

## DECREASE OF DDT IN MUSSELS

*Elliott Berkhiser*

---

Intertidal mussels are useful indicators of the relative amounts of DDT and PCB contamination in nearshore waters. The Coastal Water Project's 1971 survey of these synthetic organics in *Mytilus californianus* from stations throughout the Bight revealed a distinct correlation between the concentrations of both total DDT and PCB 1254 in the tissue of a mussel and the proximity of the station from which the mussel was taken to the Palos Verdes Peninsula, a region of major DDT and PCB inputs.

Since 1971, there have been significant reductions in the concentrations of these chlorinated hydrocarbons in the municipal wastewater effluent discharged off Palos Verdes by the Los Angeles County Sanitation Districts. Monitoring data suggest that the level of total DDT in the effluent (shown in [Figure 1](#)) fell from approximately 50 ppb in mid 1971 to less than 10 ppb in mid 1973. The data on PCB are more variable, but they also suggest a trend of decreasing annual inputs as shown in Figure 2.

Analyses of DDT and PCB in mussels collected between 1971 and 1973 from Royal Palms State Beach, which is at the base of the outfall system, were done by Brock de Lappe and Robert Risebrough of the University of California, Berkeley. The results are also presented in [Figures 1](#) and [2](#). In general, the changes in concentrations in the mussel samples were similar to those in the effluent.

During 1973, we conducted a special experiment to determine the rate of response of the mussel to changes in environmental levels of DDT. In May, numerous specimens of *M. californianus* 5 cm in length were collected from Royal Palms Beach and moved to nylon bags suspended at the intertidal level from the pier of Scripps Institution of Oceanography, La Jolla. (Concentrations of DDT in the mussels found at La Jolla were less than 3 percent of those in the Palos Verdes mussels.) Ten specimens were taken from the bags every 2 weeks for 28 weeks and analyzed in the Project's trace organics laboratory by electron capture gas chromatography. The decreases with time in whole tissue concentrations of p,p' DDE (the dominant DDT compound observed) are illustrated in [Figure 3](#).

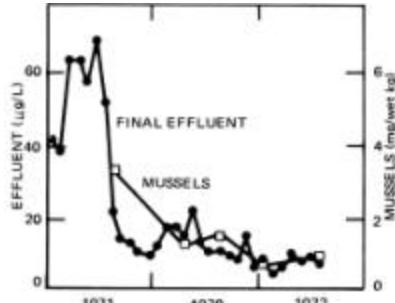
These data indicate a relatively rapid turnover of DDE in whole tissue of *Mytilus*. After correcting for growth, mathematical analysis showed that approximately 85 percent of the DDE originally in the organism was lost with a biological half life of 11 days, while the remaining 15 percent had a half life of almost 200 days.

We had already noted in our previous studies that *Mytilus* is extensively distributed along temperate zone coasts, is easy to collect, and concentrates trace quantities of DDE from seawater to more easily discernable amounts. This study suggests that the mussel will rapidly reflect changes in the seawater concentrations of chlorinated hydrocarbons.

## FIGURES

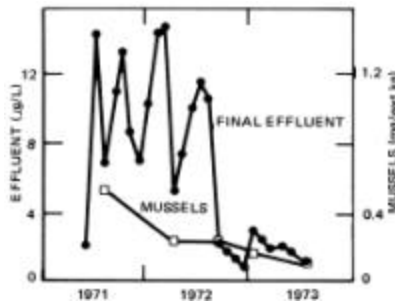
**Figure 1.**

DDT concentrations in the final effluent from the Joint Water Pollution Control Plant, Los Angeles County Sanitation Districts, and in mussels from Royal Palms State Beach



**Figure 2.**

PCB concentrations in the final effluent from the Joint Water Pollution Control Plant, Los Angeles County Sanitation Districts, and in mussels from Royal Palms State



**Figure 3.**

Decreases in total DDT concentrations in Palos Verdes mussels suspended from Scripps Pier, La Jolla, April to October, 1973.

