



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Biota

REFERENCE MATERIAL

Biota sample 356



Certificate of Analysis Biota 356

General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model mean and standard deviation are calculated using all reported data when at least 4 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into two sections: Consensus Values and Indicative Values. The division is made on the reliability of the data. Consensus Values are based on at least 10 results while the relative uncertainty is smaller than 6.25%. Indicative Values are based on a relative uncertainty of maximum 35% with at least 4 and less than 10 results or a relative uncertainty higher than 6.25%.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation) and the uncertainty in the assigned value. The confidence limits (at 95 % probability) are calculated for these determinands.

The results of each determinand is expressed on a wet weight basis.

Sample information

QUASIMEME reference materials cover a range of natural Biota species from contaminated waters from the North Sea and/or Mediterranean. The supplied wet test materials are homogenised and sterilised by autoclaving.

This Biota sample 356 of De-headed dab and sole from Western Scheldt, Netherlands is prepared for the QUASIMEME proficiency programs. The results on which the values in this report are based were taken from the periods given in the following table.

| Year.Round | Program | Sample Round Id |
|------------|---------|-----------------|
| 2020.1 | BT1 | QTM126BT |
| 2019.1 | BT2 | QOR139BT |
| 2019.1 | BT9 | QBC059BT |
| 2018.2 | BT1 | QTM121BT |



Consensus Values BT1

Method: Metals - BT1

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | |
|-----------|-------|------|----------|------|----|--------|-------|-------------|------------------------|--------|
| Arsenic | mg/kg | 5.78 | 0.644 | 11.1 | 45 | 5.81 | 0.467 | 0.120 | 5.59 | - 5.98 |
| Cadmium | µg/kg | 13.0 | 1.49 | 11.4 | 44 | 13.1 | 1.05 | 0.28 | 12.6 | - 13.5 |
| Chromium | µg/kg | 213 | 31.8 | 15.0 | 41 | 220 | 22.7 | 6.2 | 203 | - 223 |
| Cobalt | µg/kg | 20.2 | 3.38 | 16.7 | 22 | 19.8 | 2.35 | 0.90 | 18.8 | - 21.7 |
| Copper | µg/kg | 1040 | 108 | 10.4 | 48 | 1040 | 78 | 20 | 1010 | - 1073 |
| Iron | mg/kg | 33.0 | 4.28 | 13.0 | 33 | 33.2 | 3.07 | 0.93 | 31.5 | - 34.5 |
| Lead | µg/kg | 40.1 | 4.65 | 11.6 | 40 | 40.8 | 3.17 | 0.92 | 38.6 | - 41.6 |
| Magnesium | mg/kg | 373 | 23.6 | 6.3 | 11 | 374 | 16.4 | 8.9 | 358 | - 389 |
| Manganese | µg/kg | 1860 | 200 | 10.8 | 35 | 1900 | 136 | 42 | 1789 | - 1926 |
| Mercury | µg/kg | 60.8 | 4.98 | 8.2 | 57 | 60.5 | 3.42 | 0.82 | 59.5 | - 62.1 |
| Molybdene | µg/kg | 14.9 | 2.49 | 16.7 | 17 | 14.7 | 1.73 | 0.76 | 13.6 | - 16.2 |
| Nickel | µg/kg | 164 | 48.5 | 29.6 | 42 | 163 | 34.0 | 9.3 | 149 | - 179 |
| Potassium | mg/kg | 3450 | 307 | 8.9 | 10 | 3430 | 216 | 121 | 3238 | - 3671 |
| Selenium | µg/kg | 876 | 74.2 | 8.5 | 38 | 889 | 50.0 | 15.0 | 851 | - 900 |
| Silver | µg/kg | 5.89 | 0.666 | 11.3 | 19 | 6.00 | 0.490 | 0.191 | 5.57 | - 6.21 |
| Sodium | mg/kg | 1550 | 56 | 3.6 | 11 | 1530 | 37 | 21 | 1510 | - 1584 |
| Uranium | µg/kg | 1.90 | 0.195 | 10.3 | 12 | 1.93 | 0.132 | 0.070 | 1.78 | - 2.02 |
| Vanadium | µg/kg | 77.5 | 14.80 | 19.1 | 20 | 77.4 | 10.18 | 4.14 | 70.6 | - 84.4 |
| Zinc | mg/kg | 16.2 | 1.64 | 10.1 | 46 | 16.3 | 1.15 | 0.30 | 15.7 | - 16.7 |

Method: Weight - BT1

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | |
|------------|------|------|----------|------|----|--------|------|-------------|------------------------|---------|
| Dry-weight | % | 22.9 | 0.19 | 0.8 | 37 | 22.9 | 0.13 | 0.04 | 22.81 | - 22.94 |



Indicative Values BT1

Method: Metals - BT1

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | | |
|------------|-------|-------|----------|------|----|--------|--------|-------------|------------------------|---|-------|
| Aluminium | mg/kg | 13.9 | 3.37 | 24.2 | 14 | 13.2 | 2.36 | 1.13 | 12.0 | - | 15.8 |
| Antimony | µg/kg | 3.01 | 1.075 | 35.7 | 10 | 2.90 | 0.687 | 0.425 | 2.26 | - | 3.77 |
| Barium | µg/kg | 181 | 20.8 | 11.5 | 8 | 183 | 14.0 | 9.2 | 164 | - | 198 |
| Calcium | mg/kg | 3590 | 146 | 4.1 | 8 | 3610 | 105 | 65 | 3471 | - | 3710 |
| Cesium | µg/kg | 22.7 | 0.83 | 3.7 | 4 | 22.7 | 0.60 | 0.52 | 21.5 | - | 23.8 |
| Lithium | µg/kg | 64.2 | 5.74 | 9.0 | 4 | 64.1 | 3.99 | 3.59 | 56.2 | - | 72.1 |
| Phosphorus | mg/kg | 3740 | 799 | 21.4 | 8 | 3730 | 563 | 353 | 3090 | - | 4390 |
| Rubidium | µg/kg | 873 | 48.3 | 5.5 | 4 | 876 | 32.0 | 30.2 | 806 | - | 940 |
| Thallium | µg/kg | 0.567 | 0.3278 | 57.8 | 5 | 0.750 | 0.2374 | 0.1832 | 0.191 | - | 0.944 |
| Tin | µg/kg | 93.4 | 12.45 | 13.3 | 8 | 93.9 | 7.85 | 5.50 | 83.3 | - | 104 |
| Titanium | µg/kg | 561 | 204.1 | 36.4 | 6 | 502 | 139.4 | 104.2 | 357 | - | 765 |

Method: Weight - BT1

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | | |
|------------|------|------|----------|------|---|--------|-------|-------------|------------------------|---|------|
| Ash-Weight | % | 2.26 | 0.087 | 3.9 | 4 | 2.26 | 0.055 | 0.055 | 2.14 | - | 2.38 |

Method: Lipids - BT1

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | | |
|-------------|------|------|----------|------|---|--------|-------|-------------|------------------------|---|------|
| Total-Lipid | % | 3.44 | 0.699 | 20.3 | 6 | 3.51 | 0.495 | 0.357 | 2.74 | - | 4.14 |



Consensus Values BT2

Method: Chlorinated organics - BT2

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | | |
|---------|-------|-------|----------|------|----|--------|--------|-------------|------------------------|---|-------|
| PCB28 | µg/kg | 1.83 | 0.208 | 11.4 | 21 | 1.84 | 0.140 | 0.057 | 1.73 | - | 1.92 |
| PCB101 | µg/kg | 6.11 | 0.788 | 12.9 | 21 | 6.23 | 0.523 | 0.215 | 5.76 | - | 6.47 |
| PCB118 | µg/kg | 4.25 | 0.678 | 16.0 | 19 | 4.26 | 0.430 | 0.195 | 3.93 | - | 4.58 |
| PCB138 | µg/kg | 8.31 | 1.351 | 16.2 | 18 | 8.53 | 0.957 | 0.398 | 7.64 | - | 8.98 |
| PCB153 | µg/kg | 17.7 | 3.88 | 21.9 | 20 | 18.0 | 2.79 | 1.08 | 15.9 | - | 19.5 |
| PCB156 | µg/kg | 0.897 | 0.1501 | 16.7 | 15 | 0.889 | 0.1000 | 0.0484 | 0.814 | - | 0.979 |
| pp'-DDD | µg/kg | 0.649 | 0.1061 | 16.4 | 14 | 0.675 | 0.0715 | 0.0354 | 0.588 | - | 0.710 |
| pp'-DDE | µg/kg | 2.87 | 0.572 | 19.9 | 17 | 2.96 | 0.400 | 0.174 | 2.58 | - | 3.17 |



Indicative Values BT2

Method: Chlorinated organics - BT2

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | |
|----------------|-------|--------|----------|------|----|--------|--------|-------------|------------------------|----------|
| PCB31 | µg/kg | 1.01 | 0.165 | 16.3 | 8 | 0.972 | 0.112 | 0.073 | 0.877 | - 1.15 |
| PCB52 | µg/kg | 2.65 | 0.665 | 25.1 | 20 | 2.63 | 0.455 | 0.186 | 2.34 | - 2.96 |
| PCB105 | µg/kg | 0.761 | 0.1895 | 24.9 | 14 | 0.803 | 0.1325 | 0.0633 | 0.652 | - 0.870 |
| PCB138+PCB163 | µg/kg | 11.5 | 1.76 | 15.3 | 4 | 11.4 | 1.10 | 1.10 | 9.03 | - 13.9 |
| PCB180 | µg/kg | 7.17 | 1.663 | 23.2 | 21 | 7.47 | 1.179 | 0.454 | 6.42 | - 7.93 |
| HCB | µg/kg | 0.125 | 0.0284 | 22.7 | 14 | 0.130 | 0.0200 | 0.0095 | 0.109 | - 0.141 |
| Dieldrin | µg/kg | 0.845 | 0.3514 | 41.6 | 6 | 0.868 | 0.2450 | 0.1793 | 0.494 | - 1.20 |
| Transnonachlor | µg/kg | 0.0497 | 0.0117 | 23.6 | 4 | 0.0542 | 0.0090 | 0.0073 | 0.0334 | - 0.0659 |

Method: Lipids - BT2

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits | |
|-------------------|------|------|----------|------|---|--------|-------|-------------|------------------------|--------|
| Total-Lipid | % | 3.30 | 0.355 | 10.7 | 8 | 3.32 | 0.225 | 0.157 | 3.01 | - 3.59 |
| Extractable-Lipid | % | 3.31 | 0.460 | 13.9 | 4 | 3.29 | 0.300 | 0.288 | 2.67 | - 3.95 |



Consensus Values BT9

Method: Brominated Flame Retardants - BT9

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits |
|---------|-------|-------|----------|------|----|--------|--------|-------------|------------------------|
| BDE47 | µg/kg | 0.284 | 0.0443 | 15.6 | 11 | 0.284 | 0.0300 | 0.0167 | 0.255 - 0.314 |



Indicative Values BT9

Method: Brominated Flame Retardants - BT9

| Element | Unit | Mean | Std.Dev. | CV % | N | Median | MAD | Uncertainty | 95 % confidence limits |
|---------|-------|--------|----------|------|----|--------|--------|-------------|------------------------|
| BDE28 | µg/kg | 0.0172 | 0.0043 | 24.7 | 9 | 0.0171 | 0.0029 | 0.0018 | 0.0140 - 0.0204 |
| BDE99 | µg/kg | 0.0188 | 0.0065 | 34.3 | 8 | 0.0195 | 0.0046 | 0.0029 | 0.0136 - 0.0241 |
| BDE100 | µg/kg | 0.0797 | 0.0128 | 16.1 | 10 | 0.0810 | 0.0095 | 0.0051 | 0.0707 - 0.0888 |
| BDE153 | µg/kg | 0.0194 | 0.0028 | 14.3 | 6 | 0.0201 | 0.0020 | 0.0014 | 0.0166 - 0.0222 |
| BDE154 | µg/kg | 0.0389 | 0.0120 | 30.9 | 9 | 0.0397 | 0.0083 | 0.0050 | 0.0298 - 0.0479 |