# Supporting Information

# Biomagnification of mercury in mollusks from coastal areas of the Chinese Bohai Sea

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**Analysis of Hg.** For THg analysis, approximately 0.05-0.1 g of the mollusk tissue was weighed into a nickel boat, completely covered with an appropriate amount of diatomite and directly detected using the Hydra-C mercury analyzer (Teledyne Leeman Labs, USA) following USEPA method 7473.

For MeHg analysis, KOH/$CH_3OH$ solution was used for MeHg extraction. Approximately 0.1 g of soft tissue was transferred into a 8-mL brown glass container and extracted with 4 mL of 25% (m/v) KOH/$CH_3OH$ solution by shaking for 4 h at 37 °C and 240 rpm with a shaker. The digested solution was then diluted with $CH_3OH$ to the appropriate concentration for determination. The concentrations of MeHg were determined with a MERX Automatic Methylmercury System (Brooks Rand Laboratories, Seattle, WA) following USEPA method 1630.

**Table S1. Lipid Content, Trophic Level (TL), THg and MeHg Concentrations of Mollusks Collected from Bohai Sea in 2009 and 2012 (Mean ± SD)**

| Species | Class | Order | Lipid content N | Lipid content (% d.w.) | TL N | TL | THg ($\mu g\ kg^{-1}$ d.w.) | MeHg ($\mu g\ kg^{-1}$ d.w.) |
|---|---|---|---|---|---|---|---|---|
| **Amu** | Bivalvia | Pterioida | 9 | 11.01±3.05 | 15 | 3.13±0.16 | 70.0±29.7 | 27.5±16.8 |
| **Chl** | Bivalvia | Pterioida | 7 | 14.03±2.55 | 16 | 3.07±0.22 | 104.0±53.2 | 39.5±18.7 |
| **Cyc** | Bivalvia | Veneroida | 7 | 7.51±1.99 | 14 | 3.02±0.25 | 56.8±21.1 | 16.3±8.9 |
| **Mac** | Bivalvia | Veneroida | 4 | 7.93±0.64 | 8 | 2.95±0.54 | 67.6±51.9 | 32.3±55.7 |
| **Mer** | Bivalvia | Veneroida | 9 | 13.55±1.80 | 20 | 2.61±0.74 | 46.5±13.2 | 14.2±9.5 |
| **Mya** | Bivalvia | Myoida | 6 | 11.34±0.89 | 8 | 2.74±0.29 | 83.9±45.8 | 26.2±18.4 |
| **Myt** | Bivalvia | Mytioida | 4 | 15.50±0.53 | 10 | 2.72±0.35 | 79.9±45.5 | 16.8±15.1 |
| **Ost** | Bivalvia | Veneroida | 7 | 15.71±2.22 | 10 | 2.97±0.51 | 96.2±63.7 | 44.0±21.2 |
| **Sca** | Bivalvia | Arcoida | 8 | 13.21±4.54 | 17 | 3.08±0.49 | 72.8±43.0 | 12.5±10.0 |
| **Nev** | Prosobranchia | Gastropoda | 10 | 6.18±1.72 | 18 | 3.28±0.19 | 107.4±57.4 | 68.6±34.9 |
| **Rap** | Prosobranchia | Gastropoda | 21 | 6.99±1.76 | 39 | 3.33±0.28 | 130.7±64.5 | 91.7±62.6 |
| **Total** | | | 92 | 10.41±4.05 | 175 | 3.05±0.45 | 89.6±55.7 | 43.8±46.4 |

Amu, *Amusium veneriformis*; Chl, *Chlamys farreri*; Cyc, *Cyclina sinensis*; Mac, *Mactra veneriformis*; Mer, *Meretix meretrix*; Mya, *Mya arenaria*; Myt, *Mytilus edulis*; Ost, *Crassostrea talienwhanensis*; Sca, *Scapharca subcrenata*; Nev, *Neverita didyma*; Rap, *Rapana venosa*.

44 **Table S2. Results for the Analysis of Certified Reference Materials (CRMs) (μg kg$^{-1}$)**

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| CRM | Source | Description | N | THg | | MeHg | |
|---|---|---|---|---|---|---|---|
| | | | | Obtained value | Certified value | Obtained value | Certified value |
| **TORT-2** | NRCC[1] | Lobster Hepatopancreas | 4 | 269.2±13.2 | 270±60 | 126.9±5.3 | 152±13 |
| **DORM-3** | NRCC | Fish Protein | 5 | 369.4±14.9 | 382±60 | 329.6±17.9 | 355±56 |
| **DORM-4** | NRCC | Fish Protein | 4 | 394.2±6.1 | 410±55 | 339.5±10.4 | 354±31 |

46 [1]NRCC—National Research Council Canada

48 **Table S3. Concentrations of THg and MeHg and %MeHg in the Mollusk Samples from**

49 **Bohai Sea during 2007-2012**

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| Mollusks | N | THg (μg kg$^{-1}$) | | | | MeHg (μg kg$^{-1}$) | | | | %MeHg | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Median | Min | Max | Mean | Median | Min | Max | Mean | Median | Min | Max |
| **Amu** | 38 | 89.7 | 89.7 | 44.6 | 226.4 | 35.8 | 30.1 | 9.1 | 121.2 | 40.1 | 36.9 | 8.3 | 92.2 |
| **Chl** | 33 | 108.9 | 93.7 | 35.9 | 244.4 | 38.7 | 34.4 | 9.6 | 90.6 | 38.3 | 37.1 | 11.9 | 70.7 |
| **Cyc** | 32 | 62.9 | 59.4 | 32.0 | 132.6 | 20.3 | 19.2 | 5.5 | 57.0 | 33.8 | 32.8 | 8.8 | 74.9 |
| **Mac** | 25 | 86.8 | 61.9 | 35.7 | 203.7 | 32.6 | 16.9 | 5.5 | 169.8 | 35.3 | 25.7 | 11.6 | 92.6 |
| **Mer** | 56 | 59.4 | 54.1 | 27.2 | 140.5 | 22.3 | 17.4 | 3.5 | 59.7 | 37.6 | 29.7 | 6.6 | 94.2 |
| **Mya** | 16 | 96.4 | 81.6 | 42.0 | 217.7 | 34.1 | 25.6 | 7.4 | 95.4 | 32.5 | 32.9 | 16.3 | 48.4 |
| **Myt** | 30 | 100.8 | 80.9 | 27.7 | 274.5 | 20.0 | 14.4 | 2.6 | 64.4 | 21.3 | 20.0 | 4.2 | 59.1 |
| **Ost** | 40 | 105.8 | 103.5 | 32.4 | 242.3 | 46.1 | 42.7 | 12.7 | 97.5 | 49.5 | 42.8 | 12.7 | 92.5 |
| **Sca** | 43 | 88.1 | 76.4 | 36.9 | 211.8 | 19.2 | 15.3 | 2.1 | 104.5 | 21.1 | 17.2 | 5.7 | 57.0 |
| **Nev** | 35 | 91.4 | 79.6 | 36.5 | 261.2 | 50.2 | 44.1 | 12.4 | 138.7 | 57.3 | 59.4 | 15.6 | 95.1 |
| **Rap** | 83 | 151.1 | 125.2 | 53.9 | 461.1 | 102.6 | 83.6 | 14.3 | 295.5 | 65.8 | 68.7 | 21.7 | 95.8 |
| **Total** | 431 | 99.4 | 80.9 | 27.2 | 461.1 | 45.1 | 29.4 | 2.1 | 295.5 | 42.6 | 37.2 | 4.2 | 95.8 |

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**Table S4. Concentrations of Hg species (μg kg$^{-1}$) in Mollusks from Different Areas in the World**

| Species | Location | | THg | MeHg | Reference |
|---|---|---|---|---|---|
| Zebra mussel | Lakes in the USA | d.w. | 529.0±78.0 | | 1 |
| Oyster | Te´rminos Lagoon, Mexico | d.w. | 880.0(400.0-2000.0) | | 2 |
| Oyster | Coastal lagoons, SE Gulf of California, Mexico | d.w. | 700.0(60.0-910.0) | | 3 |
| Oyster | Gulf of Mexico | d.w. | 30.0-500.0 | 10.0-200.0 | 4 |
| Mussel/Oyster | French Coast | d.w. | 147.0±62.0<br>(39.0-437.0) | 64.0±35.0<br>(8.0-238.0) | 5 |
| Mollusk | Gulf of Taranto, Italy | d.w. | 626.0(21.0-1403.0)<br>1019.0(224.0-1867.0) | 176.4(n.d.-377.0)<br>524.4(37.0-1321.0) | 6 |
| Mangrove Oyster | North Coast of Villa Clara, Cuba | d.w. | 190.0-690.0 | | 7 |
| Common mussel<br>Mangrove Oyster | Sepetiba Bay, Brazil | d.w. | 76.0±7.1<br>19.0±3.6 | 48.0±5.1<br>6.9±0.4 | 8 |
| Oyster | Ceara River, Brazil | d.w. | 154.0±60.0<br>(56.0-300.0) | | 9 |
| Oyster/Clam /Mussel | Todos os Santos Bay, Bahia, Brazil | d.w. | <30.0-350.0 | | 10 |
| Mollusk | Kastela Bay, Adriatic Sea | d.w. | 138.0-325.0 | 30.3-59.3 | 11 |
| Mollusk | Mar Piccolo, Ionian Sea | d.w. | 200.0(110.0-290.0) | | 12 |
| Mussel | Southern Baltic Sea | d.w. | 110.0±10.0 | | 13 |
| Cupped oyster<br>European flat oyster<br>Mediterranean mussel | Mediterranean Sea | w.w. | 32.0(5.0-90.0)<br>30.0(5.0-470.0)<br>40.0(20.0-60.0) | 13.0(2.0-36.0)<br>12.0(2.0-188.0)<br>16.0(8.0-24.0) | 14 |
| Blue mussel | West Greenland | d.w. | 60.0±30.0 | 11.0±2.0 | 15 |
| Mussel | Krka Estuary, Croatia | w.w. | 14.0-33.0 | 3.8-9.1 | 16 |
| Bivalve | Turkey | w.w. | <LOD-120.0 | | 17 |
| Rocky oyster | Coast of Qeshm Island, Persian Gulf, Iran | d.w. | 50.7 | | 18 |
| Blue Mussel<br>Washington clam | Masan Bay, Korea | d.w. | 20.0±7.0<br>34.0±4.5 | 8.8±5.4<br>16.0±3.5 | 19 |
| Mollusk | Markets throughout Korea | d.w. | 51.0 | | 20 |
| Mollusk | Coastal area of Guangdong, China | w.w. | 13.9±9.3<br>(1.8-53.3) | | 21 |
| Marine bivalve | East Coasts of Hong Kong, China | d.w. | 30.2-91.9 | 8.9-18.8 | 22 |

| | | | | | |
|---|---|---|---|---|---|
| Mussel/Clam/Oyster | Bohai Sea, China | w.w. | 6.7-453.0 | 4.8-168.4 | 23 |
| Marine bivalve | Dalian City, China | d.w. | 70.0-350.0 | | 24 |
| Mollusk | Bohai Sea, China | d.w. | 99.4(27.2-461.1) | 45.1(2.1-295.5) | This work |

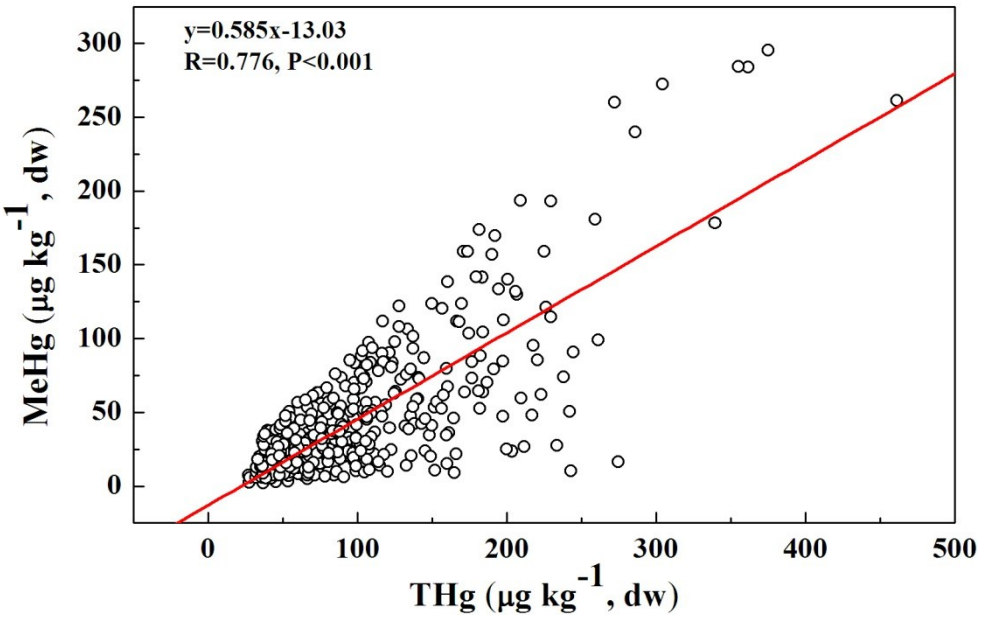
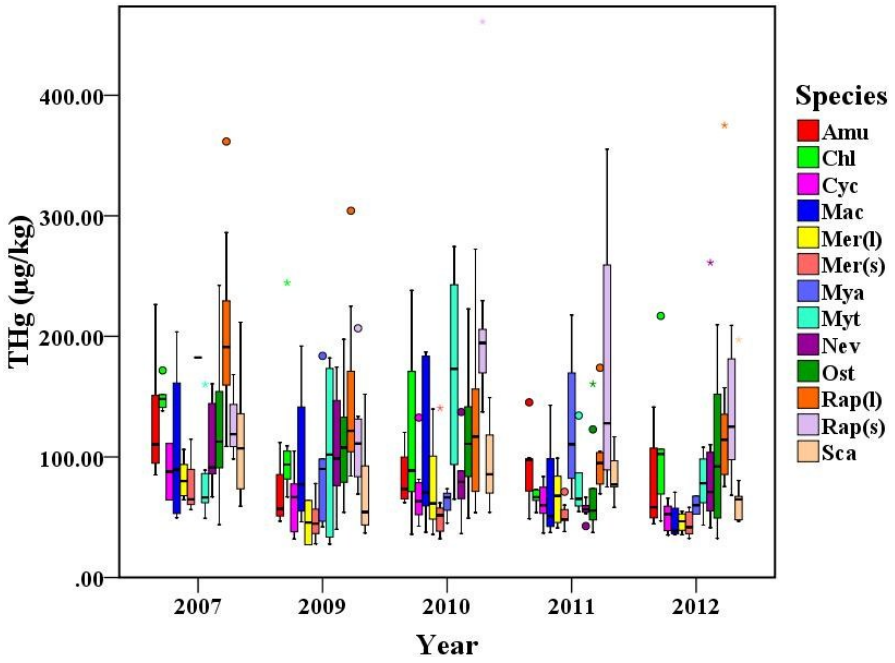



**Figure S1.** Relations between THg and MeHg concentration in mollusks from Bohai Sea.



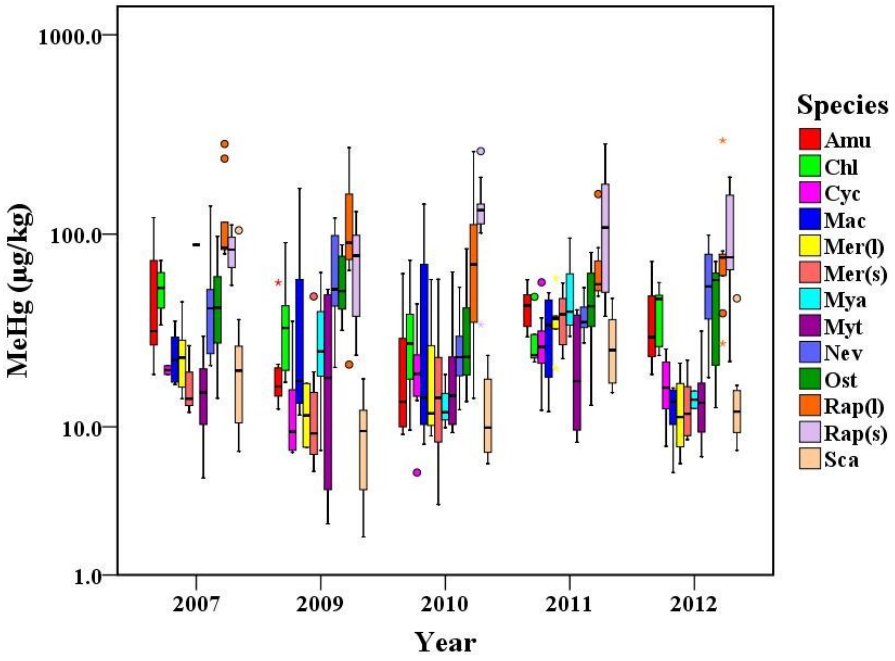
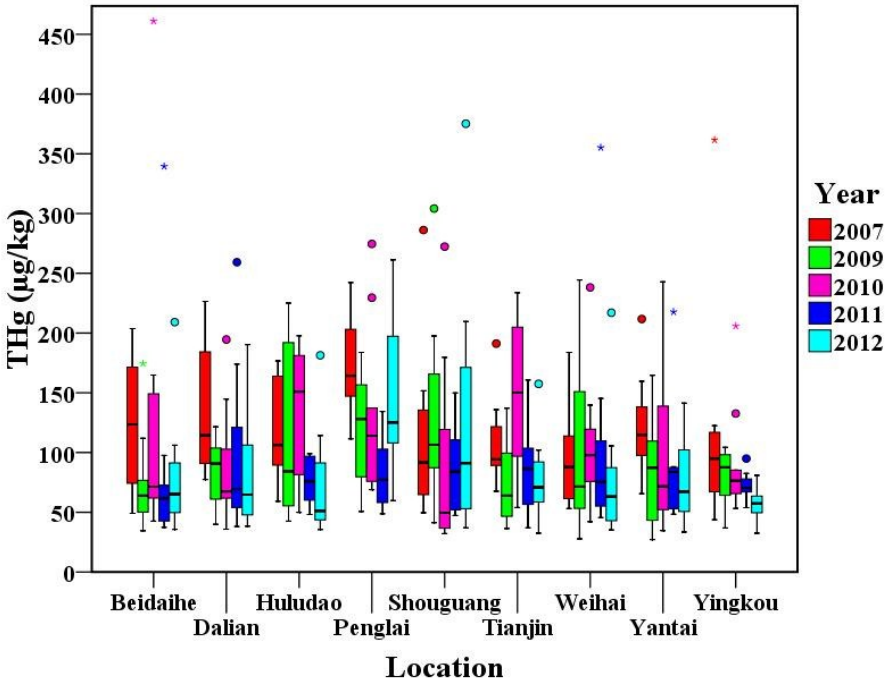




**Figure S2.** Boxplots of THg and MeHg in mollusks collected from the year 2007 to 2012.



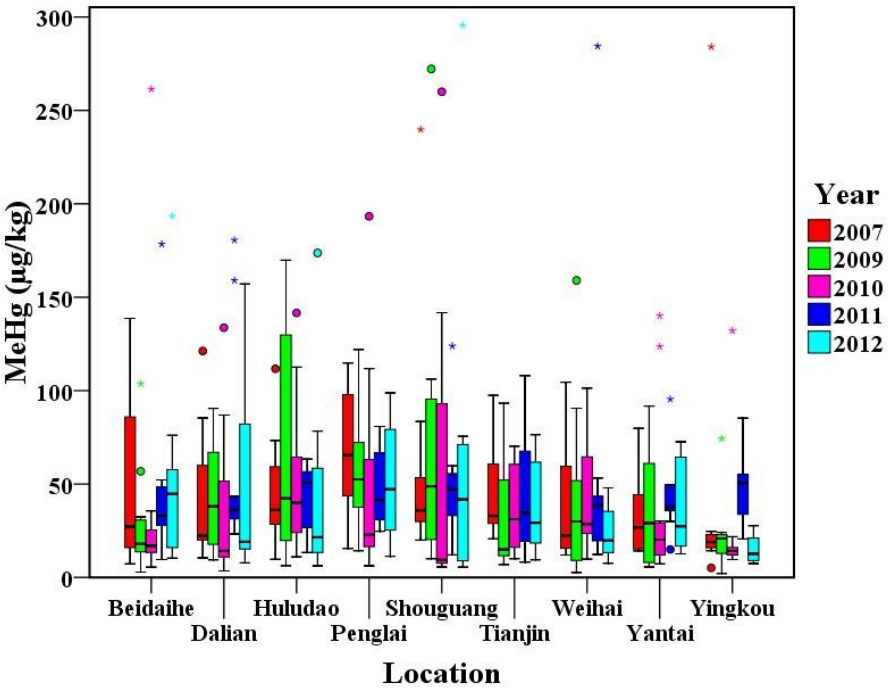




**Figure S3.** Boxplots of THg and MeHg in mollusks from the nine coastal areas along Bohai Sea.

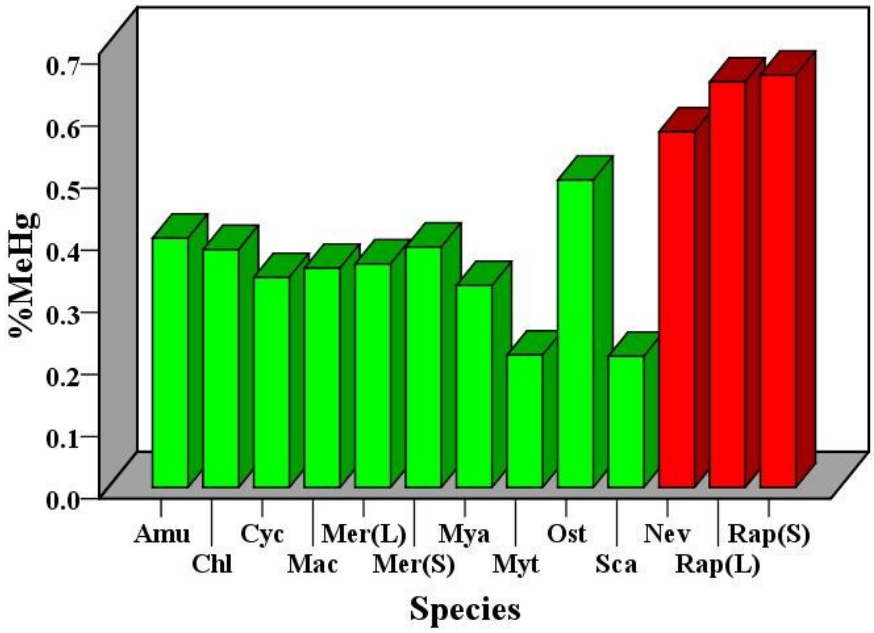
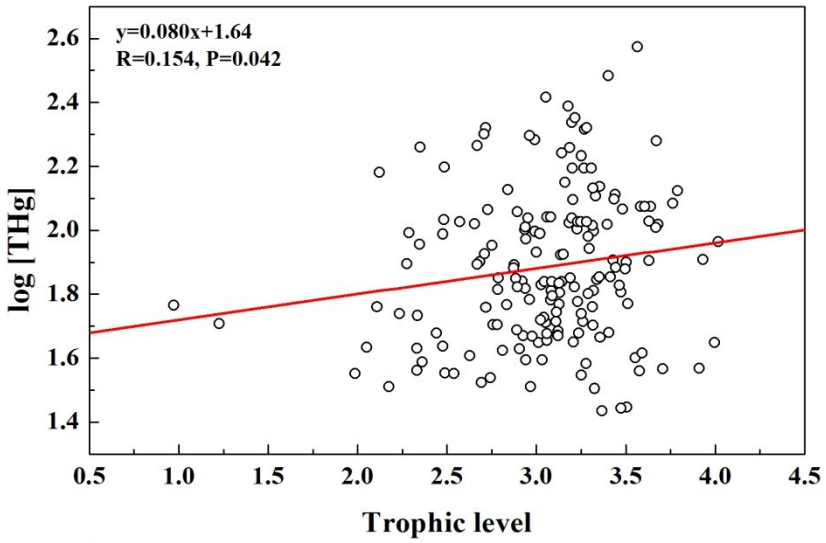



**Figure S4.** Percentages of MeHg in THg in 11 mollusk species.

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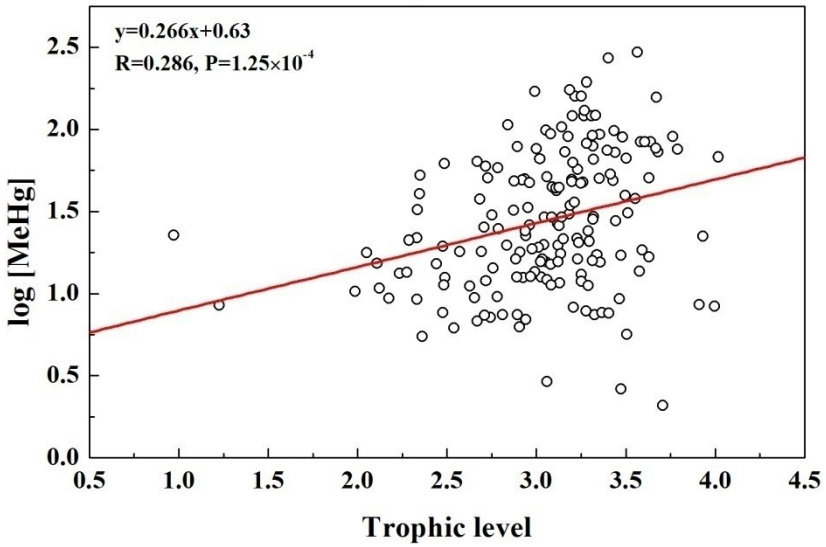


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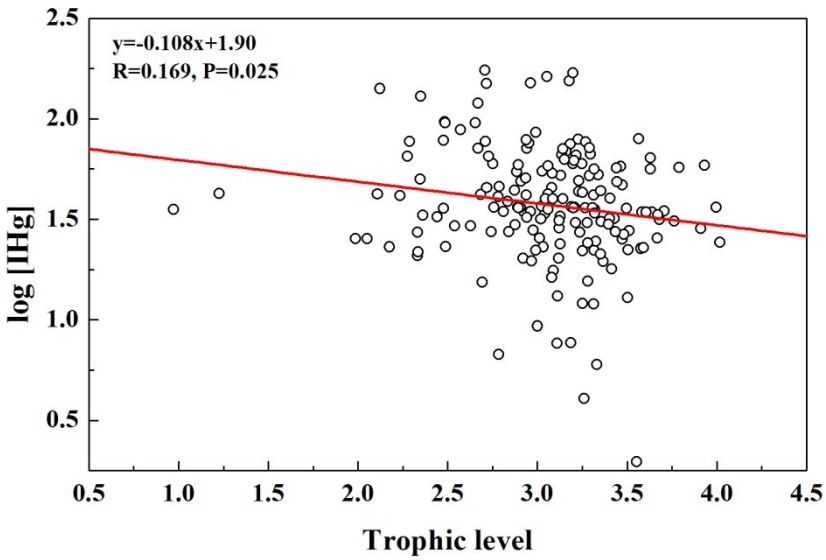


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88 **Figure S5.** Relations between log[Hg] and trophic level (TL).

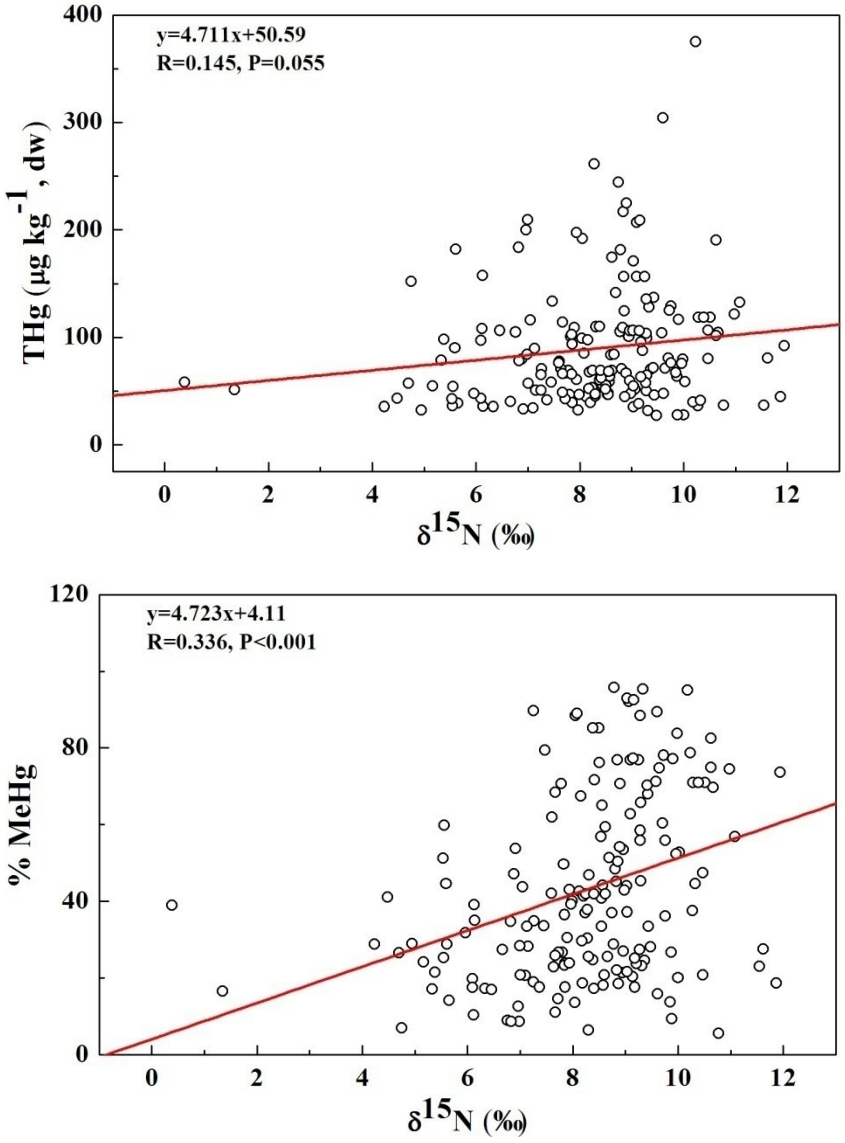


**Figure S6.** Relations between concentrations of THg and %MeHg and $\delta^{15}N$.

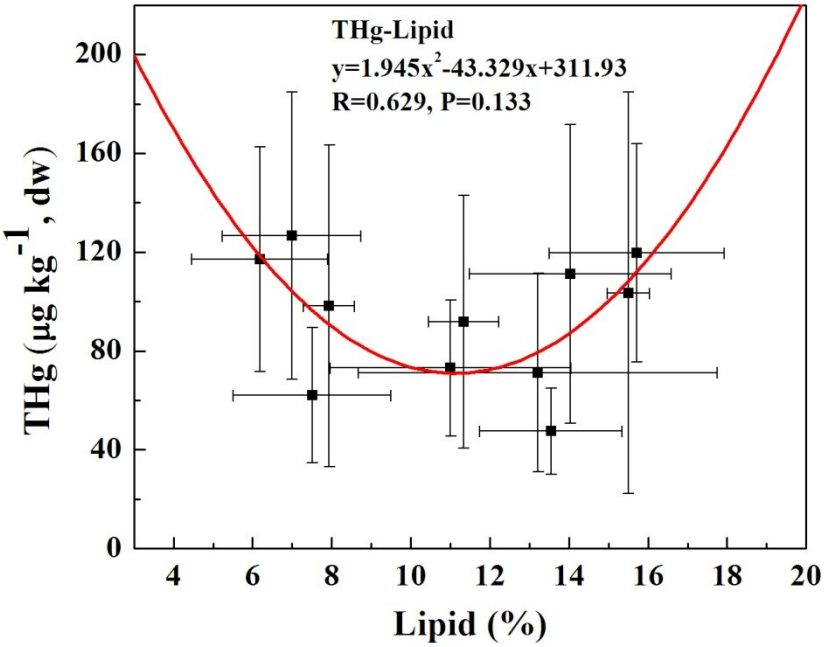


**Figure S7.** Relations between concentrations of THg and lipid content.

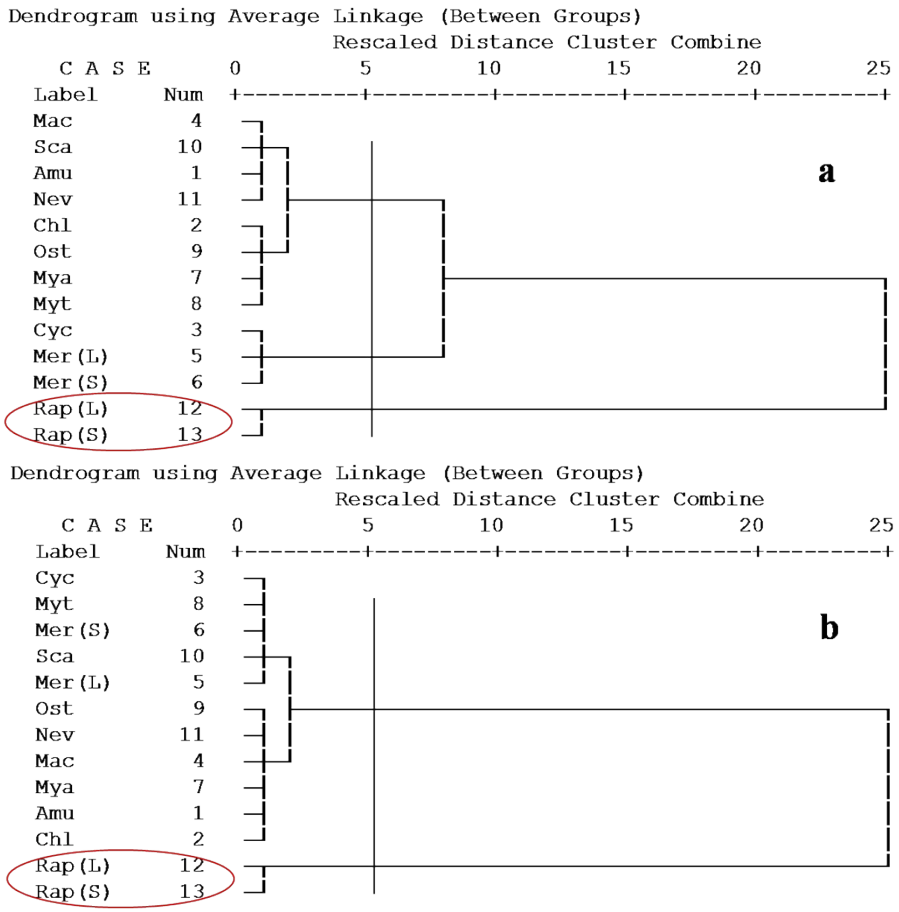


**Figure S8.** Dendrogram derived from the hierarchical cluster analysis by using the data matrix of THg (a) and MeHg (b) in mollusks.

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