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Mercury in Marine Organisms of the Mediterranean and other European Seas

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Summary

The Hg level has been determined in 21 marine species (n=542) from the Mediterranean, the North and the Baltic Sea with AAS.

Resumée

La teneur en Hg dans 21 espèces marines (n=542) de la Méditerranée, de la Mer du Nord et de la Mer Baltique a été analysée par AAS.

Cumont et al (1972) supposed from comparative measurements that fishes from the Mediterranean Sea contained considerably more Hg than fishes from other European seas. Because such differences if real, would be of great practical and theoretical importance we have started a detailed comparison on Hg concentrations in samples from different trophic levels of the marine food chain. First results on 21 species will be presented here (Tables 1 and 2).

The Hg determinations were carried out after careful preparation on subsamples of about 2.0 g (fresh weight) applying a partly automated atomic absorption procedure (Matthes et al, 1976). It could be shown that duplicate analysis of fish fillets taken from both sides of a specimen gave practically identical results. This means that one fillet sample from each fish is representative for the whole muscle.

The results obtained for Hg in fish as well for the Mediterranean (predominantly Ligurian and Tyrrhenian Sea) as for other European seas showed for the specimens studied no extreme differences in Hg values compared with former studies (e.g. Holden, 1973; Cooperative Research Report, 1974; Georgakis and Panetsos, 1975) but sometimes slightly elevated values for Mediterranean samples. Since at present from our results it is not yet possible to draw definite conclusions the study will be continued and expanded.

References

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Table 1 Total Hg concentration in marine organisms from Mediterranean, predominantly Ligurian and Tyrrhenian Sea

(μ g Hg/kg Freshweight)

Species	n	mean	range	length (range) (cm)
Mytilus sp.	39	54	22- 80	4.2 - 8.0
Octopus vulgaris	6	259	79- 702	68.0 - 85.0
Eledone moschata	6	401	355- 490	-
Sepia officinalis ⁺	11	492	177-1090	-
Sepia officinalis ⁺	5	128	91- 139	-
Penaeus kerathurus	10	100	31- 171	11.0 - 14.0
Portunus sp.	15	39	20- 56	2.2 - 3.5
Raja asterias	3	336	176- 539	-
Atherina sp.	21	107	53- 206	-
Crenilabrus tinca	20	393	173- 681	11.0 - 21.5
Merluccius merluccius	12	121	78- 192	18.0 - 22.0
Mullus barbatus	81	140	38- 783	8.0 - 17.0
Mullus surmuletus	10	96	58- 319	14.0 - 15.8
Maena maena	4	169	124- 232	13.2 - 14.5
Sardina pilchardus	26	217	117- 309	14.0 - 16.5
Phycis blennioides	1	148		23.5
Uranoscopus scaber	2	200	147- 253	17.0 - 18.0
Scorpaena porcus	1	300		13.0

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Table 2 Total Hg concentration in marine organisms from North and Baltic Sea

Species	n	mean	range	length (range)(cm)
Mytilus sp.a)	20	113	60- 199	5.5 - 7.5
Mytilus sp.b)	76	67	25- 135	3.7 - 7.5
Sepia officinalis b)	13	80	47- 115	
Loligo vulgaris b)	10	99	83- 130	10.0 - 15.0
Gadus morhua c)	50	121	37- 263	47.0 - 58.0
Clupea harengus d)	50	41	19- 71	21.0 - 29.0
Pleuronectes platessa b)	50	121	78- 192	29.0 - 39.0
Solea sp.				

a) German Coast; b) Dutch Coast; c) Danish Coast; d) Baltic Sea;

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Questions and comments:

1. I agree with you concerning the concentration variabilities of Hg in different species. Our results on Hg concentrations are in agreement with yours but we found differences in concentration of Hg in various mollusc species collected from the same sea area. We also found differences in specific accumulation for many other elements in these mollusc species.

Concerning the correlation of Hg concentration and body size of the fish I think that we have to consider that this element according to some published data reaches a plateau of concentration versus size and age plot in comparison to Zn that decreases with age and size. (C. PAPADOPOLOU, Greece).

2. What % of total mercury in mytilus is present as organic (methyl) mercury? Monaco results on mytilus indicate that the % is closer to 20 %. (D.L. ELDER, Monaco)
 - At present we analyze only total Hg. From the literature it is known that fishes contain somewhat around 80 - 90% methylmercury, while in mytilus we would guess it is around 50%.
3. It is very hard to compare Hg contents from Atlantic samples to Mediterranean. Hg content depends on a) species, b) habitat, c) turnover rate, d) size and age. (A. BALLESTER, Spain).
 - We agree with your comment, but the results of Cumont and ours indicate that there could be some differences between mercury concentration in fishes from the Mediterranean Sea and other European Seas whatever the reasons are. The importance of real differences would be 1) A higher Hg burden for fish consumers in the Mediterranean Countries 2) A stimulation for detailed research on the reasons for this behaviour. From our hitherto obtained results it seems that at least in particular zones and for particular species the

mean values in the Mediterranean Sea are appreciable higher than the highest values in the North and Baltic Sea.