Concentrations of heavy metals in fishes from coastal waters around the Baltic Sea

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As the two mainly used fish species for monitoring regarding harmful substances in the Baltic biota, Baltic herring (*Clupea harengus membras*) and cod (*Gadus morhua*) most certainly reflect the situation in the open sea due to their pelagic habits, the more stationary and benthic species like flounder (*Platichthys flesus*) and eelpout (*Zoarces viviparus*) have been selected to describe the situation in coastal waters. The smelt (*Osmerus eperlanus*) being a more stationary species than herring, also partly competing on same food organisms although mainly feeding on benthic organisms, completes the attempt.

Material from selected and known extremely polluted and almost non affected areas as well, in Finland (mouth of the river Kokemäenjoki-Kumo älv, Åland Islands; Nåtö, Archipelago Sea; Nagu-Korpo, Hanko-Hangö peninsula; Tvärminne), Estonia (Muuga, Vainupea, Väike vääin), Latvia (Riga Bay; Kolka) and Germany (Firth of Kiel, harbour area of Kiel), were collected for heavy metal analysis regarding concentrations in both muscle tissue and internal organs like liver and gonads for both sexes.

1. The highest concentrations of mercury (Hg) in muscle tissue were recorded in flounder from Kokemäenjoki (mean 0.24 mg/kg f.wt).
2. The highest concentrations of iron (Fe) in muscle tissue were recorded in flounder from Nåtö (mean 70.1 mg/kg d.wt.) - and in liver of eelpout from Estonia (1298.6) an of flounder from Nåtö (947.0).
3. Manganese (Mn) concentrations were highest in muscle tissue in smelt from Estonia (5.6) and in eelpout from Riga Bay (4.1) - and in liver of smelts from Kiel harbour (17.5) and Tvärminne (12.1).
4. Zink (Zn) maxima were recorded in muscle tissue in eelpout (98.4), herring (86.5) both from Estonia and in eelpout (70.4) from Archipelago Sea - and in liver of eelpout (141.6) from Estonia, of smelt (139.2) from Kokemäenjoki and in flounder (122.0) from Tvärminne.
5. For copper (Cu) the highest concentration in muscle tissue were recorded in flounder from Kiel firth (5.9), Kiel harbour (5.7) and Nåtö (4.9) - and in liver the maxima were recorded in flounder from Tvärminne (70.9) and Nåtö (52.5).
6. Cadmium (Cd) concentrations were remarkably high in muscle tissue of flounder from Nåtö (0.21) - not to mention the extreme concentrations in livers of the same flounders from Nåtö (3.15), in flounder liver from Tvärminne (3.78) and in eelpout liver from Estonia (1.73).
7. The highest lead (Pb) concentrations in muscle tissue were recorded in Estonian eelpout (0.34), herring (0.30) and smelt (0.30) - and in liver of smelt from Kokemäenjoki (1.73) and of eelpout from Estonia (0.90).
8. For nickel (Ni) the maxima were recorded in muscle tissue of flounder (0.6) and of smelt (0.5) both from Kokemäenjoki and of eelpout (0.4) from Kiel harbour - and in liver of smelt from Kiel harbour (0.85), eelpout from Estonia (0.82), smelt from Kokemäenjoki (0.79), flounder from Nåtö (0.75), flounder from Tvärminne (0.70) and eelpout from Tvärminne (0.66).

As the recorded levels of some metal concentrations are remarkably high even in areas regarded as almost virgin, like f.ex. the Åland Islands the need for further and detailed investigations is obvious.