Chlorinated Hydrocarbons in Red Mullet *(Mullus barbatus)* from the Greek Seas

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This study reports on the concentration of PCBs and DDTs in the flesh of red mullet collected at 8 locations in Greek waters from 1986 till 1988. Concentrations of chlorinated hydrocarbons and lipids were determined according to the procedure proposed by SATSMADJIS et al (1988). GC analysis was performed with a GC (Varian 3700) equipped with a 63 Ni electron capture detector and a fused silica Megabore column DB-1, 30m long.

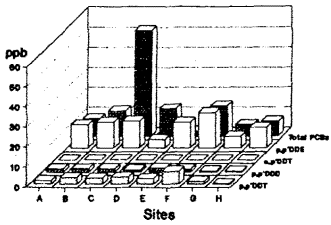


Figure 1. Mean concentrations of DDTs and total PCBs (ppb wet weight) in the flesh of red mullet from Greek waters.
A: Alexandroupolis, B: Chios, C: Pagassitikos, D: Saronikos, E: Rhodes, F: Heraclion, G: Chania, H: Preveza.

The higher mean concentration of total PCBs coincided with the shallow, enclosed gulf of Pagassitikos (52.6 ppb wet weight), where a considerable outflow of urban and industrial wastes takes place (Fig 1). The lowest value (2.6 ppb) was detected off Rhodes island (open S. Aegean Sea) while in the other locations PCBs fluctuated between 5.6 and 15 ppb. The main compound of DDTs was p,p´ DDE (Fig 1). DDTs values ranged from 15.2 to 25.6 ppb at the 5 sites (A, B, C, E, F) of the Aegean Sea. Saronikos Gulf, although exhibiting high p.p´ DDT values, displayed low concentrations of all other DDTs (8.9 ppb). Low DDTs values were also found in the two locations off western Greece (8 ppb off Chania and 11.1 ppb off Preveza).

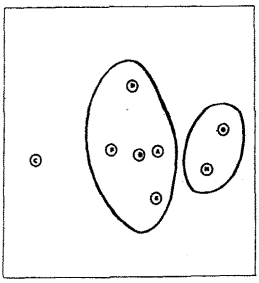
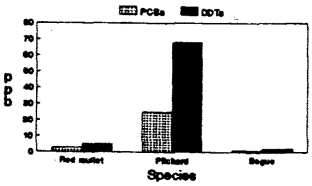
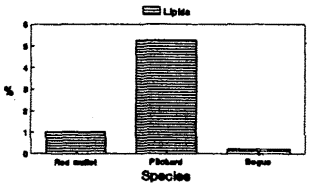


Figure 2. Multidimensional scaling plot for 8 sites according to the concentration of PCBs and DDTs.
A: Alexandroupolis, B: Chios, C: Pagassitikos, D: Saronikos, E: Rhodes, F: Heraclion, G: Chania, H: Preveza.

Nonmetric multidimensional scaling performed on the mean concentations of PCBs and DDTs (Fig. 2), using the PRIMER algorithms (CLARKE & WARWICK, 1989) revealed three groups of sites. Group I was formed by sites A, B, D, E and F (Aegean Sea), which exhibited relatively high DDTs concentrations, fact related to the extensive use of DDT on the close by Mediterranean coast of Asia and Africa during the last decade (PICER & PICER, 1978). Site C (Pagassitikos Gulf) displaying the highest PCBs concentrations was separated from all others (group II), while sites G and H (western Greece) presenting low values of both PCBs and DDTs formed group III.



3a



3b

Figure 3. PCBs, DDTs (3a) and lipid concentration (3b) in red mullet, pilchard and bogue caught in the same area/season.

Chlorinated hydrocarbon (Fig. 3a) and lipid (Fig. 3b) concentration values in red mullet were compared with those of two other species, Sardina pilchardus (pilchard) and Boops boops (bogue), caught in the same area/season. Both values were higher in pilchard and lower in bogue, as compared to those in red mullet. This possibly implies a positive relation between lipids and chlorinated hydrocarbons, as has been found in six species from the NW. Atlantic (STOUT, 1980).

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