Tributyltin levels in Mussels and sediments in Italian Coastal Waters

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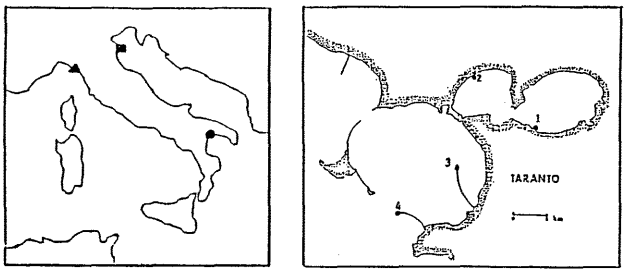
Organotin compounds concentrations in marine environment and their effects on organisms have been studied since the eighties. Many data come from U.S.A. and Great Britain; several works have been made on "Imposex", mostly concerning Nucella lapillus (Gibbs et al. 1987). Viceversa it is not easy to find some literature about organotin compounds concentrations in water and organisms from the Mediterranean sea.
As the presence of such compounds is mainly due to naval antifouling paints, but also to biocides for agricultural and industrial use, we decided to make a preliminary survey in different environments.



●Taranto ▲LaSpezia ■Scardovari

Fig. 1 - The three coastal sites choosen in Italian waters and in the four sampling sites choosen in Taranto basins.

Material and methods.

We have chosen Taranto and La Spezia harbours because in both there are mussels cultivations. Both the harbours have an Italian Military Navy base. Mussels have also been collected from a cultivation located not near an harbour, in the Northern Adriatic sea: Scardovari lagoon, in the Po river delta.
The samples has been made in the first months of 1989. In Taranto, where the Institute is located, mussels samples have been made in different areas(Fig.1). In the same winter season sediment have also been analysed.
TBT and total tin have been determined by mean of atomic spectroscopy with Zeeman graphite furnace (Stephenson and Smith 1988).
Five subsamples containig 15 mussels were analysed for each sample, as well as 5 sediment samples have been analysed in each of the four sampling sites in Taranto.

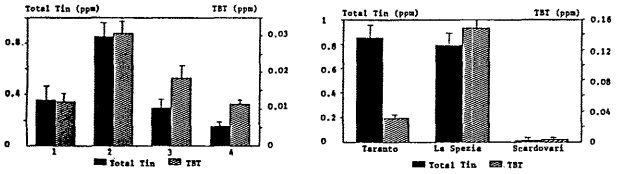


Fig. 2 - Total and Tributyl Tin concentration in the mussels of the four sampling sites in Taranto basins and in the three coastal sampling sites: Taranto, La Spezia and Scardovari.

As we can see in fig. 1, the presence of organotin compounds in the two considered harbours is by far higher than in the Po river delta. In particular in La Spezia harbour TBT values are about four times higher than those in Taranto. Being the total tin concentrations similar in the two harbours, one can think about a different status of degradation processes. We know, in fact, that TBT tends to became Dibutyltin, Monubutyltin and inorganic tin at the end. So higher values observed in mussels from La Spezia may be due to a recent TBT water contamination by antifouling paints not yet degradated.

Table 1. Total and Tributyl Tin concentration in sediments of the four sampling sites in Taranto basins.

Sampling sites		1	2	3	4
Total Tin	(ppm)	0.137	0.362	0.529	0.402
TBT	(ppm)	0.021	0.048	0.015	0.016

TBT values both in mussels and in sediments from the four sampling sites in Taranto basins show a pike at station 2, the nearest to the Navy Arsenal, and a decrease towards the open sea. On the contrary total tin tends to increase towards the open sea (Fig.2). Finally it is interesting that TBT accumulation in sediments, in the range between 0.02 and 0.05 ppm, is more homogeneus and only a little lower than in mussels. Mussels collected from cultivations far from ship traffic (Scardovari) show TBT values lower than one order of magnitude (0.003 ppm) at least.
Sea water TBT concentration and Organotin different degradation status both in Mussels and sediments, will contribute to understand better the true role and risks, for human beings too, caused by this Kind of pollution.

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Sensitivity of Sea Bass, *Dicentrarchus labrax* early developmental stages on water soluble fraction of Crude Iraq Oil

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It is well known that early developmental stages of different fish, like herring, plaice, cod, etc., are very sensitive to different types of oil, oil derivatives and oil hydrocarbons. These life stages, especially eggs and larvae represent the most susceptible part of the whole life cycle (Kühnhold, 1977). However, there is no published data on sensitivity of Mediterranean fish species to crude oils normally transported in this area. So, early developmental stages, fertilized eggs, yolk-sac larvae and postlarvae of one typical Mediterranean fish species, Dicentrarchus labrax Linnaeus, 1758, were in our experiments exposed to crude Iraq oil, which is common in tanker traffic in the Adriatic sea.

Eggs, larvae and postlarvae of sea bass used in the experiments were provided by artificial spawning and rearing (Katavić,1986). Water soluble fraction of crude Iraq oil was prepared by methods of Anderson et all., (1974). Experiments were done in triplicate under static conditions, in water bath with ambient sea water (11.2 ^{o} C). Medium was gently mixed by aeration from the jar bottom.

The analysis showed water soluble fraction (WSF) of crude Iraq to be very rich in light hydrocarbons, toluene, xylene, benzene and naphthalenes.

Eggs exposed to WSF in gastrula stage showed high resistance during first 72 hours. Thereafter, all developed embryos died in all concentrations, and only in lowest (10 %) WSF concentration 4.1 % embryos hatched, compared to 75 % in the controls. Most of dead embryos were in different stages of embryogenesis (95 %), and only small number in late gastrula stage. Heartbeat rate in embryos was drastically reduced and only in lowest WSF concentration we observed arithmic heartbeats. All hatched larvae in 10% WSF had spinal deformities and lay immotile on jar bottom. Hatched larvae in control groups had only 0.3 % spinal deformities, regular heartbeat (60 beats per minute) and were very motile.

Short term exposure (24 h) of two day old larvae showed slight increase of mortality toward higher WSF concentrations, but only the highest concentration (50 %) had significantly higher mortality if compared to the controls. Examination of WSF influence on yolk sac resorption showed slowing down of the resorption rate in two higher (30 and 50 %) WSF concentrations which is associated with slower motility of larvae in jars. This has been atributed earlier to narcotic effect of oil hydrocarbons (Kühnhold, 1977).

Postlarvae (20 days old) seemed to be most resistant among studied sea bass stages. Lowest WSF (10%) concentration showed similar mortality during all 96 h exposure as that in the controls. Other concentrations had significantly lower survival after 24 h exposure, but if compared with gilthead sea bream, Sparus aurata postlarvae (Glamuzina et all., 1990), they are more resistant to the exposure to water soluble fraction of crude Iraq oil.

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