352 | 0.4504 | 0.1150 | | |
| | **LOQ** | 0.5005 | 0.1277 | 0.2002 | 0.0511 | 0.2002 | 0.0511 | 1.0010 | 0.2555 | 0.9384 | 0.2395 | 1.0355 | 0.2643 | 1.7664 | 0.4508 | 1.5015 | 0.3832 | | |

(Cont. Table 22)

| Species | Sampling site | TBBPA (µg/kg) | | 2.4.6-Tribromphenol (µg/kg) | | α-HBCD (µg/kg) | | β-HBCD (µg/kg) | | γ-HBCD (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| sole. large | Goro. IT | - | - | - | - | - | - | - | - | - | - |
| mackerel. fresh | Goro. IT | <0.1 | <0.05 | <1 | <0.5 | 4.2 | 1.55 | <0.1 | <0.05 | <0.1 | <0.05 |
| seabream | Other origin | <0.1 | <0.05 | <1 | <0.5 | <0.1 | <0.05 | <0.1 | <0.05 | <0.1 | <0.05 |
| Mussels | Goro. IT | <0.1 | <0.05 | 12 | 2.15 | 0.6 | 0.11 | <0.1 | <0.05 | 0.36 | 0.06 |
| Plaice. small | North Sea | <0.1 | <0.05 | 1.3 | 0.25 | 0.08 | 0.02 | <0.1 | <0.05 | <0.1 | <0.05 |
| Plaice. large | North Sea | - | - | - | - | - | - | - | - | - | - |
| Mackerel. fresh | North Sea | <0.1 | <0.05 | <1 | <0.5 | 0.67 | 0.24 | <0.1 | <0.05 | <0.1 | <0.05 |
| Mussels | Netherlands | <0.1 | <0.05 | 3.5 | 0.73 | 0.27 | 0.06 | <0.1 | <0.05 | 0.34 | 0.07 |
| Mussels | Ireland | <0.1 | <0.05 | 16.2 | 2 | 2.05 | 0.25 | 0.2 | 0.02 | 0.47 | 0.06 |
| Brown crab | Netherlands | - | - | - | - | - | - | - | - | - | - |
| Mussels | Spain | <0.1 | 0.57 | 12.4 | 1.8 | 0.36 | 0.05 | <0.1 | <0.05 | <0.1 | <0.05 |
| Octopus. small | Mediterranean | - | - | - | - | - | - | - | - | - | - |
| Octopus. large | Mediterranean | - | - | - | - | - | - | - | - | - | - |
| mackerel fresh | Spain | 1.9 | 0.57 | <1 | | 2 | 0.6 | <0.1 | <0.05 | <0.1 | <0.05 |
| Mussels | Limfiord. Denmark | <0.1 | <0.05 | 9.4 | 1.56 | 0.12 | 0.02 | <0.1 | <0.05 | <0.1 | <0.05 |
| Norwegian salmon (farmed) | DanSalmon. Denmark | <0.1 | <0.05 | <1 | <0.5 | 0.43 | 0.18 | <0.1 | <0.05 | 0.255 | 0.11 |
| Atlantic Cod | North Sea. Denmark | <0.1 | <0.05 | <1 | <0.5 | 0.075 | 0.015 | <0.1 | <0.05 | <0.1 | <0.05 |
| mackerel | North Sea. Denmark | <0.1 | <0.05 | <1 | <0.5 | 0.42 | 0.18 | <0.1 | <0.05 | <0.1 | <0.05 |
| Monkfish. small | Portugal | 0.486 | 0.09 | <1 | <0.5 | <0.1 | <0.05 | <0.1 | <0.05 | <0.1 | <0.05 |
| Monkfish. largel | Portugal | <0.1 | <0.05 | <1 | <0.5 | <0.1 | <0.05 | <0.1 | <0.05 | <0.1 | <0.05 |
| Canned Tuna | Portugal | <0.1 | <0.05 | <1 | <0.5 | <0.1 | <0.05 | <0.1 | <0.05 | <0.1 | <0.05 |
| Canned mackerel | Portugal | 1.85 | 0.78 | <1 | <0.5 | <0.1 | <0.05 | <0.1 | <0.05 | <0.1 | <0.05 |
| Plaice/Sole. small | Channel | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole. large | Channel | - | - | - | - | - | - | - | - | - | - |
| Mussels | France | <0.1 | <0.05 | 11.7 | 2.9 | 0.15 | 0.04 | <0.1 | | <0.1 | |
| Pacific hake. small | South America | - | - | - | - | - | - | - | - | - | - |
| Pacific hake. large | South America | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake. small | South Africa | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake. large | South Africa | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna. small | Pacific | <0.1 | <0.05 | <1 | <0.5 | <0.1 | <0.05 | <0.1 | <0.05 | 0.11 | 0.03 |
| Imported Tuna. large | Pacific | <0.1 | <0.05 | <1 | <0.5 | <0.1 | <0.05 | <0.1 | <0.05 | <0.1 | <0.05 |
| (- not measured) | **LOD** | 0.10 | 0.05 | 1.00 | 0.50 | 0.10 | 0.05 | 0.10 | 0.05 | 0.10 | 0.05 |
| | **LOQ** | 0.20 | | 2.00 | | 0.20 | | 0.20 | | 0.20 | |

### 3.6.2 Endocrine disruptors (ECDs)

Table 23 - ECDS content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | BPA(µg/kg) | | Triclosan (µg/kg) | | Methylparaben (µg/kg) | | TBEP (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | <0.008 | <0.001 | <0.001 | <0.000 | <0.002 | <0.000 | <0.001 | <0.000 |
| Mackerel, fresh | Goro. IT | <0.06 | <0.02 | <0.004 | <0.001 | <0.001 | <0.000 | <0.008 | <0.003 |
| Seabream | Other origin | 21.5 | 4.62 | <0.002 | <0.000 | 2.7 | 0.581 | <0.001 | <0.000 |
| Mussels | Goro. IT | 9.32 | 1.67 | <0.004 | <0.001 | 2.28 | 0.408 | <0.03 | <0.005 |
| Plaice, small | North Sea | <0.008 | <0.002 | <0.002 | <0.000 | <0.002 | <0.000 | <0.003 | <0.001 |
| Plaice, large | North Sea | <0.008 | <0.002 | <0.002 | <0.000 | <0.002 | <0.000 | <0.003 | <0.001 |
| Mackerel, fresh | North Sea | <0.02 | <0.01 | 0.96 | 0.34 | <0.001 | <0.000 | <0.003 | <0.001 |
| Mussels | Netherlands | <0.06 | <0.01 | <0.04 | <0.008 | <0.004 | <0.001 | <0.03 | <0.006 |
| Mussels | Ireland | <0.06 | <0.007 | <0.14 | <0.02 | <0.004 | <0.000 | <0.03 | <0.004 |
| Brown crab | Netherlands | 10.31 | 4.07 | <0.04 | <0.02 | <0.004 | <0.002 | <0.03 | <0.01 |
| Mussels | Spain | 8.26 | 1.21 | <0.04 | <0.006 | <0.01 | <0.001 | <0.09 | <0.01 |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | 25.02 | 7.45 | 0.89 | 0.27 | <0.001 | <0.000 | <0.003 | <0.001 |
| Mussels | Limfiord. Denmark | <0.06 | <0.01 | <0.14 | <0.02 | <0.004 | <0.001 | <0.03 | <0.005 |
| Norwegian salmon (farmed) | DanSalmon. Denmark | 8.56 | 3.54 | <0.02 | <0.008 | 0.35 | 0.14 | <0.03 | <0.01 |
| Atlantic Cod | North Sea. Denmark | <0.008 | <0.002 | <0.002 | <0.000 | <0.002 | <0.000 | <0.001 | <0.000 |
| Mackerel | North Sea. Denmark | <0.02 | <0.009 | <0.004 | <0.002 | 8.86 | 3.84 | <0.003 | <0.001 |
| Monkfish, small | Portugal | - | - | - | - | - | - | - | - |
| Monkfish, large | Portugal | - | - | - | - | - | - | - | - |
| Canned Tuna | Portugal | 69.1 | 27.21 | <0.004 | <0.002 | <0.001 | <0.000 | <0.003 | <0.001 |
| Canned mackerel | Portugal | 7.6 | 3.22 | <0.004 | <0.002 | <0.001 | <0.000 | <0.003 | <0.001 |
| Plaice/Sole, small | Channel | <0.008 | <0.002 | <0.001 | <0.000 | <0.002 | <0.000 | <0.001 | <0.000 |
| Plaice/Sole, large | Channel | <0.008 | <0.002 | <0.001 | <0.000 | <0.002 | <0.000 | <0.001 | <0.000 |
| Mussels | France | 8.26 | 2.04 | <0.14 | <0.03 | <0.01 | <0.002 | <0.09 | <0.02 |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | <0.02 | <0.006 | 2.74 | 0.86 | <0.001 | <0.000 | <0.003 | <0.001 |
| Imported Tuna, large | Pacific | <0.02 | <0.006 | <0.02 | <0.006 | <0.01 | <0.003 | <0.01 | <0.003 |
| Nile Perch | Lake Victoria | | | | | | | | |
| Pangasius | Vietnam | | | | | | | | |
| Shrimp vannamei | Asia | | | | | | | | |
| (- not measured) | **LOD** | 0.008-0.06 | 0.002-0.01 | 0.25-0.30 | 0.001-0.01 | 0.005-0.04 | 0.001-0.004 | 0.02-0.45 | 0.001-0.006 |
| | **LOQ** | 0.03-0.2 | 0.004-0.05 | 0.75-0.90 | 0.001-0.03 | 0.01-0.12 | 0.001-0.01 | 0.05-1.35 | 0.001-0.02 |

### 3.6.3 Inorganic Arsenic

Table 24 - Inorganic arsenic content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | iAs (µg/kg) | | T-iAs (µg/kg) | |
|---|---|---|---|---|---|
| | | dw | ww | dw | ww |
| Sole large | Goro. IT | - | - | - | - |
| Mackerel, fresh | Goro. IT | - | - | - | - |
| Seabream | Other origin | - | - | - | - |
| Mussels | Goro. IT | 0.08 | 0.01 | 8.29 | 1.48 |
| Plaice, small | North Sea | - | - | - | - |
| Plaice, large | North Sea | - | - | - | - |
| Mackerel, fresh | North Sea | - | - | - | - |
| Mussels | Netherlands | 0.54 | 0.11 | 8.97 | 1.87 |
| Mussels | Ireland | 0.47 | 0.06 | 15.80 | 1.92 |
| Brown crab | Netherlands | 0.09 | 0.03 | 34.20 | 13.50 |
| Mussels | Spain | 0.15 | 0.02 | 19.80 | 2.91 |
| Octopus, small | Mediterranean | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - |
| Mackerel fresh | Spain | - | - | - | - |
| Mussels | Limfiord. Denmark | 0.17 | 0.03 | - | - |
| Norwegian salmon (farmed) | DanSalmon. Denmark | - | - | - | - |
| Atlantic Cod | North Sea. Denmark | - | - | - | - |
| Mackerel | North Sea. Denmark | - | - | - | - |
| Monkfish, small | Portugal | - | - | - | - |
| Monkfish, large | Portugal | - | - | - | - |
| Canned Tuna | Portugal | - | - | - | - |
| Canned mackerel | Portugal | - | - | - | - |
| Plaice/Sole, small | Channel | - | - | - | - |
| Plaice/Sole, large | Channel | - | - | - | - |
| Mussels | France | 0.06 | 0.02 | 14.70 | 3.63 |
| Pacific hake, small | South America | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - |
| Imported Tuna, small | Pacific | - | - | - | - |
| Imported Tuna, large | Pacific | - | - | - | - |
| Nile Perch | Lake Victoria | | | | |
| Pangasius | Vietnam | | | | |
| Shrimp vannamei | Asia | | | | |
| (- not measured) | **LOD** | **<0.01** | **<0.002** | **<0.01** | **<0.002** |
| | **LOQ** | **<0.03** | **<0.006** | **<0.03** | **<0.006** |

### 3.6.4 Musk

Table 25 - Musk content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | DPMI (µg/kg) | | ADBI (µg/kg) | | AHMI (µg/kg) | | ATII (µg/kg) | | HHCB (µg/kg) | | AHTN (µg/kg) | | MX (µg/kg) | | MM (µg/kg) | | MK (µg/kg) | | HHCB-Lactone (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | 9.28 | 1.31 | <2 | <0.3 | <2 | <0.3 | <2 | <0.3 | 34.16 | 4.82 | 7.33 | 1.03 | <5 | <0.7 | <5 | <0.7 | <5 | <0.7 | <2 | <0.3 |
| Mackerel, fresh | Goro. IT | <4 | <1.5 | <2 | <0.7 | <2 | <0.7 | <2 | <0.7 | 90.93 | 33.46 | 9.31 | 3.43 | <5 | <7.8 | <5 | <1.8 | <5 | <1.8 | 190.41 | 70.07 |
| Seabream | Other origin | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Goro. IT | <10 | <1.8 | <4 | <0.7 | <4 | <0.7 | <2 | <0.4 | 24.00 | 4.30 | <1 | <0.2 | <10 | <1.8 | <10 | <1.8 | <10 | <1.8 | <5 | <0.9 |
| Plaice, small | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice, large | North Sea | <2 | <0.4 | <2 | <0.4 | <2 | <0.4 | <2 | <0.4 | 20.05 | 3.87 | 6.42 | 1.24 | <5 | <1.0 | <5 | <1.0 | <5 | <1.0 | 48.86 | 9.40 |
| Mackerel, fresh | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Netherlands | 8.00 | 1.67 | <4 | <0.8 | <4 | <0.8 | <2 | <0.4 | <5 | <1.0 | <1 | <0.2 | <10 | <2.1 | <10 | <2.1 | <10 | <2.1 | <5 | <1.0 |
| Mussels | Ireland | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Brown crab | Netherlands | <2 | <0.8 | <2 | <0.8 | <2 | <0.8 | <2 | <0.8 | 28.29 | 11.17 | 12.71 | 5.02 | <5 | <2.0 | <5 | <2.0 | <5 | <2.0 | <2 | <0.8 |
| Mussels | Spain | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Limfiord. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Norwegian salmon (farmed) | DanSalmon. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic Cod | North Sea. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North Sea. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish, small | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish, large | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned Tuna | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned mackerel | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, small | Channel | <2 | <0.5 | <2 | <0.5 | <2 | <0.5 | <2 | <0.5 | 21.58 | 5.05 | 6.96 | 1.63 | <5 | <1.2 | <5 | <1.2 | <5 | <1.2 | 38.33 | 9.00 |
| Plaice/Sole, large | Channel | <5 | <1.1 | <2 | <0.4 | <2 | <0.4 | <2 | <0.4 | 23.06 | 5.04 | 5.86 | 1.28 | <5 | <1.1 | <5 | <1.1 | <5 | <1.1 | <2 | <0.4 |
| Mussels | France | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, large | Pacific | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (- not measured) | **White fish LOD** | **2.00** | **1.00** | **2.00** | **1.00** | **2.00** | **1.00** | **2.00** | **1.00** | **1.00** | **1.00** | **1.00** | **1.00** | **5.00** | **3.00** | **5.00** | **3.00** | **5.00** | **3.00** | **2.00** | **1.00** |
| | **White fish LOQ** | **5.00** | **3.00** | **5.00** | **3.00** | **5.00** | **3.00** | **5.00** | **3.00** | **5.00** | **3.00** | **5.00** | **3.00** | **20.00** | **11.00** | **20.00** | **11.00** | **50.00** | **11.00** | **5.00** | **3.00** |
| | **Fatty fish LOD** | **4.00** | **1.00** | **2.00** | **0.70** | **2.00** | **0.70** | **2.00** | **0.70** | **1.00** | **0.30** | **1.00** | **0.30** | **5.00** | **2.00** | **5.00** | **2.00** | **5.00** | **2.00** | **4.00** | **1.00** |
| | **Fatty Fish LOQ** | **10.00** | **3.00** | **5.00** | **2.00** | **5.00** | **2.00** | **5.00** | **2.00** | **5.00** | **2.00** | **5.00** | **2.00** | **20.00** | **7.00** | **20.00** | **7.00** | **20.00** | **7.00** | **10.00** | **3.00** |
| | **Mussels LOD** | **4.00** | **2.00** | **4.00** | **2.00** | **4.00** | **2.00** | **2.00** | **0.80** | **1.00** | **0.40** | **1.00** | **0.40** | **10.00** | **4.00** | **10.00** | **4.00** | **10.00** | **4.00** | **5.00** | **2.00** |
| | **Mussels LOQ** | **10.00** | **4.00** | **10.00** | **4.00** | **10.00** | **4.00** | **5.00** | **2.00** | **5.00** | **2.00** | **5.00** | **2.00** | **30.00** | **12.00** | **30.00** | **12.00** | **30.00** | **12.00** | **15.00** | **6.00** |

### 3.6.5 Pharmaceuticals (PhACs)

Table 26 - PhACs content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | Diclofenac (µg/kg) | | Azithromycin (µg/kg) | | Sulfamethoxazole (µg/kg) | | Sotalol (µg/kg) | | Diazepam (µg/kg) | | Carbamazepine (µg/kg) | | Venlafaxine (µg/kg) | | Citalopram (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | <0.04 | <0.006 | <0.02 | <0.003 | <0.13 | <0.02 | <0.01 | <0.001 | <0.01 | <0.001 | <0.12 | <0.02 | <0.26 | <0.037 | <0.16 | <0.02 |
| Mackerel, fresh | Goro. IT | <0.01 | <0.004 | <16.7 | <6.14 | <0.21 | <0.07 | <0.01 | <0.004 | <0.01 | <0.004 | <0.03 | <0.01 | <0.04 | <0.01 | <0.73 | <0.27 |
| Seabream | Other origin | <0.04 | <0.009 | <0.02 | <0.004 | <0.04 | <0.009 | <0.01 | <0.002 | <0.01 | <0.002 | <0.12 | <0.03 | <0.26 | <0.06 | <0.16 | <0.03 |
| Mussels | Goro. IT | - | - | <0.01 | <0.002 | <0.02 | <0.004 | <0.20 | <0.04 | <0.58 | <0.1 | <0.03 | <0.005 | <0.01 | <0.002 | <0.06 | <0.01 |
| Plaice, small | North Sea | <0.04 | <0.008 | <0.02 | <0.004 | <0.04 | <0.004 | <0.01 | <0.004 | <0.01 | <0.004 | <0.12 | <0.004 | <0.26 | <0.004 | <0.16 | <0.004 |
| Plaice, large | North Sea | <0.04 | <0.008 | <0.02 | <0.004 | <0.04 | <0.008 | <0.01 | <0.002 | <0.01 | <0.002 | <0.12 | <0.02 | <0.26 | <0.05 | <0.16 | <0.03 |
| Mackerel, fresh | North Sea | <0.01 | <0.004 | <5.01 | <1.8 | <0.06 | <0.02 | <0.01 | <0.004 | <0.01 | <0.004 | <0.03 | <0.01 | <0.04 | <0.01 | <0.22 | <0.08 |
| Mussels | Netherlands | - | - | <0.01 | <0.002 | <0.01 | <0.002 | <0.20 | <0.04 | <0.58 | <0.1 | <0.03 | <0.006 | <0.01 | <0.002 | <0.06 | <0.01 |
| Mussels | Ireland | - | - | <0.01 | <0.001 | <0.01 | <0.001 | <0.20 | <0.02 | <0.58 | <0.07 | <0.03 | <0.004 | <0.01 | <0.001 | <0.06 | <0.007 |
| Brown crab | Netherlands | - | - | <0.01 | <0.004 | <0.01 | <0.004 | <0.20 | <0.08 | <0.58 | <0.02 | <0.03 | <0.01 | <0.01 | <0.004 | <0.06 | <0.02 |
| Mussels | Spain | - | - | <0.01 | <0.001 | <0.01 | <0.001 | <0.20 | <0.02 | <0.58 | <0.08 | <0.03 | <0.004 | <0.01 | <0.001 | <0.06 | <0.009 |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | <0.01 | <0.003 | <5.01 | <1.5 | <0.06 | <0.02 | <0.01 | <0.003 | <0.01 | <0.003 | <0.11 | <0.03 | <0.04 | <0.01 | <0.22 | <0.07 |
| Mussels | Limfiord. Denmark | - | - | <0.01 | <0.002 | <0.01 | <0.002 | <0.20 | <0.03 | <0.58 | <0.1 | <0.03 | <0.005 | <0.01 | <0.002 | <0.06 | <0.01 |
| Norwegian salmon (farmed) | DanSalmon. Denmark | <0.02 | <0.008 | <0.01 | <0.004 | <0.17 | <0.07 | <0.001 | <0.000 | <0.01 | <0.004 | <0.11 | <0.05 | <0.02 | <0.008 | <0.001 | <0.000 |
| Atlantic Cod | North Sea. Denmark | <0.04 | <0.008 | <0.02 | <0.004 | <0.04 | <0.008 | <0.01 | <0.002 | <0.01 | <0.002 | <0.12 | <0.02 | <0.26 | <0.05 | <0.16 | <0.03 |
| Mackerel | North Sea. Denmark | <0.01 | <0.004 | <5.01 | <2.17 | <0.21 | <0.09 | <0.01 | <0.004 | <0.01 | <0.004 | <0.03 | <0.01 | <0.04 | <0.02 | <0.22 | <0.1 |
| Monkfish, small | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish, large | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned Tuna | Portugal | <0.01 | <0.004 | <16.71 | <6.59 | <0.06 | <0.02 | <0.01 | <0.004 | <0.01 | <0.004 | <0.03 | <0.01 | <0.04 | <0.02 | <0.22 | <0.09 |
| Canned mackerel | Portugal | <0.01 | <0.004 | <5.01 | <2.12 | <0.06 | <0.02 | <0.01 | <0.004 | <0.01 | <0.004 | <0.03 | <0.01 | <0.04 | <0.02 | <0.22 | <0.09 |
| Plaice/Sole, small | Channel | <0.04 | <0.009 | <0.02 | <0.005 | <0.04 | <0.009 | <0.01 | <0.002 | <0.01 | <0.002 | <0.12 | <0.03 | <0.26 | <0.06 | <0.16 | <0.04 |
| Plaice/Sole, large | Channel | <0.04 | <0.009 | <0.02 | <0.004 | <0.04 | <0.009 | <0.01 | <0.002 | <0.01 | <0.002 | <0.12 | <0.03 | <0.26 | <0.06 | <0.16 | <0.04 |
| Mussels | France | - | - | <0.01 | <0.002 | <0.01 | <0.002 | <0.20 | <0.05 | <0.58 | <0.1 | <0.03 | <0.007 | <0.01 | <0.002 | <0.06 | <0.01 |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | <0.01 | <0.003 | <5.01 | <1.57 | <0.06 | <0.02 | <0.01 | <0.003 | <0.01 | <0.003 | <0.03 | <0.009 | <0.04 | <0.01 | <0.22 | <0.07 |
| Imported Tuna, large | Pacific | <0.01 | <0.003 | <16.71 | <5.41 | <0.06 | <0.02 | <0.01 | <0.003 | <0.01 | <0.003 | <0.11 | <0.04 | <0.04 | <0.01 | <0.22 | <0.07 |
| (- not measured) | **LOD** | **0.19-0.65** | **0.003-0.009** | **0.01** | **0.001-0.009** | **0.01-0.03** | **0.001-0.070** | **0.07-0.26** | **0.002-0.006** | **0.08-0.12** | **0.001-0.004** | **0.01-0.08** | **0.004-0,01** | **0.04-0.40** | **0.001-0.09** | **0.05-0.12** | **0.001-0.09** |
| | **LOQ** | **0.62-2.16** | **0.01-0.05** | **0.02-0.03** | **0.003-0.03** | **0.02-0.09** | **0.003-0.23** | **0.24-0.88** | **0.005-0.02** | **0.25-0.41** | **0.001-0.004** | **0.04-0.25** | **0.01-0.04** | **0.15-1.33** | **0.004-0.29** | **0.16-0.41** | **0.001-0.30** |

### 3.6.6 Perfluorinated substances (PFCs)

Table 27 - PFCs content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | PFBA (µg/kg) | | PFPeA (µg/kg) | | PFHxA (µg/kg) | | PFHpA (µg/kg) | | PFOA (µg/kg) | | PFNA (µg/kg) | | PFDcA (µg/kg) | | PFUnA (µg/kg) | | PFDoA (µg/kg) | | PFTrA (µg/kg) | | PFTeA (µg/kg) | | PFBS (µg/kg) | | PFHxS (µg/kg) | | PFHpS (µg/kg) | | PFOS (µg/kg) | | PFDS (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | <0.5 | <0.08 | <0.5 | <0.08 | <0.05 | <0.04 | <0.05 | <0.04 | <0.05 | <0.04 | 0.1 | 0.02 | 0.4 | 0.06 | <0.05 | <0.04 | <0.05 | <0.04 | <0.5 | <0.08 | <0.05 | <0.04 | <0.3 | <0.07 | <0.4 | <0.07 | <0.4 | <0.07 | 1.3 | 0.2 | <0.4 | <0.07 |
| Mackerel, fresh | Goro. IT | <0.4 | <0.2 | <0.4 | <0.2 | <0.04 | <0.08 | <0.04 | <0.08 | <0.04 | <0.08 | <0.04 | <0.08 | <0.04 | <0.08 | <0.04 | <0.08 | <0.04 | <0.08 | 0.1 | 0.04 | <0.04 | <0.08 | <0.3 | <0.1 | <0.3 | <0.1 | <0.3 | <0.1 | 2.2 | 0.8 | <0.3 | <0.1 |
| Seabream | Other origin | <0.4 | <0.09 | <0.4 | <0.09 | <0.04 | <0.05 | <0.04 | <0.05 | <0.04 | <0.05 | <0.04 | <0.05 | <0.04 | <0.05 | <0.04 | <0.05 | <0.04 | <0.05 | <0.4 | <0.09 | <0.04 | <0.05 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 | <0.3 | <0.08 |
| Mussels | Goro. IT | <0.5 | <0.10 | <0.5 | <0.10 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.5 | <0.10 | <0.05 | <0.05 | <0.3 | <0.08 | <0.4 | <0.08 | <0.4 | <0.08 | <0.4 | <0.09 | <0.4 | <0.09 |
| Plaice, small | North Sea | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.4 | <0.08 | <0.5 | <0.09 | <0.5 | <0.09 | <0.5 | <0.09 | <0.5 | <0.09 |
| Plaice, large | North Sea | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.4 | <0.08 | <0.5 | <0.09 | <0.5 | <0.09 | <0.5 | <0.09 | <0.5 | <0.09 |
| Mackerel, fresh | North Sea | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.4 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 |
| Mussels | Netherlands | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.4 | <0.09 | <0.5 | <0.10 | <0.5 | <0.10 | <0.5 | <0.10 | <0.5 | <0.1 |
| Mussels | Ireland | <0.5 | <0.07 | <0.5 | <0.07 | <0.5 | <0.07 | <0.5 | <0.07 | <0.5 | <0.07 | <0.5 | <0.07 | <0.5 | <0.07 | 3.7 | 0.4 | <0.5 | <0.07 | <0.5 | <0.07 | <0.5 | <0.07 | <0.4 | <0.05 | <0.5 | <0.06 | <0.5 | <0.06 | <0.5 | <0.06 | <0.5 | <0.06 |
| Brown crab | Netherlands | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.4 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 |
| Mussels | Spain | <0.6 | <0.09 | <0.6 | <0.09 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.6 | <0.09 | <0.05 | <0.05 | <0.4 | <0.08 | <0.4 | <0.08 | <0.4 | <0.08 | <0.4 | <0.08 | <0.4 | <0.08 |
| Octopus, small | Mediterranean | <1.3 | <0.2 | <1.3 | <0.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 4.8 | 0.7 | <0.1 | <0.1 | 13 | 2.0 | 1.8 | 0.3 | <0.9 | <0.2 | <0.9 | <0.2 | <0.9 | <0.2 | 1.9 | 0.3 | <0.9 | <0.2 |
| Octopus, large | Mediterranean | <0.7 | <0.1 | <0.7 | <0.1 | <0.06 | <0.07 | <0.06 | <0.07 | <0.06 | <0.07 | <0.06 | <0.07 | <0.06 | <0.07 | 0.5 | 0.10 | 0.1 | 0.02 | 1.7 | 0.3 | 0.6 | 0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | 0.4 | 0.08 | <0.5 | <0.1 |
| Mackerel fresh | Spain | <0.7 | <0.2 | <0.7 | <0.2 | <0.06 | <0.1 | <0.06 | <0.1 | <0.06 | <0.1 | <0.06 | <0.1 | <0.06 | <0.1 | 1.9 | 0.6 | <0.06 | <0.1 | 1.4 | 0.4 | <0.06 | <0.1 | <0.4 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | 5.5 | 1.6 | <0.5 | <0.2 |
| Mussels | Limfiord. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Norwegian salmon (farmed) | DanSalmon. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic Cod | North Sea. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North Sea. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish, small | Portugal | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.4 | <0.08 | <0.5 | <0.09 | <0.5 | <0.09 | <0.5 | <0.09 | <0.5 | <0.09 |
| Monkfish, large | Portugal | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.4 | <0.09 | <0.5 | <0.09 | <0.5 | <0.10 | <0.5 | <0.10 | <0.5 | <0.10 |
| Canned Tuna | Portugal | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.4 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 |
| Canned mackerel | Portugal | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.4 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 |
| Plaice/Sole, small | Channel | <1.2 | <0.3 | <1.2 | <0.3 | <1.2 | <0.3 | <0.2 | <0.04 | <1.2 | <0.3 | <0.2 | <0.04 | <0.2 | <0.04 | <1.2 | <0.3 | <1.2 | <0.3 | <1.2 | <0.3 | <0.2 | <0.04 | <1.0 | <0.2 | <1.1 | <0.2 | <1.1 | <0.2 | 2.3 | 0.5 | <1.1 | <0.3 |
| Plaice/Sole, large | Channel | <0.9 | <0.2 | <0.9 | <0.2 | <0.9 | <0.2 | <0.1 | <0.03 | <0.9 | <0.2 | <0.1 | <0.03 | <0.1 | <0.03 | <0.9 | <0.2 | <0.9 | <0.2 | <0.9 | <0.2 | <0.1 | <0.03 | <0.8 | <0.2 | <0.8 | <0.2 | <0.8 | <0.2 | 1.2 | 0.3 | <0.8 | <0.2 |
| Mussels | France | <0.6 | <0.1 | <0.6 | <0.1 | <0.6 | <0.1 | <0.09 | <0.02 | <0.6 | <0.1 | <0.09 | <0.02 | 0.1 | 0.03 | <0.6 | <0.1 | <0.6 | <0.1 | <0.6 | <0.1 | <0.09 | <0.02 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 |
| Pacific hake, small | South America | <0.6 | <0.1 | <0.6 | <0.1 | <0.6 | <0.1 | <0.10 | <0.02 | <0.6 | <0.1 | <0.10 | <0.02 | <0.10 | <0.02 | <0.6 | <0.1 | <0.6 | <0.1 | <0.6 | <0.1 | <0.10 | <0.02 | <0.5 | <0.10 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.6 | <0.1 |
| Pacific hake, large | South America | <0.8 | <0.2 | <0.8 | <0.2 | <0.8 | <0.2 | <0.1 | <0.03 | <0.8 | <0.2 | <0.1 | <0.03 | <0.1 | <0.03 | <0.8 | <0.2 | <0.8 | <0.2 | <0.8 | <0.2 | <0.1 | <0.03 | <0.6 | <0.2 | <0.7 | <0.2 | <0.7 | <0.2 | <0.7 | <0.2 | <0.7 | <0.2 |
| Atlantic hake, small | South Africa | <0.7 | <0.1 | <0.7 | <0.1 | <0.7 | <0.1 | <0.1 | <0.02 | <0.7 | <0.1 | <0.1 | <0.02 | <0.1 | <0.02 | <0.7 | <0.1 | <0.7 | <0.1 | <0.7 | <0.1 | <0.1 | <0.02 | <0.5 | <0.1 | <0.6 | <0.1 | <0.6 | <0.1 | <0.6 | <0.1 | <0.6 | <0.1 |
| Atlantic hake, large | South Africa | <1.0 | <0.2 | <1.0 | <0.2 | <1.0 | <0.2 | <0.2 | <0.03 | <1.0 | <0.2 | <0.2 | <0.03 | <0.2 | <0.03 | <1.0 | <0.2 | <1.0 | <0.2 | <1.0 | <0.2 | <0.2 | <0.03 | <0.8 | <0.2 | <0.9 | <0.2 | <0.9 | <0.2 | <0.9 | <0.2 | <0.9 | <0.2 |
| Imported Tuna, small | Pacific | <0.5 | <0.2 | <0.5 | <0.2 | <0.5 | <0.2 | <0.08 | <0.03 | <0.5 | <0.2 | <0.08 | <0.03 | <0.08 | <0.03 | 5.9 | 1.8 | 0.5 | 0.2 | 3.6 | 1.1 | 0.8 | 0.3 | <0.4 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.1 | <0.5 | <0.2 |
| Imported Tuna, large | Pacific | <0.4 | <0.1 | <0.4 | <0.1 | <0.4 | <0.1 | <0.06 | <0.02 | <0.4 | <0.1 | <0.06 | <0.02 | <0.06 | <0.02 | 41 | 13 | 11 | 3.5 | 24 | 7.7 | 4.2 | 1.4 | <0.4 | <0.1 | <0.4 | <0.1 | <0.4 | <0.1 | 2.0 | 0.6 | <0.4 | <0.1 |
| (- not measured) | **LOD** | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 |
| | **LOQ** | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.04 | | <0.03 | | <0.03 | | <0.03 | | <0.03 | | <0.03 |

### 3.6.7 Polycyclic aromatic hydrocarbons (PAHs)

Table 28 - PAHs content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | acenapthylene (µg/kg) | | acenapthene (µg/kg) | | fluorene (µg/kg) | | phenanthrene (µg/kg) | | anthracene (µg/kg) | | fluoranthene (µg/kg) | | pyrene (µg/kg) | | benzo(a)anthracene (µg/kg) | | chrysene (µg/kg) | | benzo(b)fluoranthene (µg/kg) | | benzo(k)fluoranthene (µg/kg) | | benzo(j)fluoranthene (µg/kg) | | benzo(e)pyrene (µg/kg) | | benzo(a)pyrene (µg/kg) | | indeno(123cd) pyrene (µg/kg) | | dibenzo(ah) anthracene | | benzo(ghi)per ylene (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | Goro. IT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Seabream | Other origin | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Goro. IT | <2.70 | <0.18 | <23.54 | <1.59 | 8.99 | 0.60 | <25.04 | <1.67 | <2.70 | <0.18 | <23.54 | <1.57 | <7.05 | <0.47 | <2.70 | <0.18 | 7.41 | 0.49 | 4.45 | 0.30 | <2.70 | <0.18 | 3.10 | 0.21 | 4.72 | 0.32 | <2.70 | <0.18 | <2.70 | <0.18 | <2.70 | <0.18 | <2.70 | <0.18 |
| Plaice, small | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice, large | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Netherlands | 1.17 | 0.24 | 10.87 | 2.24 | 26.37 | 5.44 | 62.64 | 12.92 | 2.01 | 0.41 | 53.53 | 11.04 | 40.16 | 8.28 | 8.68 | 1.79 | 13.35 | 2.75 | 11.08 | 2.28 | 5.69 | 1.17 | 5.61 | 1.16 | 11.37 | 2.35 | 5.84 | 1.21 | 5.26 | 1.08 | 1.52 | 0.31 | 6.50 | 1.34 |
| Mussels | Ireland | 1.23 | 0.14 | <10.53 | <1.20 | 17.79 | 2.03 | 32.70 | 3.73 | 3.05 | 0.35 | 57.64 | 6.57 | 54.85 | 6.25 | 20.17 | 2.30 | 16.93 | 1.93 | 24.98 | 2.85 | 12.55 | 1.43 | 11.83 | 1.35 | 25.16 | 2.87 | 14.83 | 1.69 | 11.18 | 1.27 | 2.67 | 0.30 | 14.00 | 1.60 |
| Brown crab | Netherlands | <LOD | <LOD | <LOD | <LOD | <LOD | <LOD | 2.57 | 1.03 | <0.26 | <0.10 | 0.52 | 0.21 | <0.51 | <0.20 | <0.26 | <0.10 | 0.48 | 0.19 | 0.20 | 0.08 | <0.26 | <0.10 | 0.39 | 0.16 | <0.26 | <0.10 | <0.26 | <0.10 | <0.26 | <0.10 | <0.26 | 0 | <0.26 | <0.10 |
| Mussels | Spain | 1.19 | 0.15 | <9.18 | <1.16 | 13.27 | 1.68 | 25.17 | 3.18 | <1.03 | <0.13 | 36.46 | 4.61 | 33.25 | 4.20 | 18.41 | 2.33 | 30.04 | 3.79 | 31.08 | 3.93 | 15.61 | 1.97 | 14.30 | 1.81 | 25.41 | 3.21 | 8.17 | 1.03 | 8.44 | 1.07 | 2.60 | 0.33 | 8.99 | 1.14 |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | Limfiord. Denmark | 2.02 | 0.36 | 11.06 | 1.95 | 10.23 | 1.80 | 20.84 | 3.67 | 0.81 | 0.14 | 10.96 | 1.93 | 15.29 | 2.69 | 2.18 | 0.38 | 4.77 | 0.84 | 3.55 | 0.63 | 1.66 | 0.29 | 2.32 | 0.41 | 2.38 | 0.42 | 1.36 | 0.24 | 2.11 | 0.37 | <0.74 | <0.13 | 2.66 | 0.47 |
| Norwegian salmon (farmed) | DanSalmon. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic Cod | North Sea. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel | North Sea. Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish, small | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Monkfish, large | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned Tuna | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Canned mackerel | Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | France | 0.68 | 0.16 | <5.02 | <1.17 | 7.44 | 1.73 | 8.17 | 1.90 | <0.56 | <0.13 | 5.47 | 1.27 | 5.32 | 1.24 | 1.09 | 0.25 | 1.86 | 0.43 | 2.32 | 0.54 | 0.97 | 0.23 | 1.29 | 0.30 | 1.82 | 0.42 | <0.56 | <0.13 | 1.02 | 0.24 | <0.56 | <0.13 | 1.21 | 0.28 |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, large | Pacific | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (- not measured) | LOD | | 0.01 | | 0.03 | | 0.22 | | 0.06 | | 0.01 | | 0.05 | | 0.23 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 | | 0.01 |
| | LOQ | | 0.15 | | 0.15 | | 0.43 | | 0.15 | | 0.15 | | 0.15 | | 0.47 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 | | 0.15 |

### 3.6.8 Tetrabromobisphenol (TBBPA) and bisphenol (BPA)

Table 29 - TBBPA and BPA content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | BPA (µg/kg) | | TBBPA (µg/kg) | |
|---|---|---|---|---|---|
| | | dw | ww | dw | ww |
| Sole large | Goro. IT | - | | - | |
| Mackerel, fresh | Goro. IT | <10.00 | <3.68 | <5.00 | <1.84 |
| Seabream | Other origin | 150.16 | 32.28 | <5.00 | <1.08 |
| Mussels | Goro. IT | <10.00 | <1.79 | <5.00 | <0.90 |
| Plaice, small | North Sea | - | | - | |
| Plaice, large | North Sea | - | | - | |
| Mackerel, fresh | North Sea | <10.00 | <3.58 | <5.00 | <1.79 |
| Mussels | Netherlands | <10.00 | <2.08 | <5.00 | <1.04 |
| Mussels | Ireland | <10.00 | <1.22 | <5.00 | <0.61 |
| Brown crab | Netherlands | <10.00 | <3.95 | <5.00 | <1.97 |
| Mussels | Spain | <10.00 | <1.45 | <5.00 | <0.73 |
| Octopus, small | Mediterranean | - | | - | |
| Octopus, large | Mediterranean | - | | - | |
| Mackerel fresh | Spain | <10.00 | <2.98 | <5.00 | <1.49 |
| Mussels | Limfiord. Denmark | <10.00 | <1.66 | <5.00 | <0.83 |
| Norwegian salmon (farmed) | DanSalmon. Denmark | <10.00 | <4.14 | <5.00 | <2.07 |
| Atlantic Cod | North Sea. Denmark | <10.00 | <1.93 | <5.00 | <0.97 |
| Mackerel | North Sea. Denmark | <10.00 | <4.33 | <5.00 | <2.17 |
| Monkfish, small | Portugal | 30.63 | 5.85 | <5.00 | <0.96 |
| Monkfish, large | Portugal | 20.81 | 4.23 | <5.00 | <1.02 |
| Canned Tuna | Portugal | 20.52 | 8.08 | <5.00 | <1.97 |
| Canned mackerel | Portugal | <10.00 | <4.23 | <5.00 | <2.12 |
| Plaice/Sole, small | Channel | - | | - | |
| Plaice/Sole, large | Channel | - | | - | |
| Mussels | France | <10.00 | | <5.00 | |
| Pacific hake, small | South America | - | | - | |
| Pacific hake, large | South America | - | | - | |
| Atlantic hake, small | South Africa | - | | - | |
| Atlantic hake, large | South Africa | - | | - | |
| Imported Tuna, small | Pacific | 41.98 | 13.16 | <5.00 | <1.57 |
| Imported Tuna, large | Pacific | <10.00 | <3.24 | <5.00 | <1.62 |
| (- not measured) | **LOD** | **5** | | **0.5** | |
| | **LOQ** | **10** | | **5** | |

### 3.6.9 Total and organic mercury

Table 30 - Total and organic mercury content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | MeHg | | T-Hg | |
|---|---|---|---|---|---|
| | | dw | ww | dw | ww |
| Sole large | Goro. IT | 118.95 | 17.09 | 192.56 | 27.67 |
| Mackerel, fresh | Goro. IT | 434.02 | 159.72 | 637.58 | 234.63 |
| Seabream | Other origin | 302.47 | 65.03 | 453.80 | 97.57 |
| Mussels | Goro. IT | - | - | - | - |
| Plaice, small | North Sea | 258.64 | 48.97 | 360.03 | 68.17 |
| Plaice, large | North Sea | 252.13 | 48.62 | 344.25 | 66.38 |
| Mackerel, fresh | North Sea | 104.08 | 37.25 | 180.04 | 64.44 |
| Mussels | Netherlands | - | - | - | - |
| Mussels | Ireland | - | - | - | - |
| Brown crab | Netherlands | - | - | - | - |
| Mussels | Spain | - | - | - | - |
| Octopus, small | Mediterranean | 322.52 | 50.41 | 520.55 | 81.36 |
| Octopus, large | Mediterranean | 1337.06 | 266.07 | 1888.37 | 375.79 |
| Mackerel fresh | Spain | 264.94 | 78.90 | 495.87 | 147.67 |
| Mussels | Limfiord. Denmark | - | - | - | - |
| Norwegian salmon (farmed) | DanSalmon. Denmark | 29.39 | 12.17 | 65.67 | 27.19 |
| Atlantic Cod | North Sea. Denmark | 408.04 | 78.75 | 576.29 | 111.22 |
| Mackerel | North Sea. Denmark | 76.29 | 33.04 | 112.04 | 48.51 |
| Monkfish, small | Portugal | 668.07 | 127.53 | 936.91 | 178.86 |
| Monkfish, large | Portugal | 858.85 | 174.78 | 1185.84 | 241.32 |
| Canned Tuna | Portugal | 76.58 | 30.16 | 138.06 | 54.37 |
| Canned mackerel | Portugal | 65.75 | 27.84 | 121.96 | 51.64 |
| Plaice/Sole, small | Channel | 228.05 | 53.32 | 346.70 | 81.06 |
| Plaice/Sole, large | Channel | 310.35 | 67.78 | 435.26 | 95.06 |
| Mussels | France | - | - | - | - |
| Pacific hake, small | South America | 668.74 | 130.67 | 843.58 | 164.83 |
| Pacific hake, large | South America | 852.84 | 216.11 | 1137.11 | 288.14 |
| Atlantic hake, small | South Africa | 419.33 | 84.58 | 550.25 | 110.99 |
| Atlantic hake, large | South Africa | 886.49 | 187.05 | 1121.43 | 236.62 |
| Imported Tuna, small | Pacific | 383.55 | 120.28 | 578.34 | 181.37 |
| Imported Tuna, large | Pacific | 456.68 | 147.97 | 646.95 | 209.61 |
| (- not measured) | **LOD** | **5** | **0.5-2** | **5** | **0.5-2** |
| | **LOQ** | **10** | **1-4** | **10** | **1-4** |

### 3.6.10 UV-filters

Table 31 - UV-filters content (µg/kg dw and µg/kg ww) obtained in raw samples from Round II.

| Species | Sampling site | EHS (µg/kg) | | HS (µg/kg) | | IMC (µg/kg) | | 4-MBC (µg/kg) | | EPABA (µg/kg) | | EHMC (µg/kg) | | OC (µg/kg) | | BP3 (µg/kg) | | BP1 (µg/kg) | | DHMB (µg/kg) | | DBENZO (µg/kg) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww | dw | ww |
| Sole large | Goro. IT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | Goro. IT | <3.00 | <1.10 | <2.00 | <0.74 | <10.00 | <3.68 | <8.00 | <2.94 | <1.50 | <0.55 | <5.00 | <1.84 | <5.00 | <1.84 | <10.00 | <3.68 | <10.00 | 3.68 | <12.00 | <4.42 | <20.00 | <7.36 |
| Seabream | Other origin | 42.86 | 9.21 | 33.35 | 7.17 | <10.00 | <2.15 | <2.45 | <0.53 | <5.00 | <1.08 | <5.00 | <1.08 | 103.28 | 22.21 | <10.00 | <2.15 | 98.86 | 21.25 | 398.86 | 85.75 | <20.00 | <4.30 |
| Mussels | Goro. IT | <10.00 | <1.79 | <3.16 | <0.57 | <10.00 | <1.79 | <8.00 | <1.43 | <5.00 | <0.90 | <5.00 | <0.90 | <5.00 | <0.90 | <10.00 | <1.79 | 49.63 | 8.88 | <12.00 | <2.15 | <20.00 | <3.58 |
| Plaice, small | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice, large | North Sea | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel, fresh | North Sea | <10.00 | 3.58 | <5.00 | <1.79 | <10.00 | <3.58 | <8.00 | <2.86 | <5.00 | <1.79 | <5.00 | <1.79 | <5.00 | <1.79 | <10.00 | <3.58 | <10.00 | <3.58 | <12.00 | <4.29 | <20.00 | <7.16 |
| Mussels | Netherlands | 17.00 | 3.54 | 12.00 | 2.50 | <10.00 | <2.08 | <8.00 | <1.67 | <5.00 | <1.04 | <5.00 | <1.04 | 56.00 | 11.67 | <10.00 | <2.08 | <10.00 | <2.08 | <12.00 | <2.50 | <20.00 | <4.17 |
| Mussels | Ireland | <10.00 | <1.22 | <5.00 | <0.61 | <10.00 | <1.22 | <8.00 | <0.97 | <5.00 | <0.61 | <5.00 | <0.61 | <5.00 | <0.61 | <10.00 | <1.22 | <10.00 | <1.22 | <12.00 | <1.46 | <20.00 | <2.44 |
| Brown crab | Netherlands | <10.00 | <3.95 | <5.00 | <1.97 | <10.00 | <3.95 | <8.00 | <3.16 | <5.00 | <1.97 | <5.00 | <1.97 | <5.00 | <1.97 | <10.00 | <3.95 | <10.00 | <3.95 | <12.00 | <4.74 | <20.00 | <7.89 |
| Mussels | Spain | <3.00 | <0.44 | 19.14 | 2.81 | <10.00 | <1.47 | <2.45 | <0.36 | <1.50 | <0.22 | <5.00 | <0.73 | <5.00 | <0.73 | <10.00 | <1.47 | 69.20 | 10.16 | <12.00 | <1.76 | <20.00 | <2.94 |
| Octopus, small | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Octopus, large | Mediterranean | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mackerel fresh | Spain | <10.00 | <2.98 | <5.00 | <1.49 | <10.00 | <2.98 | <8.00 | <2.38 | <1.50 | <0.45 | <5.00 | <1.49 | <5.00 | <1.49 | <10.00 | <2.98 | <10.00 | <2.98 | <12.00 | <3.57 | <10.00 | <2.98 |
| Mussels | Limfiord. Denmark | 13.14 | 2.18 | <3.53 | <0.59 | <10.00 | <1.66 | <8.00 | <1.33 | <1.50 | <0.25 | <5.00 | <0.83 | <5.00 | <0.83 | <10.00 | <1.66 | <10.00 | <1.66 | <12.00 | <1.99 | <10.00 | <1.66 |
| Norwegian salmon (farmed) | DanSalmon. Denmark | 22.95 | 9.50 | 15.26 | 6.32 | <10.00 | <4.14 | <8.00 | <3.31 | <1.50 | <0.62 | <5.00 | <2.07 | <5.00 | <2.07 | <10.00 | <4.14 | <10.00 | <4.14 | <12.00 | <4.97 | <10.00 | <4.14 |
| Atlantic Cod | North Sea. Denmark | 26.72 | 5.16 | <5.00 | <0.97 | <10.00 | <1.93 | <8.00 | <1.54 | <1.50 | <0.29 | <5.00 | <0.97 | 39.14 | 7.55 | <10.00 | <1.93 | <10.00 | <1.93 | <12.00 | <2.32 | <10.00 | <1.93 |
| Mackerel | North Sea. Denmark | 16.57 | 7.17 | 6.38 | 2.76 | <10.00 | <4.33 | <2.45 | <1.06 | <5.00 | <2.17 | <5.00 | <2.17 | 43.18 | 18.70 | <10.00 | <4.33 | <10.00 | <4.33 | <12.00 | <5.20 | <10.00 | <4.33 |
| Monkfish, small | Portugal | 15.27 | 2.92 | <1.25 | <0.24 | <10.00 | <1.91 | <8.00 | <1.53 | <5.00 | <0.95 | <3.25 | <0.62 | 11.80 | 2.25 | <10.00 | <1.91 | <10.00 | <1.91 | 17.75 | 3.39 | <20.00 | <3.82 |
| Monkfish, large | Portugal | <3.00 | <0.61 | <3.78 | <0.77 | <10.00 | <2.04 | <8.00 | <1.63 | <5.00 | <1.02 | 5.00 | <1.02 | 19.25 | 3.92 | <10.00 | <2.04 | <10.00 | <2.04 | 90.69 | 18.46 | <20.00 | <4.07 |
| Canned Tuna | Portugal | 13.78 | 5.43 | 10.36 | 4.08 | <10.00 | <3.94 | <8.00 | <3.15 | <5.00 | <1.97 | 65.44 | 25.77 | 57.57 | 22.67 | 27.56 | <3.94 | <10.00 | <3.94 | <12.00 | <4.73 | <20.00 | <7.88 |
| Canned mackerel | Portugal | 48.11 | 20.37 | 5.11 | 2.16 | <10.00 | <4.23 | <8.00 | <3.39 | <5.00 | <2.12 | <5.00 | <2.12 | 18.45 | 7.81 | <10.00 | <4.23 | <10.00 | <4.23 | <12.00 | <5.08 | <20.00 | <8.47 |
| Plaice/Sole, small | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Plaice/Sole, large | Channel | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Mussels | France | <10.00 | <2.98 | <5.000 | <1.49 | <10.00 | <2.98 | <8.00 | <2.38 | <5.00 | <2.17 | <5.00 | <2.17 | <5.00 | <2.07 | <10.00 | <2.98 | <10.00 | <2.98 | <12.00 | <3.57 | <20.00 | <2.98 |
| Pacific hake, small | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pacific hake, large | South America | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, small | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Atlantic hake, large | South Africa | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Imported Tuna, small | Pacific | <10.00 | <3.14 | 58.45 | 18.33 | <10.00 | <3.14 | <2.45 | <0.77 | <0.30 | <0.09 | <5.00 | <1.57 | <5.00 | <1.57 | <10.00 | <3.14 | <10.00 | <3.14 | <8.16 | <2.56 | <20.00 | <6.27 |
| Imported Tuna, large | Pacific | <10.00 | <3.24 | 22.52 | 7.30 | <10.00 | <3.24 | <2.45 | <0.79 | <0.30 | <0.01 | <5.00 | <1.62 | <5.00 | <1.62 | <10.00 | <3.24 | <10.00 | <3.24 | <12.00 | <3.89 | <20.00 | <6.48 |
| (- not measured) | LOD | 6.00 | | 2.00 | | 6.00 | | 6.00 | | 1.50 | | 2.00 | | 3.00 | | 2.00 | | 3.00 | | 6.00 | | 20.00 | |
| | LOQ | 10.00 | | 5.00 | | 10.00 | | 20.00 | | 5.00 | | 5.00 | | 10.00 | | 5.00 | | 10.00 | | 20.00 | | 100.00 | |

### 3.6.11. Microplastics

Because of low levels of microplastics and fibres found in hotspot and commercial samples (round I), and budgetary restrictions, it was decided not to assess the levels of microplastics in round II of commercial samples.

From the data of raw samples of Round II it is possible to highlight the following results:

**Brominated flame retardants:** PBDEs, dechloranes, MeO-PBDEs, HBB, PBEB and DBDPE were analysed in 20 samples of 8 species. No detectable contamination level was observed for PBEB and DBDPE. HBB was detected in 18 out of 20 samples analysed, with the highest level 5.56 µg/kg w.w. registered in mackerel from Spain. PBDEs, dechlorane and MeO-PBDEs were found in detectable levels. BDE-28, BDE-47, BDE-99, BDE-153 and BDE-154 were the prevalent PBDEs detected in these samples. Among the samples analysed, seabream was the species showing the highest contamination with PBDEs, followed by mackerel. The presence of PBDEs in mackerel was verified in all locations (Italy, North Sea, Denmark and Channel), with the Italian sample presenting the highest levels (∑PBDEs 17.32 µg/kg w.w.). Independently of origin, mussels were also contaminated with PBDEs. In mackerel and mussels, the contamination levels of dechloranes (DEC 602, 603, 604, syn-DP, anti-DP), particularly Dec603 were noticed. 5-MBDE-100 and 6-MBDE-47 were the MeO-PBDE predominant in positive samples. Overall, canned tuna was the most contaminated species followed by mackerel and seabream as far as MeO-PBDEs are concerned.

α-, β-, γ-Hexabromocyclododecane (α-, β-, γ-HBCD), 2,4,6 tribromophenol and tetrabrombisphenol A were analysed in 20 samples of 8 species. α-HBCD was detected in 13 out of 20 samples. Generally, β- and γ-HBCD were non-detected or found at very low concentrations. The highest levels of α-HBCD, i.e. 4.2, 2.0 and 0.67 µg/kg d.w. were found in mackerel from Italy, Spain and The Netherlands, respectively. Farmed salmon contained 0.43 µg/kg d.w. α-HBCD and 0.26 µg/kg d.w. γ-HBCD. The occurrence of γ-HBCD at identical levels as α-HBCD indicates a recent contamination with technical HBCD, as in the marine environment and fish, α-HBCD will be the predominant congener. Tetrabrombisphenol A (TBBPA) was found in 3 samples: 1.9 µg/kg d.w. in canned mackerel from Portugal, 1.9 µg/kg d.w. in fresh mackerel from Spain and 0.49 µg/kg d.w. in small monkfish from Portugal. The 2,4,6-tribromophenol was found in all 6 mussel samples in the range of 3.5-16.2 µg/kg d.w. In addition, a lower concentration of 1.3 µg/kg d.w. was seen in plaice from The Netherlands.

**Endocrine disruptors**: BPA, triclosan, methylparaben and TBEP were analysed in 23 samples from 9 species. BPA was detected in 5 species: seabream, mussels, brown crab, tuna and mackerel. TBEP was not observed. Triclosan was detected in 2 species (mackerel and imported tuna), with the highest levels quantified in imported tuna from the Pacific (0.86 µg/kg w.w.). Methylparaben was detected in 4 species (seabream, mussel, salmonand mackerel), being mackerel from Denmark the most contaminated one (3.84 µg/kg d.w.).

**Inorganic arsenic**: iAs and total As were analysed in 7 samples from 2 species (mussels and broen crab). The highest quantified iAs level was observed in mussels (up to 0.54 mg/kg dw). Contamination of this species was independent of location, with samples from Netherlands presenting the highest levels, similar to what was observed in Round I.

**Musks**: ten different musks were analysed in 8 samples from 5 species. Celestolide (ADBI), pantolide (AHMI), ATII (5-acetyl-1,1,2,6-tetramethyl-3-isopropylindane), Musk xylene (MX), Musk moskene (MM) and Musk ketone (MK) were not detected. In contrast, cashmeran (DPMI) was detected in sole and mussels. Galaxolide (HHCB) was observed in four species: sole, mackerel, mussels and brown crab. Tonalide (AHTN) was observed in all five species studied: sole, mackerel, mussels, brown crab and plaice. HHCB and HHCB-Lactone were observed in most samples, with HHCB being detected in 7 out of 8 samples and the highest level observed in mackerel (33.46 µg/kg w.w.) followed by sole (4.82 µg/kg w.w.). The highest levels of HHCB-Lactone were detected in mackerel. Musk results from

round I and II are found between 1-100 ppb (w.w). Trabalon et al. (2015) revealed higher levels comparing with this study, with concentrations ranging from <LOD to 367.3 ng/g (d.w.). Motaleb et al. (2009) indicated concentrations ranging between 234 and 970 ng/g for galaxolide and between 26 and 97 ng/g for tonalide. Therefore it could be concluded that the current results indicate no toxic levels in seafood for musks.

**Pharmaceuticals**: eight pharmaceuticals (diclofenac, azithromycin, sulfamethoxazol, sotalol, diazepam, carbamazepine, venlafaxine and citalopram) were analysed in 16 samples from 7 species. The levels found for diclofenac, sotalol, carbamazepine, venlafaxine and citalopram were either below the detection or quantification limits. In contrast, azithromycin, sulfamethoxazole and diazepam were quantified in mackerel, tuna and mussels samples.

**Perfluorinated substances**: sixteen different perfluorinated contaminants were analysed in 27 samples from 9 species. No detectable contamination levels were observed for PFBA, PFPeA, PFHxA, PFHpA, PFOA PFBS, PFHxS, PFHpS and PFDS. PFOS was measured in 8 out of 27 samples analysed, with the highest levels being found in mackerel from Spain (1.6 µg/kg w.w). The highest detectable level of PFUnA, PFDoA, PFTrA and PFTeA was observed in imported large tuna, followed by imported small tuna from Pacific.

**Polycyclic aromatic hydrocarbons**: seventeen different compounds were analysed in 7 samples from 2 species. Detectable contamination levels were observed for the compounds analysed. Among the measured compounds detected, phenanthrene presented the highest levels in most samples analysed. Mussel was the species most contaminated, with the highest levels observed in mussels from The Netherlands, followed by Spain.

**Tetrabromobisphenol A and bisphenol A**: TBBPA and BPA were analysed in 20 samples from 8 species. Detectable contaminations levels of BPA were measured in 3 species: monkfish, tuna and seabream. TBBPA was detectable in all samples at levels below the method quantification.

**Total and organic mercury**: Methyl mercury was analysed in 24 samples from 13 species. Detectable levels were measured in all samples analysed. The highest levels of MeHg were measured in large octopus and Atlantic hake, with 266µg/kg w.w. and 187µg/kg w.w., respectively.

**UV-filters**: Eleven different compounds were measured in 20 samples from 8 species. For most samples the contamination level was below the method quantification limit. The highest levels were detected for DHMB, OC and BP1 with 85.75 µg/kg w.w., 22.21 µg/kg w.w. and 21.25 µg/kg w.w., respectively, in fresh mackerel from Italy. EHS (2-Ethylhexyl salicylate), HS (homosalate), 4-MBC (3-(4-Methylbenzylidenecamphor) and EHMC (2-Ethylhexyl 4-methoxycinnamate) were detected in a wide range of samples. Among the samples analysed, seabream and large monkfish were the most contaminated commercial species with UV-filters.

# 4. Conclusions

A wide range of environmental pollutants have been measured in a variety of seafood species and locations in order to understand intrinsic and extrinsic factors that may cause variability in their contamination levels, and the subsequent human exposure.

The amounts found in hotspots and commercial samples were generally low and within the regulated and safety limits.

The levels of non-regulated contaminants found in all samples analysed are in accordance to those reported in scientific literature.

## 5. References

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