

## **Supplemental Material**

### **A Quantitative Synthesis of Mercury in Commercial Seafood and Implications for Exposure in the U.S.**

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**Supplemental Material, Table S1. Summary of Hg concentrations across studies in commonly consumed seafood items in the U.S.**

<b>Seafood Item</b>	<b>Grand Mean Hg (ppm)<sup>a</sup></b>	<b>Samples (Total)<sup>b</sup></b>	<b>SE<sub>W</sub></b>	<b>SD<sub>W</sub></b>	<b>Min, Max (ppm)<sup>c</sup></b>	<b>CV</b>
Anchovies (All)	0.103	455	0.041	0.197	(0.008, 0.154)	1.91
Bass (Chilean)	0.357	100	0.041	0.185	(0.310, 0.600)	0.52
Bass (Freshwater, All)	0.170	149	0.059	0.361	(0.118, 0.242)	2.12
Bass (Saltwater, Black, White, Striped)	0.288	1660	0.150	1.004	(0.005, 0.650)	3.49
Bass, Striped (All)	0.285	1367	0.140	1.155	(0.028, 0.650)	4.05
Bass, Striped (farmed)	0.028	15	NA	NA	(0.028, 0.028)	NA
Bass, Striped (wild)	0.295	1311	0.134	1.147	(0.094, 0.650)	3.89
Bluefish	0.351	1019	0.145	0.965	(0.034, 0.680)	2.75
Butterfish	0.054	109	0.021	0.112	(0.004, 0.080)	2.08
Carp (All)	0.156	477	0.095	0.521	(0.030, 0.472)	3.35
Catfish (All)	0.118	1757	0.087	0.586	(0.005, 0.714)	4.97
Catfish (wild, all species)	0.144	1396	0.078	0.513	(0.005, 0.714)	3.57
Catfish, Channel (wild)	0.120	521	0.038	0.253	(0.020, 0.231)	2.10
Catfish (farmed, all species)	0.012	320	0.008	0.073	(0.008, 0.030)	6.14
Clams (All)	0.028	1027	0.032	0.177	(0.005, 0.300)	6.29
Clams, Hard	0.047	181	0.026	0.130	(0.005, 0.300)	2.75
Clams, Geoduck	0.030	11	0.021	0.049	(0.010, 0.041)	1.66
Clams, Cockle	0.054	122	0.073	0.404	(0.019, 0.253)	7.47
Clams, Pacific Littleneck	0.022	18	0.009	0.022	(0.011, 0.028)	0.99
Clams, Softshell	0.016	471	0.020	0.249	(0.008, 0.086)	15.42
Cod (All)	0.087	2115	0.038	0.358	(0.019, 0.176)	4.12
Cod, Atlantic (farmed)	0.034	24	NA	NA	(0.034, 0.034)	NA
Cod, Atlantic (wild)	0.070	1452	0.017	0.261	(0.035, 0.113)	3.70
Cod, Pacific	0.144	431	0.038	0.260	(0.019, 0.176)	1.81
Crab (All)	0.098	1564	0.086	0.453	(0.005, 0.302)	4.61
Crab (Blue, King and Snow)	0.095	1087	0.098	0.526	(0.005, 0.302)	5.56
Crab, Blue	0.110	864	0.103	0.594	(0.014, 0.302)	5.40
Crab, Dungeness	0.120	264	0.037	0.225	(0.051, 0.192)	1.88
Crab, King	0.027	203	0.032	0.154	(0.005, 0.101)	5.63
Crab, Snow	0.110	20	0.073	0.187	(0.048, 0.223)	1.71
Crawfish (All)	0.034	206	0.019	0.104	(0.021, 0.210)	3.03
Croaker (All)	0.092	856	0.058	0.308	(0.011, 0.287)	3.36
Croaker, Atlantic	0.069	572	0.025	0.135	(0.011, 0.146)	1.97
Croaker, White	0.169	193	0.066	0.344	(0.040, 0.287)	2.04
Cuttlefish	0.134	156	0.085	0.275	(0.020, 0.270)	2.05
Eel (All)	0.186	986	0.111	0.608	(0.030, 0.800)	3.28
Eel (wild)	0.216	659	0.110	0.551	(0.030, 0.800)	2.55
Eel (farmed)	0.066	220	0.027	0.163	(0.049, 0.181)	2.46
Flatfish (Flounder, Plaice, Sole)	0.110	3070	0.079	0.417	(0.005, 0.463)	3.80
Flounder (All)	0.119	1687	0.075	0.406	(0.005, 0.463)	3.42
Flounder, Summer	0.121	427	0.042	0.216	(0.005, 0.184)	1.79
Flounder, Windowpane	0.152	84	0.037	0.152	(0.105, 0.180)	1.00
Flounder, Winter	0.070	302	0.039	0.228	(0.021, 0.146)	3.27
Freshwater Perch (All)	0.141	1295	0.110	0.745	(0.014, 0.810)	5.27
Grouper (All)	0.417	643	0.196	0.804	(0.035, 1.080)	1.93
Haddock (All)	0.164	226	0.166	0.752	(0.020, 0.381)	4.59
Hake (All)	0.146	739	0.090	0.489	(0.015, 0.269)	3.36
Halibut (All)	0.254	3532	0.060	0.703	(0.036, 0.450)	2.76
Halibut, Pacific	0.261	3111	0.053	1.127	(0.158, 0.450)	4.32

Table S1. (continues through page 4)

<b>Seafood Item</b>	<b>Grand Mean Hg (ppm)<sup>a</sup></b>	<b>Samples (Total)<sup>b</sup></b>	<b>SE<sub>W</sub></b>	<b>SD<sub>W</sub></b>	<b>Min, Max (ppm)<sup>c</sup></b>	<b>CV</b>
Halibut, Greenland	0.183	138	0.120	0.630	(0.040, 0.289)	3.44
Herring (All)	0.043	1277	0.026	0.174	(0.010, 0.321)	4.09
Herring, Atlantic	0.037	973	0.015	0.119	(0.010, 0.132)	3.19
Herring, Pacific	0.060	194	0.048	0.300	(0.017, 0.140)	4.97
Lingcod	0.363	333	0.128	0.952	(0.080, 0.440)	2.62
Lobster (All)	0.153	344	0.070	0.315	(0.042, 0.249)	2.06
Lobster, American	0.200	142	0.075	0.367	(0.045, 0.249)	1.84
Lobster, Spiny	0.100	62	0.035	0.137	(0.064, 0.210)	1.36
Mackerel (All)	0.586	2481	0.450	3.237	(0.008, 1.510)	5.53
Mackerel, Atlantic	0.045	191	0.037	0.192	(0.033, 0.270)	4.30
Mackerel, Chub	0.099	129	0.033	0.166	(0.028, 0.152)	1.68
Mackerel, King	1.101	821	0.383	3.470	(0.110, 1.510)	3.15
Mackerel, Spanish	0.440	1168	0.097	1.105	(0.147, 0.530)	2.51
Marlin (All)	1.517	821	1.654	7.495	(0.140, 10.520)	4.94
Marlin, Blue	2.465	364	2.120	9.532	(0.190, 10.520)	3.87
Marlin, Striped	0.861	179	0.528	2.356	(0.140, 1.720)	2.74
Marlin, White	0.695	56	0.120	0.518	(0.270, 0.718)	0.75
Monkfish	0.174	92	0.024	0.117	(0.083, 0.198)	0.67
Mullet	0.050	638	0.027	0.152	(0.006, 0.310)	3.05
Mussels (All)	0.028	755	0.016	0.106	(0.013, 0.085)	3.84
Ocean Perch	0.117	262	0.082	0.421	(0.010, 0.548)	3.59
Orange Roughy	0.513	152	0.103	0.569	(0.350, 0.595)	1.11
Oysters (All)	0.020	5310	0.013	0.178	(0.005, 0.083)	9.00
Oysters, Eastern	0.018	4573	0.009	0.161	(0.006, 0.083)	8.87
Oysters, Pacific	0.039	290	0.025	0.171	(0.008, 0.070)	4.37
Pike	0.404	1374	0.101	1.328	(0.247, 1.340)	3.29
Plaice	0.148	282	0.137	0.576	(0.015, 0.343)	3.88
Pollock (All)	0.058	540	0.059	0.342	(0.005, 0.704)	5.93
Pollock, Atlantic	0.160	79	0.053	0.330	(0.030, 0.170)	2.07
Pollock, Pacific/Alaska	0.050	235	0.027	0.145	(0.005, 0.140)	2.89
Porgy	0.065	169	0.027	0.143	(0.033, 0.102)	2.20
Sablefish	0.243	477	0.080	0.620	(0.151, 0.517)	2.55
Salmon (All)	0.048	2818	0.023	0.143	(0.005, 0.190)	3.00
Salmon, Atlantic (farmed)	0.026	145	0.020	0.077	(0.005, 0.117)	2.91
Salmon, Atlantic (wild)	0.058	95	0.015	0.083	(0.047, 0.073)	1.43
Salmon, Chinook, farmed	0.017	4	0.017	0.024	(0.005, 0.029)	1.41
Salmon, Chinook, wild	0.067	580	0.013	0.106	(0.041, 0.090)	1.59
Salmon, Chum	0.046	456	0.018	0.139	(0.014, 0.082)	3.00
Salmon, Coho	0.044	567	0.007	0.065	(0.016, 0.063)	1.49
Salmon, Pink	0.037	222	0.009	0.064	(0.005, 0.040)	1.72
Salmon, Sockeye	0.039	396	0.004	0.026	(0.005, 0.057)	0.66
Salmon (canned)	0.035	61	0.012	0.042	(0.028, 0.090)	1.20
Sardine (All)	0.079	1007	0.036	0.201	(0.010, 0.330)	2.56
Scallops (All)	0.040	336	0.033	0.148	(0.004, 0.090)	3.65
Seabass, Black	0.120	139	0.032	0.118	(0.005, 0.150)	0.98
Shad (All)	0.077	93	0.031	0.099	(0.040, 0.156)	1.29
Shad, American	0.067	76	0.019	0.095	(0.040, 0.111)	1.42
Shark (All)	0.882	3722	0.462	2.504	(0.080, 8.250)	2.84
Shark, Blacktip	0.882	250	0.274	1.249	(0.380, 2.140)	1.42
Shark, Blue	0.664	50	0.480	1.516	(0.270, 1.900)	2.28
Shark, Mako	1.259	166	0.464	1.995	(0.206, 3.200)	1.58
Shark, Sandbar	0.869	115	0.301	1.141	(0.082, 1.397)	1.31
Shark, Thresher	0.622	119	0.421	1.874	(0.130, 1.300)	3.01

Table S1. (continues through page 4)

<b>Seafood Item</b>	<b>Grand Mean Hg (ppm)<sup>a</sup></b>	<b>Samples (Total)<sup>b</sup></b>	<b>SE<sub>w</sub></b>	<b>SD<sub>w</sub></b>	<b>Min, Max (ppm)<sup>c</sup></b>	<b>CV</b>
Sheepshead	0.166	340	0.038	0.347	(0.128, 0.197)	2.09
Shrimp (All)	0.053	935	0.053	0.212	(0.003, 0.380)	4.03
Shrimp, Brown	0.077	72	0.024	0.083	(0.020, 0.130)	1.07
Shrimp, Pink	0.083	49	0.016	0.079	(0.005, 0.085)	0.95
Shrimp, White	0.057	113	0.036	0.136	(0.006, 0.200)	2.38
Skate (All)	0.138	70	0.027	0.093	(0.032, 0.214)	0.67
Smelt	0.025	175	0.019	0.086	(0.008, 0.125)	4.03
Snapper (All)	0.230	1244	0.104	0.514	(0.031, 0.776)	2.27
Snapper, Gray	0.233	699	0.068	0.595	(0.121, 0.348)	2.55
Snapper, Red	0.243	279	0.168	0.725	(0.031, 0.776)	2.98
Sole	0.086	1101	0.056	0.310	(0.013, 0.308)	3.62
Squid	0.044	728	0.024	0.130	(0.008, 0.095)	2.99
Swordfish	0.893	1726	0.296	2.052	(0.150, 3.310)	2.30
Tilapia	0.019	129	0.027	0.097	(0.002, 0.150)	4.99
Tilefish (All)	0.883	109	0.695	2.962	(0.080, 1.450)	3.35
Tilefish, Atlantic	0.171	47	0.049	0.195	(0.131, 0.229)	1.14
Tilefish, Gulf of Mexico	1.445	61	0.059	0.324	(1.123, 1.450)	0.22
Trout (freshwater, wild and unknown status)	0.344	2804	0.087	1.030	(0.030, 0.440)	3.00
Trout, Lake	0.349	2748	0.080	1.268	(0.047, 0.440)	3.63
Trout (freshwater, farmed)	0.029	178	0.015	0.066	(0.005, 0.060)	2.30
Tuna (fresh/frozen, All)	0.450	3780	0.340	1.619	(0.007, 3.030)	3.59
Tuna, Albacore	0.317	296	0.103	0.475	(0.030, 0.500)	1.50
Tuna, Atlantic bonito	0.499	263	0.359	2.200	(0.326, 1.662)	4.41
Tuna, Bigeye	0.582	376	0.222	1.113	(0.114, 1.149)	1.91
Tuna, Blackfin	0.856	159	0.231	0.972	(0.200, 1.160)	1.14
Tuna, Bluefin (farmed)	0.455	108	0.156	0.540	(0.190, 1.020)	1.19
Tuna, Bluefin (wild)	0.796	514	0.542	2.408	(0.057, 3.030)	3.03
Tuna, Skipjack	0.198	341	0.083	0.320	(0.060, 0.450)	1.62
Tuna, Yellowfin	0.270	1183	0.125	0.797	(0.030, 0.650)	2.95
Tuna, Albacore (canned)	0.328	1362	0.113	0.955	(0.155, 0.588)	2.92
Tuna, Light (canned or packed)	0.118	972	0.038	0.300	(0.047, 0.400)	2.55
Tuna, Yellowfin (canned)	0.143	298	0.098	0.688	(0.029, 0.240)	4.80
Weakfish/Seatrout (All)	0.361	2105	0.193	1.348	(0.021, 1.060)	3.73
Whitefish (All)	0.106	2721	0.051	0.707	(0.018, 0.352)	6.70
Whiting	0.040	27	0.015	0.056	(0.030, 0.051)	1.38

SE<sub>w</sub> = Weighted standard error (see main text for details)

SD<sub>w</sub> = Weighted standard deviation (see main text for details)

CV = Coefficient of variation

<sup>a</sup>Grand Mean Hg calculated across studies, based on wet weight

<sup>b</sup>Total samples across studies

<sup>c</sup>Minimum and maximum mean reported across studies

## Search Terms for Supplemental Material, Table S2: Seafood Hg Database

mercury and anchovies  
mercury and anchovy  
mercury and bass  
mercury and bluefish  
mercury and buffalofish  
mercury and butterflyfish  
mercury and carp  
mercury and catfish  
mercury and clam  
mercury and cod  
mercury and crab  
mercury and crayfish  
mercury and croaker  
mercury and flounder  
mercury and grouper  
mercury and haddock  
mercury and hake  
mercury and halibut  
mercury and herring  
mercury and lincod  
mercury and lobster  
mercury and mackerel  
mercury and marlin  
mercury and monkfish  
mercury and mullet  
mercury and mussel  
mercury and orange roughy  
mercury and oyster  
mercury and perch  
mercury and pike  
mercury and plaice  
mercury and pollock  
mercury and porgy  
mercury and sablefish  
mercury and salmon  
mercury and sardine  
mercury and scallop  
mercury and scorpionfish  
mercury and sea trout  
mercury and seatrout  
mercury and shad  
mercury and shark  
mercury and sheepshead  
mercury and shrimp  
mercury and skate  
mercury and smelt  
mercury and snapper  
mercury and sole  
mercury and squid  
mercury and swordfish  
mercury and tilapia  
mercury and tilefish  
mercury and trout  
mercury and tuna  
mercury and whitefish

## References for Supplemental Material, Table 2: Seafood Hg Database

- Adams D, Sonneb C, Basuc N, Dietzb R, Namc D, Leifssond P, et al. 2010. Mercury contamination in spotted seatrout, *Cynoscion nebulosus*: An assessment of liver, kidney, blood, and nervous system health. *Sci Total Environ* 408(23):5808-5816.
- Adams DH. 2004. Total mercury levels in tunas from offshore waters of the Florida Atlantic coast. *Mar Pollut Bull* 49(7-8):659-663.
- Adams DH, McMichael RH. 1999. Mercury levels in four species of sharks from the Atlantic coast of Florida. *Fishery Bulletin* 97(2):372-379.
- Adams DH, McMichael RH. 2007. Mercury in king mackerel, *Scomberomorus cavalla*, and Spanish mackerel, *S. maculatus*, from waters of the south-eastern USA: regional and historical trends. *Mar Freshw Res* 58(2):187-193.
- Adams DH, McMichael RH, Henderson GE. 2003. Florida Marine Research Institute Technical Report TR-9, Mercury Levels in Marine and Estuarine Fishes of Florida 1989-2001.
- Africa CR, Pascual AE, Santiago EC. 2009. Total Mercury in Three Fish Species Sold in a Metro Manila Public Market: Monitoring and Health Risk Assessment. *Science Diliman* 21(1):1-6.
- Amlund H, Lundebye AK, Berntssen MHG. 2007. Accumulation and elimination of methylmercury in Atlantic cod (*Gadus morhua* L.) following dietary exposure. *Aquat Toxicol* 83(4):323-330.
- Andersen JL, Depledge MH. 1997. A survey of total mercury and methylmercury in edible fish and invertebrates from Azorean waters. *Mar Environ Res* 44(3):331-350.
- Arcos JM, Ruiz X, Bearhop S, Furness RW. 2002. Mercury levels in seabirds and their fish prey at the Ebro Delta (NW Mediterranean): the role of trawler discards as a source of contamination. *Mar Ecol-Prog Ser* 232:281-290.
- Ashraf W. 2006. Levels of selected heavy metals in tuna fish. *Arab J Sci Eng* 31(1A):89-92.
- Augelli MA, Munoz RAA, Richter EM, Cantagallo MI, Angnes L. 2007. Analytical procedure for total mercury determination in fishes and shrimps by chronopotentiometric stripping analysis at gold film electrodes after microwave digestion. *Food Chem* 101(2):579-584.
- Baeyens W, Leermakers M, Papina T, Saprykin A, Brion N, Noyen J, et al. 2003. Bioconcentration and biomagnification of mercury and methylmercury in North Sea and Scheldt estuary fish. *Arch Environ Contam Toxicol* 45(4):498-508.
- Bahnick D, Sauer C, Butterworth B, Kuehl DW. 1994. A National Study of Mercury Contamination of Fish. 4. Analytical Methods and Results. *Chemosphere* 29(3):537-546.
- Balshaw S, Edwards JW, Ross KE, Ellis D, Padula DJ, Daughtry BJ. 2008. Empirical models to identify mechanisms driving reductions in tissue mercury concentration during culture of farmed southern bluefin tuna *Thunnus maccoyii*. *Mar Pollut Bull* 56(12):2009-2017.
- Bank MS, Chesney E, Shine JP, Maage A, Senn DB. 2007. Mercury bioaccumulation and trophic transfer in sympatric snapper species from the Gulf of Mexico. *Ecological Applications* 17:2100-2110.
- Barska I, Skrzynski I. 2003. Contents of methylmercury and total mercury in Baltic Sea fish and fish products. *Bulletin of the Sea Fisheries Institute* 3(160):3-15.
- Berntssen MHG, Julshamn K, Lundebye AK. 2010. Chemical contaminants in aquafeeds and Atlantic salmon (*Salmo salar*) following the use of traditional- versus alternative feed ingredients. *Chemosphere* 78(6):637-646.
- Bethune C, Seierstad SL, Seljeftot I, Johansen O, Arnesen H, Meltzer HM, et al. 2006. Dietary intake of differently fed salmon: a preliminary study on contaminants. *European Journal of Clinical Investigation* 36(3):193-201.
- Blanco S, Gonzalez JC, Vieites JM. 2008. Mercury, cadmium and lead levels in samples of the main traded fish and shellfish species in Galicia, Spain. *Food Addit Contam Part B-Surveill* 1(1):15-21.
- Bloom NS. 1992. On the chemical form of mercury in edible fish and marine invertebrate tissue *Can J Fish Aquat Sci* 49(5):1010-1017.
- Bordajandi LR, Gomez G, Abad E, Rivera J, Fernandez-Baston MD, Blasco J, et al. 2004. Survey of persistent organochlorine contaminants (PCBs, PCDD/Fs, and PAHs), heavy metals (Cu, Cd, Zn,

- Pb, and Hg), and arsenic in food samples from Huelva (Spain): Levels and health implications. *J Agric Food Chem* 52(4):992-1001.
- Boscher A, Gobert S, Guignard C, Ziebel J, L'Hoste L, Gutleb AC, et al. 2010. Chemical contaminants in fish species from rivers in the North of Luxembourg: Potential impact on the Eurasian otter (*Lutra lutra*). *Chemosphere* 78(7):785-792.
- Braune B, Muir D, DeMarch B, Gamberg M, Poole K, Currie R, et al. 1999. Spatial and temporal trends of contaminants in Canadian Arctic freshwater and terrestrial ecosystems: a review. *Sci Total Environ* 230(1-3):145-207.
- Braune BM. 1987. Mercury accumulation in relation to size and age of atlantic herring (*Clupea harengus harengus*) from the southwestern Bay of Fundy, Canada. *Arch Environ Contam Toxicol* 16(3):311-320.
- Brinkmann L, Rasmussen JB. 2010. High levels of mercury in biota of a new Prairie irrigation reservoir with a simplified food web in Southern Alberta, Canada. *Hydrobiologia* 641(1):11-21.
- Brockman JD, Sharp N, Ngwenyama RA, Shelnutt LD, McElroy JA. 2009. The concentration and variability of selenium and mercury measured in vacuum-packed tuna fish. *J Radioanal Nucl Chem* 282(1):45-48.
- Burger J. 2009. Risk to consumers from mercury in bluefish (*Pomatomus saltatrix*) from New Jersey: Size, season and geographical effects. *Environ Res* 109(7):803-811.
- Burger J, Gochfeld M. 2004. Mercury in canned tuna: white versus light and temporal variation. *Environ Res* 96(3):239-249.
- Burger J, Gochfeld M. 2005. Heavy metals in commercial fish in New Jersey. *Environ Res* 99(3):403-412.
- Burger J, Gochfeld M. 2006. Mercury in fish available in supermarkets in Illinois: Are there regional differences. *Sci Total Environ* 367(2-3):1010-1016.
- Burger J, Gochfeld M, Jeitner C, Burke S, Stamm T. 2007c. Metal levels in flathead sole (*Hippoglossoides elassodon*) and great sculpin (*Myoxocephalus polyacanthocephalus*) from Adak Island, Alaska: Potential risk to predators and fishermen. *Environ Res* 103(1):62-69.
- Burger J, Jeitner C, Donio M, Shukla S, Gochfeld M. 2009. Factors Affecting Mercury and Selenium Levels in New Jersey Flatfish: Low Risk to Human Consumers. *J Toxicol Env Health Part A* 72(14):853-860.
- Burger J, Gaines KF, Boring CS, Stephens WL, Snodgrass J, Gochfeld M. 2001. Mercury and selenium in fish from the Savannah River: Species, trophic level, and locational differences. *Environ Res* 87(2):108-118.
- Burger J, Gochfeld M, Jeitner C, Burke S, Stamm T, Snigaroff R, et al. 2007b. Mercury levels and potential risk from subsistence foods from the Aleutians. *Sci Total Environ* 384(1-3):93-105.
- Burger J, Gaines KF, Boring CS, Stephens WL, Snodgrass J, Dixon C, et al. 2002. Metal levels in fish from the Savannah River: Potential hazards to fish and other receptors. *Environ Res* 89(1):85-97.
- Burger J, Gochfeld M, Shukla T, Jeitner C, Burke S, Donio M, et al. 2007a. Heavy metals in Pacific Cod (*Gadus macrocephalus*) from the Aleutians: Location, age, size, and risk. *J Toxicol Env Health Part A* 70(22):1897-1911.
- Bustamante P, Lahaye V, Durnez C, Churlaud C, Caurant F. 2006. Total and organic Hg concentrations in cephalopods from the North Eastern Atlantic waters: Influence of geographical origin and feeding ecology. *Sci Total Environ* 368(2-3):585-596.
- Butala SJM, Scanlan LP, Chaudhur SN, Perry DD, Taylor R. 2007. Interlaboratory bias in the determination of mercury concentrations in commercially available fish utilizing thermal decomposition/amalgamation atomic absorption spectrophotometry. *J Food Prot* 70(10):2422-2425.
- Cabanero AI, Madrid Y, Camara C. 2004. Selenium and mercury bioaccessibility in fish samples: an in vitro digestion method. *Anal Chim Acta* 526(1):51-61.
- Cabanero AI, Madrid Y, Camara C. 2007. Mercury-selenium species ratio in representative fish samples and their bioaccessibility by an in vitro digestion method. *Biol Trace Elem Res* 119(3):195-211.

- Cabanero AI, Carvalho C, Madrid Y, Batoreu C, Camara C. 2005. Quantification and speciation of mercury and selenium in fish samples of high consumption in Spain and Portugal. *Biol Trace Elem Res* 103(1):17-35.
- Cai Y, Rooker JR, Gill GA, Turner JP. 2007. Bioaccumulation of mercury in pelagic fishes from the northern Gulf of Mexico. *Can J Fish Aquat Sci* 64(3):458-469.
- Caldwell RS, Buhler DR. 1983. Heavy metals in estuarine shellfish from Oregon Arch Environ Contam Toxicol 12(1):15-23.
- Campbell L, Hecky RE, Dixon DG, Chapman LJ. 2006. Food web structure and mercury transfer in two contrasting Ugandan highland crater lakes (East Africa). *Afr J Ecol* 44(3):337-346.
- Campbell LM, Osano O, Hecky RE, Dixon DG. 2003b. Mercury in fish from three rift valley lakes (Turkana, Naivasha and Baringo), Kenya, East Africa. *Environ Pollut* 125(2):281-286.
- Campbell LM, Hecky RE, Nyaundi J, Muggide R, Dixon DG. 2003a. Distribution and food-web transfer of mercury in Napoleon and Winam Gulfs, Lake Victoria, East Africa. *J Gt Lakes Res* 29:267-282.
- Capelli R, Minganti V, Bernhard M. 1987. Total mercury, organic mercury, copper, manganese, selenium, and zinc in *Sarda sarda* from the Guld of Genoa. *Sci Total Environ* 63:83-99.
- Capelli R, Contardi V, Cosma B, Minganti V, Zanicchi G. 1983. A 4-year study on the distribution of some heavy metals in 5 marine organisms of the Ligurian Sea. *Mar Chem* 12(4):281-293.
- Capelli R, Drava G, Siccardi C, De Pellegrini R, Minganti V. 2004. Study of the distribution of trace elements in six species of marine organisms of the Ligurian Sea (North-Western Mediterranean) - Comparison with previous findings. *Ann Chim* 94(7-8):533-546.
- Cappon CJ. 1984. Content and chemical form of mercury and selenium in Lake Ontario salmon and trout. *J Gt Lakes Res* 10(4):429-434.
- Carbonell G, Bravo JC, Fernandez C, Tarazona JV. 2009. A New Method for Total Mercury and Methyl Mercury Analysis in Muscle of Seawater Fish. *Bull Environ Contam Toxicol* 83(2):210-213.
- Carvalho ML, Santiago S, Nunes ML. 2005. Assessment of the essential element and heavy metal content of edible fish muscle. *Anal Bioanal Chem* 382(2):426-432.
- Chen CY, Chen MH. 2003. Investigation of Zn, Cu, Cd and Hg concentrations in the oyster of Chi-ku, Tai-shi and Tapeng Bay, southwestern Taiwan. *J Food Drug Anal* 11(1):32-38.
- Chen MH, Chen CY, Chang SK, Huang SW. 2007. Total and organic mercury concentrations in the white muscles of swordfish (*Xiphias gladius*) from the Indian and Atlantic oceans. *Food Addit Contam* 24(9):969-975.
- Cheung KC, Leung HM, Wong MH. 2008. Metal concentrations of common freshwater and marine fish from the Pearl River Delta, South China. *Arch Environ Contam Toxicol* 54(4):705-715.
- Chou CL. 2007. A time series of mercury accumulation and improvement of dietary feed in net caged Atlantic salmon (*Salmo salar*). *Mar Pollut Bull* 54(6):720-725.
- Chung SWC, Kwong KP, Tang ASP, Xiao Y, Ho PYY. 2008. Mercury and methylmercury levels in the main traded fish species in Hong Kong. *Food Addit Contam Part B-Surveill* 1(2):106-113.
- Ciardullo S, Aureli F, Coni E, Guandalini E, Lost F, Raggi A, et al. 2008. Bioaccumulation potential of dietary arsenic, cadmium, lead, mercury, and selenium in organs and tissues of rainbow trout (*Oncorhynchus mykiss*) as a function of fish growth. *J Agric Food Chem* 56(7):2442-2451.
- Cizdziel JV, Hinnert TA, Heithmar EM. 2002. Determination of total mercury in fish tissues using combustion atomic absorption spectrometry with gold amalgamation. *Water Air Soil Pollut* 135(1-4):355-370.
- Collings SE, Johnson MS, Leah RT. 1996. Metal contamination of angler-caught fish from the Mersey Estuary. *Mar Environ Res* 41(3):281-297.
- Cross FA, Hardy LH, Jones NY, Barber RT. 1973. Relation between Total-Body Weight and Concentrations of Manganese, Iron, Copper, Zinc, and Mercury in White Muscle of Bluefish (*Pomatomus saltatrix*) and a Bathyl-Demersal Fish *Antimora rostrata*. *Journal of the Fisheries Research Board of Canada* 30(9):1287-1291.



- Cutshall NH, Naidu JR, Pearcy WG. 1978. Mercury concentrations in pacific hake, *Merluccius productus* (ayres), as a function of length and latitude. *Science* 200(4349):1489-1491.
- Dabeka R, McKenzie AD, Forsyth DS, Conacher HBS. 2004. Survey of total mercury in some edible fish and shellfish species collected in Canada in 2002. *Food Addit Contam* 21(5):434-440.
- Das YK, Aksoy A, Baskaya R, Duyar HA, Guvenc D, Boz V. 2009. Heavy Metal Levels of Some Marine Organisms Collected in Samsun and Sinop Coasts of Black Sea, in Turkey. *Journal of Animal and Veterinary Advances* 8(3):496-499.
- Davies IM. 2012. Department of Agriculture and Fisheries for Scotland (DAFS), Fish and Shellfish Landed at Scottish Ports (1975-1976). Aberdeen, Scotland.
- De Marco SG, Botte SE, Marcovecchio JE. 2006. Mercury distribution in abiotic and biological compartments within several estuarine systems from Argentina: 1980-2005 period. *Chemosphere* 65(2):213-223.
- Del Gobbo LC, Archbold JA, Vanderlinden LD, Eckley CS, Diamond ML, Robson M. 2010. Risks and Benefits of Fish Consumption For Childbearing Women. *Can J Diet Pract Res* 71(1):41-45.
- Delaware River Basin Commission. 2011. Fish and Shellfish Tissue Data, DRBC EPA Coastal 2000. Available: <http://www.state.nj.us/drbc/fishtiss.htm> [accessed 3 February 2011].
- Della Torre C, Petochi T, Corsi I, Dinardo MM, Baroni D, Alcaro L, et al. 2010. DNA damage, severe organ lesions and high muscle levels of As and Hg in two benthic fish species from a chemical warfare agent dumping site in the Mediterranean Sea. *Sci Total Environ* 408(9):2136-2145.
- Dellinger JA, Meyers RM, Gebhardt KJ, Hansen LK. 1996. The Ojibwa Health Study: Fish residue comparisons for Lakes Superior, Michigan, and Huron. *Toxicol Ind Health* 12(3-4):393-402.
- Deshpande A, Bhendigeri S, Shirsekar T, Dhaware D, Khandekar RN. 2009. Analysis of heavy metals in marine fish from Mumbai Docks. *Environ Monit Assess* 159(1-4):493-500.
- Deshpande AD, Draxler AFJ, Zdanowicz VS, Schrock ME, Paulson AJ. 2000. Contaminant Levels in Muscle of Four Species of Recreational Fish from the New York Bight Apex. NOAA Technical Memorandum NMFS-NE-157. NMFS-NE-157. Available: <http://www.nefsc.noaa.gov/publications/tm/tm157/tm157.pdf> [accessed 24 February 2009].
- Dewailly E, Ayotte P, Lucas M, Blanchet C. 2007. Risk and benefits from consuming salmon and trout: A Canadian perspective. *Food Chem Toxicol* 45(8):1343-1348.
- Dewailly E, Rouja P, Dallaire R, Pereg D, Tucker T, Ward J, et al. 2008. Balancing the risks and the benefits of local fish consumption in Bermuda. *Food Addit Contam Part A-Chem* 25(11):1328-1338.
- Domingo JL, Bocio A, Falco G, Llobet JM. 2007. Benefits and risks of fish consumption Part I. A quantitative analysis of the intake of omega-3 fatty acids and chemical contaminants. *Toxicology* 230(2-3):219-226.
- Doyon JF, Schetagne R, Verdon R. 1998. Different mercury bioaccumulation rates between sympatric populations of dwarf and normal lake whitefish (*Coregonus clupeaformis*) in the La Grande complex watershed, James Bay, Quebec. *Biogeochemistry* 40(2-3):203-216.
- Duarte FA, Bizzi CA, Antes FG, Dressler VL, Flores EMD. 2009. Organic, inorganic and total mercury determination in fish by chemical vapor generation with collection on a gold gauze and electrothermal atomic absorption spectrometry. *Spectrochim Acta Pt B-Atom Spectr* 64(6):513-519.
- Easton MDL, Luszniak D, Von der Geest E. 2002. Preliminary examination of contaminant loadings in farmed salmon, wild salmon and commercial salmon feed. *Chemosphere* 46(7):1053-1074.
- Elhamri H, Idrissi L, Coquery M, Azemard S, El Abidi A, Benlemlih M, et al. 2007. Hair mercury levels in relation to fish consumption in a community of the Moroccan Mediterranean coast. *Food Addit Contam* 24(11):1236-1246.
- Elston R, Cake EW, Humphrey K, Isphording WC, Rensel JE. 2005. Dioxin and heavy-metal contamination of shellfish and sediments in St. Louis Bay, Mississippi and adjacent marine waters. *J Shellfish Res* 24(1):227-241.
- Endo T, Haraguchi K. 2010. High mercury levels in hair samples from residents of Taiji, a Japanese whaling town. *Mar Pollut Bull* 60(5):743-747.

- Escobar-Sanchez O, Galvan-Magana F, Rosiles-Martinez R. 2010. Mercury and Selenium Bioaccumulation in the Smooth Hammerhead Shark, *Sphyrna zygaena* Linnaeus, from the Mexican Pacific Ocean. *Bull Environ Contam Toxicol* 84(4):488-491.
- Ethier ALM, Scheuhammer AM, Bond DE. 2008. Correlates of mercury in fish from lakes near Clyde Forks, Ontario, Canada. *Environ Pollut* 154(1):89-97.
- Evans DW, Crumley PH. 2005. Mercury in Florida Bay fish: Spatial distribution of elevated concentrations and possible linkages to Everglades restoration. *Bull Mar Sci* 77(3):321-345.
- Fabris G, Turoczy NJ, Stagnitti F. 2006. Trace metal concentrations in edible tissue of snapper, flathead, lobster, and abalone from coastal waters of Victoria, Australia. *Ecotox Environ Safe* 63(2):286-292.
- Fairey R, Taberski K, Lamerdin S, Johnson E, Clark RP, Downing JW, et al. 1997. Organochlorines and other environmental contaminants in muscle tissues of sportfish collected from San Francisco Bay. *Mar Pollut Bull* 34(12):1058-1071.
- Falandysz J. 1990. Mercury content of squid *Loligo opalescens*. *Food Chem* 38(3):171-177.
- Ferreira AG, Faria VV, de Carvalho CEV, Lessa RPT, da Silva FMS. 2004. Total mercury in the night shark, *Carcharhinus signatus* in the western equatorial Atlantic Ocean. *Braz Arch Biol Technol* 47(4):629-634.
- Fisher WS, Oliver LM, Winstead JT, Long ER. 2000. A survey of oysters *Crassostrea virginica* from Tampa Bay, Florida: associations of internal defense measurements with contaminant burdens. *Aquat Toxicol* 51(1):115-138.
- Food Standards Agency. 2003. Methylmercury in imported Fish and Shellfish and Their Products, UK Farmed Fish and Their Products. London. Available: [http://www.food.gov.uk/multimedia/pdfs/fsis40\\_2003.pdf](http://www.food.gov.uk/multimedia/pdfs/fsis40_2003.pdf) [accessed 14 October 2003].
- Food Standards Agency. 2006. Survey of Metals and Other Elements in Processed Fish and Shellfish. London. Available: <http://www.food.gov.uk/multimedia/pdfs/fsis0806.pdf> [accessed May 3 2008].
- Forsyth DS, Casey V, Dabeka RW, McKenzie A. 2004. Methylmercury levels in predatory fish species marketed in Canada. *Food Addit Contam* 21(9):849-856.
- Freeman HC, Horne DA. 1973. Sampling edible muscle of swordfish (*Xiphias gladius*) for total mercury analysis. *Journal of the Fisheries Research Board of Canada* 30(8):1251-1252.
- Freeman HC, Shum G, Uthe JF. 1978. Selenium content in swordfish (*Xiphias gladius*) in relation to total mercury content. *J Environ Sci Health Part A-Environ Sci Eng Toxic Hazard Subst Control* 13(3):235-240.
- Garcia-Hernandez J, Cadena-Cardenas L, Betancourt-Lozano M, Garcia-De-La-Parra LM, Garcia-Rico L, Marquez-Farias F. 2007. Total Mercury Content Found in Edible Tissues of Top Predator Fish From the Gulf of California, Mexico. *Toxicological and Environmental Chemistry* 89(3):507-522.
- Garcia E, Carignan R. 2000. Mercury concentrations in northern pike (*Esox lucius*) from boreal lakes with logged, burned, or undisturbed catchments. *Can J Fish Aquat Sci* 57:129-135.
- Gawlik B, Druges M, Bianchi M, Bortoli A, Kettrup A, Muntau H. 1997. TUNA FISH (T-30) - A new proficiency testing material for the determination of As and Hg in seafood. *Fresenius J Anal Chem* 358(3):441-445.
- Gerhart EH. 1977. Concentrations of total mercury in several fishes from Delaware Bay, 1975. *Pesticides Monitoring Journal* 11(3):132-133.
- Gerstenberger SL, Martinson A, Kramer JL. 2010. An evaluation of mercury concentrations in three brands of canned tuna. *Environ Toxicol Chem* 29(2):237-242.
- Gilmartin M, Revelante N. 1975. Concentration of Mercury, Copper, Nickel, Silver, Cadmium, and Lead in Northern Adriatic Anchovy, *Engraulis encrasicolus*, and Sardine, *Sardina pilchardus*. *Fishery Bulletin* 73(1):193-201.

- Green-Ruiz C, Ruelas-Inzunza J, Paez-Osuna F. 2005. Mercury in surface sediments and benthic organisms from Guaymas Bay, east coast of the Gulf of California. *Environ Geochem Health* 27(4):321-329.
- Green NW, Knutzen J. 2003. Organohalogenes and metals in marine fish and mussels and some relationships to biological variables at reference localities in Norway. *Mar Pollut Bull* 46(3):362-374.
- Greenfield BK, Jahn A. 2010. Mercury in San Francisco Bay forage fish. *Environ Pollut* 158(8):2716-2724.
- Greig RA, Wenzloff DR, Mackenzie CL, Merrill AS, Zdanowicz VS. 1978. Trace metals in sea scallops, *Placopecten magellanicus*, from eastern United States. *Bull Environ Contam Toxicol* 19(3):326-334.
- Gunsen U. 2004. The residue levels of some toxic metals in different fish species. *Indian Veterinary Journal* 81(12):1339-1341.
- Gutierrez AJ, Lozano G, Gonzalez T, Reguera JI, Hardisson A. 2006. Mercury content in tinned molluscs (mussel, cockle, variegated scallop, and razor shell) normally consumed in Spain, 2005. *J Food Prot* 69(9):2237-2240.
- Haines TA, Komov V, Jagoe CH. 1992. Lake acidity and mercury content of fish in Darwin National Reserve, Russia. *Environ Pollut* 78(1-3):107-112.
- Hajeb P, Jinap S, Fatimah AB, Jamilah B. 2010. Methylmercury in marine fish from Malaysian waters and its relationship to total mercury content. *Int J Environ Anal Chem* 90(10):812-820.
- Hajeb P, Jinap S, Ismail A, Fatimah AB, Jamilah B, Rahim MA. 2009. Assessment of mercury level in commonly consumed marine fishes in Malaysia. *Food Control* 20(1):79-84.
- Hall AS, Teeny FM, Lewis LG, Hardman WH, Gauglitz EJ. 1976. Mercury in fish and shellfish of northeast pacific. 1. Pacific Halibut, *Hippoglossus stenolepis*. *Fishery Bulletin* 74(4):783-789.
- Hall RA, Zook EG, Meaburn GM. 1978. National Marine Fisheries Service Survey of Trace Elements in the Fishery Resources. NOAA Technical Report NMFS SSRF-721. TR 721. Rockville, MD:National Oceanic and Atmospheric Administration, National Marine Fisheries Service.
- Hammerschmidt CR, Fitzgerald WF. 2006. Bioaccumulation and trophic transfer of methylmercury in Long Island Sound. *Arch Environ Contam Toxicol* 51(3):416-424.
- Harding G, Dalziel J, Vass P. 2005. Prevalence and bioaccumulation of methylmercury in the food web of the Bay of Fundy, Gulf of Maine. In: *The Changing Bay of Fundy - Beyond 400 Years* Proceedings of the 6th Bay of Fundy Workshop (Percy JA, Evans AJ, Wells PG, Rolston SJ, eds). Cornwallis, Nova Scotia. September 29 - October 2, 2004. Environment Canada, Atlantic Region, 76-77.
- Hardisson A, Padron AG, de Bonis A, Sierra A. 1999. Determination of mercury in fish by cold vapor atomic absorption spectrometry. *Atom Spectrosc* 20(5):191-193.
- Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption. Ottawa, Ontario. Available: [http://www.hc-sc.gc.ca/fn-an/pubs/mercur/merc\\_fish\\_poisson-eng.php](http://www.hc-sc.gc.ca/fn-an/pubs/mercur/merc_fish_poisson-eng.php) [accessed 31 October 2011].
- Hellou J, Fancey LL, Payne JF. 1992a. Concentrations of 24 elements in bluefin tuna, *Thunnus thynnus* from the northwest Atlantic. *Chemosphere* 24(2):211-218.
- Hellou J, Warren WG, Payne JF, Belkhole S, Lobel P. 1992b. Heavy metals and other elements in 3 tissues of cod, *Gadus morhua* from the northwest. *Atlantic Mar Pollut Bull* 24(9):452-458.
- Herreros MA, Inigo-Nunez S, Sanchez-Perez E, Encinas T, Gonzalez-Bulnes A. 2008. Contribution of fish consumption to heavy metals exposure in women of childbearing age from a Mediterranean country (Spain). *Food Chem Toxicol* 46(5):1591-1595.
- Horwitz R, Ashley J, Overbeck P, Velinsky D. 2005. Final Report: Routine Monitoring Program for Toxics in Fish. Trenton, NJ. Available: <http://www.state.nj.us/dep/dsr/final-report-routinemonitoing5-05.pdf> [accessed 24 October 2007].

- Hueter RE, Fong WG, Henderson G, French MF, Manire CA. 1995. Methylmercury concentration in shark muscle by species, size and distribution of sharks in Florida coastal waters. *Water Air Soil Pollut* 80(1-4):893-899.
- Ikem A, Egiebor NO. 2005. Assessment of trace elements in canned fishes (mackerel, tuna, salmon, sardines and herrings) marketed in Georgia and Alabama (United States of America). *Journal of Food Composition and Analysis* 18(8):771-787.
- International Pacific Halibut Commission. 2003. Methylmercury and Heavy Metal Contaminant Levels in Alaskan Halibut. Available: <http://www.iphc.washington.edu/halcom/pubs/rara/2003rara/2k308RARA.pdf> [accessed 19 July 2004].
- Jackson TA. 1991. Biological and environmental control of mercury accumulation by fish in lakes and reservoirs of Northern Manitoba, Canada. *Can J Fish Aquat Sci* 48(12):2449-2470.
- Jackson TA, Whittle DM, Evans MS, Muir DCG. 2008. Evidence for mass-independent and mass-dependent fractionation of the stable isotopes of mercury by natural processes in aquatic ecosystems. *Appl Geochem* 23(3):547-571.
- Jaeger I, Hop H, Gabrielsen GW. 2009. Biomagnification of mercury in selected species from an Arctic marine food web in Svalbard. *Sci Total Environ* 407(16):4744-4751.
- Japanese Ministry of Health. 2003. Results of Mercury/Methylmercury in Fishes (Provisional Translation). Available: <http://www.mhlw.go.jp/english/wp/other/councils/mercury/index.html> [accessed 28 January 2011].
- Jardine LB, Burt MDB, Arp PA, Diamond AW. 2009. Mercury comparisons between farmed and wild Atlantic salmon (*Salmo salar* L.) and Atlantic cod (*Gadus morhua* L.). *Aquac Res* 40(10):1148-1159.
- Jasmine GI, Rajagopalsamy CBT, Jeyachandran P. 1989. Total mercury content of Indian Squid *Loligo duvauceli orbigny* from Tuticorin waters, south east coast of India. *Indian J Mar Sci* 18(3):219-220.
- Jewett SC, Naidu AS. 2000. Assessment of heavy metals in red king crabs following offshore placer gold mining. *Mar Pollut Bull* 40(6):478-490.
- Jokai Z, Abranko L, Fodor P. 2005. SPME-GC-pyrolysis-AFS determination of methylmercury in marine fish products by alkaline sample preparation and aqueous phase phenylation derivatization. *J Agric Food Chem* 53(14):5499-5505.
- Julshamn K, Brenna J. 2002. Determination of mercury in seafood by flow injection-cold vapor atomic absorption spectrometry after microwave digestion: NMKL Interlaboratory Study. *J AOAC Int* 85(3):626-631.
- Julshamn K, Grosvik BE, Nedreaas K, Maage A. 2006. Mercury concentration in fillets of Greenland halibut (*Reinhardtius hippoglossoides*) caught in the Barents Sea in January 2006. *Sci Total Environ* 372(1):345-349.
- Julshamn K, Lundebye AK, Heggstad K, Berntssen MHG, Boe B. 2004. Norwegian monitoring programme on the inorganic and organic contaminants in fish caught in the Barents Sea, Norwegian Sea and North Sea, 1994-2001. *Food Addit Contam* 21(4):365-376.
- Juresa D, Blanus M. 2003. Mercury, arsenic, lead and cadmium in fish and shellfish from the Adriatic Sea. *Food Addit Contam* 20(3):241-246.
- Kai N, Ueda T, Takeda Y, Kataoka A. 1987. Accumulation of mercury and selenium in blue marlin. *Nippon Suisan Gakkaishi* 53(9):1697-1697.
- Kamps LR, Carr R, Miller H. 1972. Total mercury - monomethylmercury content of several species of fish. *Bull Environ Contam Toxicol* 8(5):273-279.
- Kaneko JJ, Ralston NVC. 2007. Selenium and mercury in pelagic fish in the central north pacific near Hawaii. *Biol Trace Elem Res* 119:242-254.
- Kannan K, Smith RG, Lee RF, Windom HL, Heitmuller PT, Macauley JM, et al. 1998. Distribution of total mercury and methyl mercury in water, sediment, and fish from south Florida estuaries. *Arch Environ Contam Toxicol* 34(2):109-118.

- Karouna-Renier NK, Snyder RA, Allison JG, Wagner MG, Rao KR. 2007. Accumulation of organic and inorganic contaminants in shellfish collected in estuarine waters near Pensacola, Florida: Contamination profiles and risks to human consumers. *Environ Pollut* 145(2):474-488.
- Kawaguchi T, Porter D, Bushek D, Jones B. 1999. Mercury in the American oyster *Crassostrea virginica* in South Carolina, USA, and public health concerns. *Mar Pollut Bull* 38(4):324-327.
- Kehrig HDA, Costa M, Moreira I, Malm O. 2001. Methylmercury and total mercury in estuarine organisms from Rio de Janeiro, Brazil. *Environ Sci Pollut Res* 8(4):275-279.
- Kelso JRM, Frank R. 1974. Organochlorine residues, mercury, copper and cadmium in yellow perch, white bass and smallmouth bass, Long Point Bay, Lake Erie. *Trans Am Fish Soc* 103(3):577-581.
- Khansari FE, Ghazi-Khansari M, Abdollahi M. 2005. Heavy metals content of canned tuna fish. *Food Chem* 93(2):293-296.
- Kidd KA, Hesslein RH, Fudge RJP, Hallard KA. 1995. The influence of trophic level as measured by delta N-15 on mercury concentrations in freshwater organisms. *Water Air Soil Pollut* 80(1-4):1011-1015.
- Knight HT, Olson LJ. 1974. Mercury distribution in american smelt from Lake Michigan. *Am Midl Nat* 91(2):451-452.
- Knobeloch LM, Ziarnik M, Anderson HA, Dodson VN. 1995. Imported sea bass as a source of mercury exposure - a Wisconsin case study. *Environ Health Perspect* 103(6):604-606.
- Knowles TG, Farrington D, Kestin SC. 2003. Mercury in UK imported fish and shellfish and UK-farmed fish and their products. *Food Addit Contam* 20(9):813-818.
- Kojadinovic J, Potier M, Le Corre M, Cosson RP, Bustamante P. 2006. Mercury content in commercial pelagic fish and its risk assessment in the Western Indian Ocean. *Sci Total Environ* 366(2-3):688-700.
- Kojadinovic J, Potier M, Le Corre M, Cosson RP, Bustamante P. 2007. Bioaccumulation of trace elements in pelagic fish from the Western Indian Ocean. *Environ Pollut* 146(2):548-566.
- Koli AK, Williams WR, McClary EB, Wright EL, Burrell TM. 1977. Mercury Levels in Freshwater Fish of State of South-Carolina. *Bull Environ Contam Toxicol* 17(1):82-89.
- Kraepiel AML, Keller K, Chin HB, Malcolm EG, Morel FMM. 2003. Sources and variations of mercury in tuna. *Environ Sci Technol* 37(24):5551-5558.
- Krystek P, Ritsema R. 2004. Determination of methylmercury and inorganic mercury in shark fillets. *Appl Organomet Chem* 18(12):640-645.
- Kumar M, Aalbersberg B, Mosley L. 2004. IAS Technical Report Number: 2004/03, Mercury Levels in Fijian Seafoods and Potential Health Implications, Report for World Health Organization.
- Kutter VT, Mirlean N, Baisch PRM, Kutter MT, Silva E. 2009. Mercury in freshwater, estuarine, and marine fishes from Southern Brazil and its ecological implication. *Environ Monit Assess* 159(1-4):35-42.
- Kwoczek M, Szefer P, Hac E. 2006. Essential and toxic elements in seafood available in Poland from different geographical regions. *J Agric Food Chem* 54(8):3015-3024.
- Laperdina TG, Askarova OB, Papina TS, Eirikh SS, Sorokovikova LM. 1997. Methodological features of the determination of mercury in fish samples (Using fish from the Kureiskoe Reservoir as an example). *J Anal Chem* 52(6):584-589.
- Legrand M, Arp P, Ritchie C, Chan HM. 2005. Mercury exposure in two coastal communities of the Bay of Fundy, Canada. *Environ Res* 98(1):14-21.
- Levine KE, Levine MA, Weber FX, Henderson JP, Grohse PM. 2005. Mercury in an assortment of processed and unprocessed seafood samples. *Bull Environ Contam Toxicol* 74(5):973-979.
- Lewis MA, Quarles RL, Dantin DD, Moore JC. 2004. Evaluation of a Florida coastal golf complex as a local and watershed source of bioavailable contaminants. *Mar Pollut Bull* 48(3-4):254-262.
- Licata P, Trombetta D, Cristani M, Naccari C, Martino D, Calo M, et al. 2005. Heavy metals in liver and muscle of bluefin tuna (*Thunnus thynnus*) caught in the straits of Messina (Sicily, Italy). *Environ Monit Assess* 107(1-3):239-248.

- Linko RR, Terho K. 1977. Occurrence of methyl mercury in pike and baltic herring from Turku Archipelago. *Environ Pollut* 14(3):227-235.
- Locascio JV, Rudershausen PJ. 2000. An Evaluation of Mercury Levels in Spotted Seatrout in Torpon Bay, J.N. "Ding" Darling Wildlife Refuge, Sanibel, Florida, With Reference to Previous Studies. *Biological Sciences* 63(4):256-260.
- Lockhart WL, Stern GA, Low G, Hendzel M, Boila G, Roach P, et al. 2005. A history of total mercury in edible muscle of fish from lakes in northern Canada. *Sci Total Environ* 351:427-463.
- Lourenco HM, Anacleto P, Afonso C, Ferraria V, Martins MF, Carvalho ML, et al. 2009. Elemental composition of cephalopods from Portuguese continental waters. *Food Chem* 113(4):1146-1153.
- Lowenstein J, Burger J, Jeitner C, Amato G, Kolokotronis S, Gochfeld M. 2010. DNA Barcodes Reveal Species-specific Mercury Levels in Tuna Sushi That Pose a Health Risk to Consumers. *Biology Letters* 6(5):692-695.
- Lower Duwamish Waterway Group. 2005. Lower Duwamish Waterway Cleanup: Fish and Crab Tissue Data Report. Available: [http://www.ldwg.org/assets/fish\\_crab\\_tissue/appendix\\_a-data\\_tables\\_final.pdf](http://www.ldwg.org/assets/fish_crab_tissue/appendix_a-data_tables_final.pdf) [accessed 2 December 2010].
- Luckhurst BE, Prince ED, Llopiz JK, Snodgrass D, Brothers EB. 2006. Evidence of blue marlin (*Makaira nigricans*) spawning in Bermuda waters and elevated mercury levels in large specimens. *Bull Mar Sci* 79(3):691-704.
- Madany IM, Wahab AAA, AlAlawi Z. 1996. Trace metals concentrations in marine organisms from the coastal areas of Bahrain, Arabian Gulf. *Water Air Soil Pollut* 91(3-4):233-248.
- Madenjian C, O'Connor D. 2008. Trophic Transfer Efficiency of Mercury to Lake Whitefish *Coregonus clupeaformis* from its Prey. *Bull Environ Contam Toxicol* 81(6):566-570.
- Magalhaes MC, Costa V, Menezes GM, Pinho MR, Santos RS, Monteiro LR. 2007. Intra- and inter-specific variability in total and methylmercury bioaccumulation by eight marine fish species from the Azores. *Mar Pollut Bull* 54(10):1654-1662.
- Marcovecchio JE, Moreno VJ, Perez A. 1986. Bio-magnification of total mercury in Bahia Blanca Estuary shark. *Mar Pollut Bull* 17(6):276-278.
- Marcovecchio JE, Moreno VJ, Perez A. 1991. Metal accumulation in tissues of sharks from the Bahia Blanca Estuary, Argentina. *Mar Environ Res* 31(4):263-274.
- Marsico ET, Machado MES, Knoff M, Clemente SCS. 2007. Total mercury in sharks along the southern Brazilian Coast. *Arq Bras Med Vet Zootec* 59(6):1593-1596.
- Mason RP, Heyes D, Sveinsdottir A. 2006. Methylmercury concentrations in fish from tidal waters of the Chesapeake Bay. *Arch Environ Contam Toxicol* 51(3):425-437.
- McArthur T, Butler ECV, Jackson GD. 2003. Mercury in the marine food chain in the Southern Ocean at Macquarie Island: an analysis of a top predator, Patagonian toothfish (*Dissostichus eleginoides*) and a mid-trophic species, the warty squid (*Moroteuthis ingens*). *Polar Biol* 27(1):1-5.
- McKelvey W, Chang M, Arnason J, Jeffery N, Kricheff J, Kass D. 2010. Mercury and polychlorinated biphenyls in Asian market fish: A response to results from mercury biomonitoring in New York City. *Environ Res* 110(7):650-657.
- Meador JP, Ernest DW, Kagley AN. 2005. A comparison of the non-essential elements cadmium, mercury, and lead found in fish and sediment from Alaska and California. *Sci Total Environ* 339(1-3):189-205.
- Menasveta P, Siriyong R. 1977. Mercury content of several predacious fish in Andaman Sea. *Mar Pollut Bull* 8(9):200-204.
- Mendez E, Giudice H, Pereira A, Inocente G, Medina D. 2001. Total mercury content - Fish weight relationship in swordfish (*Xiphias gladius*) caught in the southwest Atlantic Ocean. *Journal of Food Composition and Analysis* 14(5):453-460.
- Miller GE, Rowland FS, Steinkru.Fj, Grant PM, Guinn VP, Kishore R. 1972. Mercury concentration in museum specimens of tuna and swordfish. *Science* 175(4026):1121-1122.
- Miller TJ, Jude DJ. 1984. Organochlorine pesticides, PBBs, and mercury in round whitefish fillets from Saginaw Bay, Lake Huron, 1977-1978. *J Gt Lakes Res* 10(2):215-220.

- Ministry of Agriculture Fisheries and Food. 1998. Concentrations of Metals and Other Elements in Marine fish and Shellfish. Available: <http://archive.food.gov.uk/maff/archive/food/infsheet/1998/no151/151fish.htm> [accessed 18 March 2011].
- Mol JH, Ramlal JS, Lietar C, Verloo M. 2001. Mercury contamination in freshwater, estuarine, and marine fishes in relation to small-scale gold mining in Suriname, South America. *Environ Res* 86(2):183-197.
- Monteiro LR, Lopes HD. 1990. Mercury content of swordfish, *Xiphias gladius*, in relation to length, weight, age, and sex. *Mar Pollut Bull* 21(6):293-296.
- Mueller CS, Ramelow GJ, Beck JN. 1989. Mercury in the Calcasieu River Lake Complex, Louisiana. *Bull Environ Contam Toxicol* 42(1):71-80.
- Nadal M, Ferre-Huguet N, Marti-Cid R, Schuhmacher M, Domingo JL. 2008. Exposure to metals through the consumption of fish and seafood by the population living near the Ebro River in Catalonia, Spain: Health risks. *Hum Ecol Risk Assess* 14(4):780-795.
- Nakagawa R, Yumita Y, Hiromoto M. 1997. Total mercury intake from fish and shellfish by Japanese people. *Chemosphere* 35(12):2909-2913.
- Nakao M, Seoka M, Tsukamasa Y, Kawasaki K, Ando M. 2007. Possibility for decreasing of mercury content in bluefin tuna *Thunnus orientalis* by fish culture. *Fisheries Science* 73(3):724-731.
- Nakao M, Seoka M, Nakatani M, Okada T, Miyashita S, Tsukamasa Y, et al. 2009. Reduction of mercury levels in cultured bluefin tuna, *Thunnus orientalis*, using feed with relatively low mercury levels. *Aquaculture* 288(3-4):226-232.
- National Marine Fisheries Service. 1975. Southwest Fisheries Center Administrative Report No. 2H, 1975, Mercury in the Pacific Blue Marlin.
- Nfon E, Cousins IT, Jarvinen O, Mukherjee AB, Verta M, Broman D. 2009. Trophodynamics of mercury and other trace elements in a pelagic food chain from the Baltic Sea. *Sci Total Environ* 407(24):6267-6274.
- NOAA (National Oceanic and Atmospheric Administration). 2008. National Status and Trends Mussel Watch Program. Available: <http://nsandt.noaa.gov/> [accessed 9 September 2008].
- Oh KS, Suh J, Park S, Paek OA, Yoon HJ, Kim HY, et al. 2008. Mercury and methylmercury levels in marine fish species from Korean retail markets. *Food Sci Biotechnol* 17(4):819-823.
- Orban E, Nevigato T, Di Lena G, Masci M, Casini I, Garnbelli L, et al. 2008. New trends in the seafood market. Sutchi catfish (*Pangasius hypophthalmus*) fillets from Vietnam: Nutritional quality and safety aspects. *Food Chem* 110(2):383-389.
- Ozden O. 2010. Seasonal differences in the trace metal and macrominerals in shrimp (*Parapenaeus longirostris*) from Marmara Sea. *Environ Monit Assess* 162(1-4):191-199.
- Padula DJ, Daughtry BJ, Nowak BF. 2008. Dioxins, PCBs, metals, metalloids, pesticides and antimicrobial residues in wild and farmed Australian southern bluefin tuna (*Thunnus maccoyii*). *Chemosphere* 72(1):34-44.
- Panutrakul S, Khamdech S, Kerdthong P, Senanan W, Tangkrock-Olan N, Alcivar-Warren A. 2007. Heavy metals in wild banana prawn (*Fenneropenaeus merguensis* de Man, 1888) from Chantaburi and Trat provinces, Thailand. *J Shellfish Res* 26(4):1193-1202.
- Papetti P, Rossi G. 2009. Heavy metals in the fishery products of low Lazio and the use of metallothionein as a biomarker of contamination. *Environ Monit Assess* 159(1-4):589-598.
- Park J, Presley BJ. 1997. Trace metals contamination of sediments and organisms from the Swan Lake area of Galveston Bay. *Environ Pollut* 98(2):209-221.
- Pastor A, Hernandez F, Peris MA, Beltran J, Sancho JV, Castillo MT. 1994. Levels of heavy metals in some marine organisms from the western Mediterranean area (Spain). *Mar Pollut Bull* 28(1):50-53.
- Paul MC, Toia RF, von Nagy-Felsobuki EI. 2003. A novel method for the determination of mercury and selenium in shark tissue using high-resolution inductively coupled plasma-mass spectrometry. *Spectrochim Acta Pt B-Atom Spectr* 58(9):1687-1697.

- Payne EJ, Taylor DL. 2010. Effects of Diet Composition and Trophic Structure on Mercury Bioaccumulation in Temperate Flatfishes. *Arch Environ Contam Toxicol* 58(2):431-443.
- Penedo de Pinho A, Davee Guimaraes JR, Martins AS, Costa PAS, Olavo G, Valentin J. 2002. Total mercury in muscle tissue of five shark species from Brazilian offshore waters: effects of feeding habit, sex, and length. *Environ Res* 89(3):250-258.
- Perello G, Marti-Cid R, Llobet JM, Domingo JL. 2008. Effects of Various Cooking Processes on the Concentrations of Arsenic, Cadmium, Mercury, and Lead in Foods. *J Agric Food Chem* 56(23):11262-11269.
- Petersen A, Mortensen GK. 1994. Trace elements in shellfish on the Danish market. *Food Addit Contam* 11(3):365-373.
- Piraino MN, Taylor DL. 2009. Bioaccumulation and trophic transfer of mercury in striped bass (*Morone saxatilis*) and tautog (*Tautoga onitis*) from the Narragansett Bay (Rhode Island, USA). *Mar Environ Res* 67(3):117-128.
- Plessi M, Bertelli D, Monzani A. 2001. Mercury and selenium content in selected seafood. *Journal of Food Composition and Analysis* 14(5):461-467.
- Polak-Juszczak L. 2009. Temporal trends in the bioaccumulation of trace metals in herring, sprat, and cod from the southern Baltic Sea in the 1994-2003 period. *Chemosphere* 76(10):1334-1339.
- Poperechna N, Heumann KG. 2005. Simultaneous multi-species determination of trimethyllead, monomethylmercury and three butyltin compounds by species-specific isotope dilution GC-ICP-MS in biological samples. *Anal Bioanal Chem* 383(2):153-159.
- Rahman SA, Wood AK, Sarmani S, Majid AA. 1997. Determination of mercury and organic mercury contents in Malaysian seafood. *J Radioanal Nucl Chem* 217(1):53-56.
- Ramlal PS, Bugenyi FWB, Kling GW, Nriagu JO, Rudd JWM, Campbell LM. 2003. Mercury concentrations in water, sediment, and biota from Lake Victoria, East Africa. *J Gt Lakes Res* 29:283-291.
- Rasmussen RS, Morrissey MT. 2007. Effects of canning on total mercury, protein, lipid, and moisture content in troll-caught albacore tuna (*Thunnus alalunga*). *Food Chem* 101(3):1130-1135.
- Ray S, Jessop BM, Coffin J, Swetnam DA. 1984. Mercury and Polychlorinated-Biphenyls in Striped Bass (*Morone saxatilis*) from 2 Nova-Scotia Rivers. *Water Air Soil Pollut* 21(1-4):15-23.
- Raymond B, Rossmann R. 2009. Total and methyl mercury accumulation in 1994-1995 Lake Michigan lake trout and forage fish. *J Gt Lakes Res* 35(3):438-446.
- Rider S, Adams D. 2000. Mercury Concentrations in Spotted Seatrout from Northwest Florida. *Gulf of Mexico Science* 2:97-103.
- Riget F, Moller P, Dietz R, Nielsen TG, Asmund G, Strand J, et al. 2007. Transfer of mercury in the marine food web of West Greenland. *J Environ Monit* 9(8):877-883.
- Rivers JB, Pearson JE, Shultz CD. 1972. Total and organic mercury in marine fish. *Bull Environ Contam Toxicol* 8(5):257-265.
- Rolfhus KR, Sandheinrich MB, Wiener JG, Bailey SW, Thoreson KA, Hammerschmidt CR. 2008. Analysis of fin clips as a nonlethal method for monitoring mercury in fish. *Environ Sci Technol* 42(3):871-877.
- Romeo M, Siau Y, Sidoumou Z, Gnassia-Barelli M. 1999. Heavy metal distribution in different fish species from the Mauritania coast. *Sci Total Environ* 232(3):169-175.
- Ruelas-Inzunza J, Paez-Osuna F. 2005. Mercury in fish and shark tissues from two coastal lagoons in the gulf of California, Mexico. *Bull Environ Contam Toxicol* 74(2):294-300.
- Ruelas-Inzunza J, Garcia-Rosales SB, Paez-Osuna F. 2004. Distribution of mercury in adult penaeid shrimps from Altata-Ensenada del Pabellon lagoon (SE Gulf of California). *Chemosphere* 57(11):1657-1661.
- Ruelas-Inzunza J, Meza-Lopez G, Paez-Osuna F. 2008. Mercury in fish that are of dietary importance from the coasts of Sinaloa (SE Gulf of California). *Journal of Food Composition and Analysis* 21(3):211-218.



- Sahuquillo I, Lagarda MJ, Silvestre MD, Farre R. 2007. Methylmercury determination in fish and seafood products and estimated daily intake for the Spanish population. *Food Addit Contam* 24(8):869-876.
- Sajwan KS, Kumar KS, Paramasivam S, Compton SS, Richardson JP. 2008. Elemental status in sediment and American oyster collected from Savannah marsh/estuarine ecosystem: A preliminary assessment. *Arch Environ Contam Toxicol* 54(2):245-258.
- San Francisco Estuary Institute. 2007. California Bay – Delta Authority Fish Mercury Project: Year 2 Annual Report (Sport Fish Sampling and Analysis). Contribution no. 535. Available: <http://legacy.sfei.org/rmp/data/rmpfishtissue.htm> [accessed 10 April 2008].
- San Francisco Public Utilities Commission. 2006. Southwest Ocean Outfall Regional Monitoring Program, Eight Year Summary Report, 1997-2004 San Francisco. Available: [http://sfwater.org/main.cfm/MC\\_ID/4/MSC\\_ID/83](http://sfwater.org/main.cfm/MC_ID/4/MSC_ID/83) [accessed 27 January 2011].
- Santerre CR, Bush PB, Xu DH, Lewis GW, Davis JT, Grodner RM, et al. 2001. Metal residues in farm-raised channel catfish, rainbow trout, and red swamp crayfish from the southern US. *J Food Sci* 66(2):270-273.
- Santoyo MM, Figueroa JAL, Wrobel K. 2009. Analytical speciation of mercury in fish tissues by reversed phase liquid chromatography-inductively coupled plasma mass spectrometry with Bi<sup>3+</sup> as internal standard. *Talanta* 79(3):706-711.
- Schetagne R, Doyon JF, Fournier JJ. 2000. Export of mercury downstream from reservoirs. *Sci Total Environ* 260(1-3):135-145.
- Scheuhammer AM, Graham JE. 1999. The bioaccumulation of mercury in aquatic organisms from two similar lakes with differing pH. *Ecotoxicology* 8(1):49-56.
- Schuler LJ, Howell JP, Heagler MG. 2000. Mercury concentrations in Louisiana and Chinese crayfish. *Bull Environ Contam Toxicol* 64(1):27-32.
- Senn DB, Chesney EJ, Blum JD, Bank MS, Maage A, Shine JP. 2010. Stable Isotope (N, C, Hg) Study of Methylmercury Sources and Trophic Transfer in the Northern Gulf of Mexico. *Environ Sci Technol* 44(5):1630-1637.
- Shim SM, Dorworth LE, Lasrado JA, Santerre CR. 2004. Mercury and fatty acids in canned tuna, salmon, and mackerel. *J Food Sci* 69(9):C681-C684.
- Shim SM, Lasrado JA, Dorworth LE, Santerre CR. 2005. Mercury and Omega-3 fatty acids in retail fish sandwiches. *J Food Prot* 68(3):633-635.
- Shomura R, Craig W. 1974. Mercury in Several Species of Billfishes Taken Off Hawaii and Southern California Kailua-Kona, Hawaii: Proceedings of the International Billfish Symposium.
- Shultz CD, Crear D. 1976. Distribution of total and organic mercury in 7 tissues of Pacific blue marlin, *Makaira nigricans*. *Pacific Science* 30(2):101-107.
- Shultz CD, Ito BM. 1979. Mercury and selenium in blue marlin, *Makaira nigricans*, from the Hawaiian Islands. *Fishery Bulletin* 76(4):872-879.
- Soegianto A, Moehammadi N, Irawan B, Affandi M, Hamami. 2010. Mercury concentrations in edible species harvested from Gresik coast, Indonesia and its health risk assessment. *Cah Biol Mar* 51(1):1-8.
- Soto-Jimenez MF, Amezcua F, Gonzalez-Ledesma R. 2010. Nonessential Metals in Striped Marlin and Indo-Pacific Sailfish in the Southeast Gulf of California, Mexico: Concentration and Assessment of Human Health Risk. *Arch Environ Contam Toxicol* 58(3):810-818.
- State of Alaska Department of Environmental Conservation. 2009. Total Mercury Concentrations in Alaskan Fishes. Available: <http://dec.alaska.gov/eh/docs/vet/metals%2009-11-19.pdf> [accessed 26 January 2011].
- State of Delaware. 2010. Department of Natural Resources and Environmental Control Open Files. Available: <http://www.dnrec.state.de.us/fw/advisory.htm> [accessed 29 November 2010].
- State of Louisiana. 2011. Department of Environmental Quality Mercury Fish Tissue Data 2005-2010 (Data file). Available: <http://www.deq.louisiana.gov/portal/default.aspx?tabid=1633> [accessed 4 February 2011].

- State of Maryland. 2007. Toxics Data Sets. Available: <http://archive.chesapeakebay.net/data/historicaldb/toxicsmain.htm> [accessed 24 October 2007].
- State of Michigan. 2011. Fish Contaminant Monitoring Program Online Database. Available: <http://www.deq.state.mi.us/fcmp/> [accessed 25 February 2011].
- State of New Jersey. 2004. Routine Monitoring For Toxics in Fish Program Available: <http://www.state.nj.us/dep/dsr/task1.pdf> (Task I- Appendix I. Draft Summary of Chemical Contaminant Concentrations) and <http://www.state.nj.us/dep/dsr/task2.pdf> (Task 2) [accessed 29 November 2011].
- State of New Jersey. 2008. Routine Monitoring Program for Toxics in Fish: Year 3 Raritan River Region. Available: <http://www.state.nj.us/dep/dsr/fishmonitoring-year3.pdf> [accessed 29 November 2011].
- State of North Carolina. 2011. Statewide Fish Tissue Metals Results Available: <http://portal.ncdenr.org/web/wq/ess/bau/fish-tissue-data>, for 1990-2010 [accessed 26 January 2011].
- State of Virginia. 2009. Department of Environmental Quality Fish Tissue Results Summary. Available: <http://www.deq.state.va.us/fishtissue/fishtissue.html> [accessed 21 July 2009].
- Storelli MM, Marcotrigiano GO. 2001. Total mercury levels in muscle tissue of swordfish (*Xiphias gladius*) and bluefin tuna (*Thunnus thynnus*) from the Mediterranean Sea (Italy). J Food Prot 64(7):1058-1061.
- Storelli MM, Stuffer RG, Marcotrigiano GO. 1998. Total mercury in muscle of benthic and pelagic fish from the South Adriatic Sea (Italy). Food Addit Contam 15(8):876-883.
- Storelli MM, Stuffer RG, Marcotrigiano GO. 2002. Total and methylmercury residues in tuna-fish from the Mediterranean sea. Food Addit Contam 19(8):715-720.
- Storelli MM, Giacomini-Stuffer R, Storelli A, Marcotrigiano GO. 2005. Accumulation of mercury, cadmium, lead and arsenic in swordfish and bluefin tuna from the Mediterranean Sea: A comparative study. Mar Pollut Bull 50(9):1004-1007.
- Storelli MM, Giacomini-Stuffer R, Storelli A, Marcotrigiano GO. 2006. Cadmium and mercury in cephalopod molluscs: Estimated weekly intake. Food Addit Contam 23(1):25-30.
- Storelli MM, Barone G, Piscitelli G, Marcotrigiano GO. 2007. Mercury in fish: Concentration vs. fish size and estimates of mercury intake. Food Addit Contam 24(12):1353-1357.
- Storelli MM, Garofalo R, Giungato D, Giacomini-Stuffer R. 2010. Intake of essential and non-essential elements from consumption of octopus, cuttlefish and squid. Food Addit Contam Part B-Surveill 3(1):14-18.
- Storelli MM, Giacomini-Stuffer R, Storelli A, D'Addabbo R, Palermo C, Marcotrigiano GO. 2003. Survey of total mercury and methylmercury levels in edible fish from the Adriatic Sea. Food Addit Contam 20(12):1114-1119.
- Strom DG, Graves GA. 2001. A comparison of mercury in estuarine fish between Florida Bay and the Indian River Lagoon, Florida, USA. Estuaries 24(4):597-609.
- Suk SH, Smith SE, Ramon DA. 2009. Bioaccumulation of mercury in pelagic sharks from the northeast Pacific Ocean. CalCOFI Rep., Vol. 50, 2009. La Jolla, CA. Available: [http://calcofi.org/publications/calcofireports/v50/172-177\\_Suk.pdf](http://calcofi.org/publications/calcofireports/v50/172-177_Suk.pdf) [accessed 3 May 2011].
- Tahan JE, Sanchez JM, Granadillo VA, Cubillan HS, Romero RA. 1995. Concentrations of total Al, Cr, Cu, Fe, Hg, Na, Pb, and Zn in commercial canned seafood determined by atomic spectrometric means after mineralization by microwave heating. J Agric Food Chem 43(4):910-915.
- Tam SYK, Mok CS. 1991. Metallic contamination in oyster and other seafood in Hong Kong. Food Addit Contam 8(3):333-342.
- Teeny FM, Hall AS, Gauglitz EJ. 1974. Reduction of mercury in sablefish (*Anoplopoma fimbria*) and use of treated flesh in smoked products. Marine Fisheries Review 36(5):15-17.
- Thieleke J. 1973. Mercury Levels in five Species of Commercially Important Pelagic fish Taken From the Pacific Ocean Near Hawaii [PhD Dissertation]. Madison, WI: University of Wisconsin, Madison.

- Thomson B, Lee L. 2009. Mercury content in imported fin fish. Available: [http://www.foodsafety.govt.nz/elibrary/industry/Mercury\\_Content-Quantifies\\_Residues.pdf](http://www.foodsafety.govt.nz/elibrary/industry/Mercury_Content-Quantifies_Residues.pdf) [accessed 2 December 2010].
- Torres-Escribano S, Velez D, Montoro R. 2010. Mercury and methylmercury bioaccessibility in swordfish. *Food Addit Contam Part A-Chem* 27(3):327-337.
- Tyrell L, McHugh B, Glynn D, Twomey M, Joyce E, Costello J, et al. 2005. Trace Metal Concentrations in Various Fish Species Landed at Selected Irish Ports, 2003. Abbotstown, Dublin: Marine Environment and Health Series.
- USEPA (U.S. Environmental Protection Agency). 2004. Environmental Monitoring and Assessment Program (EMAP). Available: <http://www.epa.gov/emap/> (EPA West) [accessed 26 April 2004].
- USEPA (U.S. Environmental Protection Agency). 2005. Proceedings of the 2005 National Forum on Contaminants in Fish, Analysis of Chemical Contaminant Levels in Store-Bought Fish from Washington State. Available: [http://water.epa.gov/scitech/swguidance/fishshellfish/techguidance/upload/2008\\_11\\_18\\_fish\\_forum\\_2005\\_proceedings2005.pdf](http://water.epa.gov/scitech/swguidance/fishshellfish/techguidance/upload/2008_11_18_fish_forum_2005_proceedings2005.pdf) [accessed 3 November 2011].
- USEPA (U.S. Environmental Protection Agency). 2006a. Mid-Atlantic Integrated Assessment (MAIA). Available: <http://www.epa.gov/emap/maia/html/data/estuary/9798/> [accessed 22 February 2006].
- USEPA (U.S. Environmental Protection Agency). 2006b. Regional Environmental Monitoring and Assessment Program (REMAP). Available: <http://www.epa.gov/emap/remap/html/data.html> (Texas, 1993-1994) [accessed 21 June 2006].
- USEPA (U.S. Environmental Protection Agency). 2007. Environmental Monitoring and Assessment Program (EMAP). Available: <http://www.epa.gov/emap/> (Carolinian Province 1994-1997) [accessed 24 October 2007].
- USEPA (U.S. Environmental Protection Agency). 2008. National Coastal Assessment. Available: <http://www.epa.gov/emap/nca/html/data/index.html> [accessed 3 October 2008].
- USEPA (U.S. Environmental Protection Agency). 2011a. National Listing of Fish Advisories. Available: <http://map1.epa.gov> [accessed 14 September 2011].
- USEPA (U.S. Environmental Protection Agency). 2011b. Environmental Monitoring and Assessment Program (EMAP). Available: <http://www.epa.gov/emap/> (Virginian Province 1991-1993) [accessed 3 February 2011].
- USEPA (U.S. Environmental Protection Agency). 2011c. Environmental Monitoring and Assessment Program (EMAP). Available: <http://www.epa.gov/emap/> (Louisianian Province 1991-1994) [accessed 3 February 2011].
- USEPA (U.S. Environmental Protection Agency) Region 9 and NOAA (National Oceanic and Atmospheric Administration). 2007. 2002-2004 Southern California Coastal Marine Fish Contaminants Survey. Available: [http://earth1.epa.gov/region09/features/pvshelf/montrose\\_report.pdf](http://earth1.epa.gov/region09/features/pvshelf/montrose_report.pdf) [accessed 14 August 2007].
- USFDA (U.S. Food and Drug Administration). 2011. Mercury Concentrations in Fish: FDA Monitoring Program. Available: <http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/FoodbornePathogensContaminants/Methylmercury/ucm191007.htm> [accessed September 15, 2011].
- USFDA (U.S. Food and Drug Administration). 2008. Total Diet Study 1991-2005. Available: <http://www.fda.gov/downloads/Food/FoodSafety/FoodContaminantsAdulteration/TotalDietStudy/UCM243059.pdf> [accessed 9 September 2008].
- Usydus Z, Szlinder-Richert J, Polak-Juszczak L, Komar K, Adamczyk M, Malesa-Cieciewicz M, et al. 2009. Fish products available in Polish market - Assessment of the nutritive value and human exposure to dioxins and other contaminants. *Chemosphere* 74(11):1420-1428.
- Vandenbroek WLF. 1981. Concentration and distribution of mercury in flesh of orange roughy (*Hoplostethus atlanticus*). *N Z J Mar Freshw Res* 15(3):255-260.
- Vedrinaro-Dragojevic I, Dragojevic D, Bujan M. 2002. Total mercury content in fish und molluscs from Adriatic Sea. *Dtsch Lebensm-Rundsch* 98(1):10-13.

- Viana F, Huertas R, Danulat E. 2005. Heavy metal levels in fish from coastal waters of Uruguay. *Arch Environ Contam Toxicol* 48(4):530-537.
- Voegborlo RB, El-Methnani AM, Abedin MZ. 1999. Mercury, cadmium and lead content of canned tuna fish. *Food Chem* 67(4):341-345.
- Voegborlo RB, Matsuyama A, Akagi H, Adimado AA, Ephraim JH. 2006. Total mercury and methylmercury accumulation in the muscle tissue of frigate (*Auxis thazard thazard*) and yellow fin (*Thunnus albacares*) tuna from the Gulf of Guinea, Ghana. *Bull Environ Contam Toxicol* 76(5):840-847.
- Wang YW, Liang LN, Shi JB, Jiang GB. 2005. Chemometrics methods for the investigation of methylmercury and total mercury contamination in mollusks samples collected from coastal sites along the Chinese Bohai Sea. *Environ Pollut* 135(3):457-467.
- Watling RJ, McClurg TP, Stanton RC. 1981. Relation between mercury concentration and size in the mako shark. *Bull Environ Contam Toxicol* 26(3):352-358.
- Whyte ALH, Hook GR, Greening GE, Gibbs-Smith E, Gardner JPA. 2009. Human dietary exposure to heavy metals via the consumption of greenshell mussels (*Perna canaliculus* Gmelin 1791) from the Bay of Islands, northern New Zealand. *Sci Total Environ* 407(14):4348-4355.
- Wren CD, Scheider WA, Wales DL, Muncaster BW, Gray IM. 1991. Relation between Mercury Concentrations in Walleye (*Stizostedion vitreum vitreum*) and Northern Pike (*Esox lucius*) in Ontario Lakes and Influence of Environmental-Factors. *Can J Fish Aquat Sci* 48(1):132-139.
- Yamashita Y, Omura Y, Okazaki E. 2005. Total mercury and methylmercury levels in commercially important fishes in Japan. *Fisheries Science* 71(5):1029-1035.
- Yamashita Y, Omura Y, Okazaki E. 2006. Distinct regional profiles of trace element content in muscle of Japanese eel *Anguilla japonica* from Japan, Taiwan, and China. *Fisheries Science* 72(5):1109-1113.
- Zauke GP, Savinov VM, Ritterhoff J, Savinova T. 1999. Heavy metals in fish from the Barents Sea in (summer 1994). *Sci Total Environ* 227(2-3):161-173.
- Zhang XM, Naidu AS, Kelley JJ, Jewett SC, Dasher D, Duffy LK. 2001. Baseline concentrations of total mercury and methylmercury in salmon returning via the Bering Sea (1999-2000). *Mar Pollut Bull* 42(10):993-997.