

Effects of polychlorinated biphenyl on marine phytoplankton

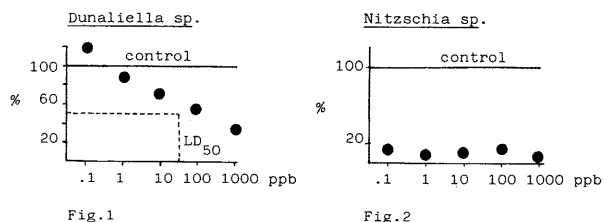
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The two representative autochthonous isolates from the Gulf of Trieste, Northern Adriatic, the chlorophyte *Dunaliella sp.* and the diatom *Nitzschia sp.* were exposed to the 5 concentrations of PCB Aroclor 1254 dissolved in acetone (1 % v/v).

The response of the two algae on PCB was entirely different. *Dunaliella sp.* grew at all PCB concentrations. At the lowest PCB level (.1 ppb) the growth was increased over the control culture containing only acetone. The higher PCB levels caused reduced final yields (Fig. 1). The LD_{50/6} was computed to be as high as 50 ppb, a dose unlikely to be encountered in marine pollution situations. On the other hand, *Nitzschia sp.* was depressed in growth even at the lowest Aroclor levels (Fig. 2). The decrease was significant (P < .001) at all PCB concentrations and the testing yields have never exceeded 20 % of the control.

The phytoplankton assemblages of the Gulf of Trieste are dominated by these two types of algae. The green small microflagellates dominate in number, while the diatoms produce the major part of organic matter. In case of eventual increased environmental PCB level, and presuming that the two types of algae would behave in the same way as they did in the laboratory, one can predict that



Figs. 1 and 2 Final yields of *Dunaliella sp.* and *Nitzschia sp.* cultures exposed to the various levels of PCB

the diatoms would be severely decimated in such situation. Hence environmental PCBs may alter marine trophic pathways by reducing phytoplankton size towards smaller species and thus divert the flow of biomass from harvestable fish to jellyfish and other gelatinous predators (O'Connors et al., 1978).

The PCB residues in the final particulate matter revealed that the proportionally highest amount of pollutant, regarding its initial concentration in the experimental solutions, was accumulated by algal cells at the lowest PCB concentration.

Reference

O'Connors, H.B., C.F.Wurster, C.D.Powers, D.C.Biggs, R.G. Rowland, 1978. Polychlorinated biphenyls may alter marine trophic pathways by reducing phytoplankton size and production. Science, 201:737-739.

This work was partly supported by UNEP grant.

Levels and trends of the pollution of chlorinated hydrocarbons in Mussels from the Rijeka Bay

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The contamination of the Adriatic Sea by higher molecular chlorinated hydrocarbons has been relatively well documented (PICER et al., 1978; FOSSATO, 1982). The Rijeka Bay, a semienclosed basin, is especially susceptible to pollution and is usually considered to be a heavily stressed ecosystem. The trends of chlorinated hydrocarbons concentrations found for mussels (*Mytilus galloprovincialis*) of the Rijeka Bay are presented in Fig. 1. As can be seen, the levels of DDTs and PCBs significantly decreased during the period of investigation. The area distribution of DDTs and PCBs concentrations confirms the local sources of pollution and the level of persistent chlorinated hydrocarbons in the mussel tissue. This is especially apparent for the PCBs concentrations. Namely, concentrations of PCBs are significantly higher in comparison with DDT and its analogues in the samples collected in the vicinity of the industrial pollution sources. In the samples collected far away from the industrial sources of pollution, the concentrations of DDT and analogues were higher than the PCBs concentrations. It is also interesting to note that the concentrations of DDT do not differ significantly between the investigated locations. Mollusca pollution level by persistent chlorinated insecticides appears to be the same throughout the coastal zone of the Rijeka Bay. Such a conclusion comes unexpectedly because it is well known that urban waste waters are relatively rich in persistent chlorinated insecticides. Possibly this could be caused by a higher usage of DDT and its analogues for pests control in agriculture and forestry in recent years, and because the coastal zone is a typical karstic region. Once applied, the persistent chlorinated insecticides enter the Rijeka Bay with drainage waters.

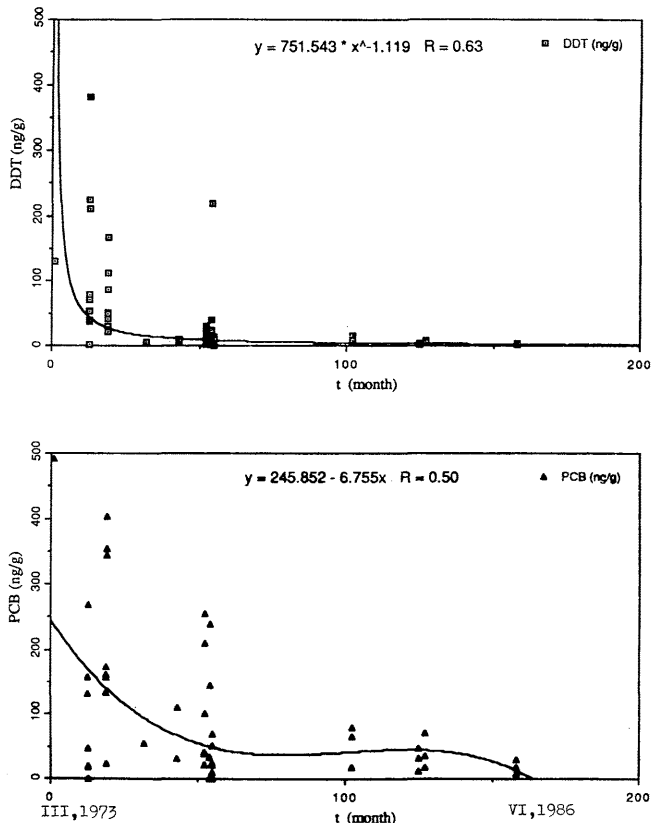


Fig.1. DDT_{total} and PCB in mussels from the Rijeka Bay sampled from March 1973 to June 1986.

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 PICER M., NENA PICER and B. NAZANSKY,(1978). . Chlorinated hydrocarbons in the sea (a review), Pomorski zbornik, 16, pp. 451-483 (in Croatian).