Natural depuration rate of Chernobyl-derived ^{137}Cs in mussels (*Mytilus galloprovincialis*) from the Bosphorus

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During the days following the accident at the Chernobyl Nuclear Plant, increased levels of radioactivity were detected in fish and mussel samples from the Black Sea, Marmara Sea and the Bosphorus (TOPCUOGLU *et al.*, 1988). In this earlier study, ^{131}I, ^{103}Ru, ^{134}Cs and ^{137}Cs were determined and the results have been reported as total activity. Since then, the monitoring programme in our laboratory has especially focused on marine organisms from the Black Sea and Marmara Sea to follow contamination trends after the Chernobyl accident (GUVEN *et al.*, 1990; BULUT *et al.*, 1990).

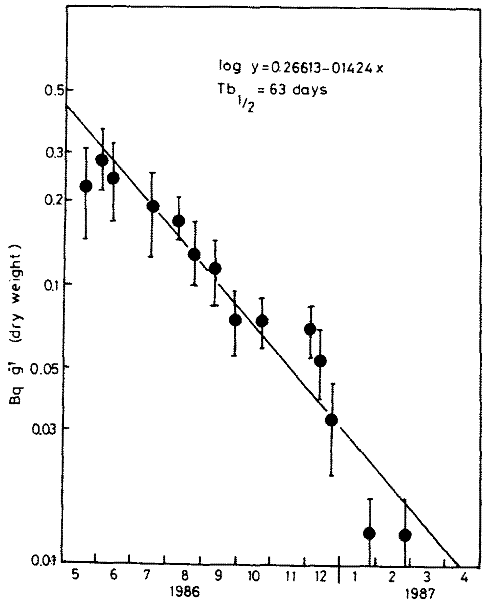
Several papers have been published concerning the biokinetics of ^{137}Cs in marine organisms under laboratory and field conditions. However, data on the biokinetics of ^{137}Cs in naturally-contaminated marine biota following the Chernobyl input are limited (WHITEHEAD *et al.*, 1988). We report here the results of our ^{137}Cs depuration rate measurements in mussels (*Mytilus galloprovincialis*) collected from the same Bosphorus station from May 1986 to February 1987.

Samples were collected at regular intervals and similar-sized mussels were dissected and soft parts were removed for analysis. The soft tissues were dried at 85°C, the dry weight was recorded and the samples were ground to powder and placed in a special cup. The cup was placed directly on a detector of high purity germanium with a resolution (FWHM) of 1.8 keV (at 1332.5 keV for ^{50}Co). All activities were corrected for decay to the date of the Chernobyl accident.

The decrease of ^{137}Cs activity in the mussel with time, or natural depuration rate, was estimated as the biological half-life which was observed under environmental conditions after Chernobyl. The depuration values have been fitted to a single component represented by the equation Log y = Log a+X Log b. From this equation, the depuration rate constant (k=log b*2.3) and biological half-life ($Tb_{1/2}$ = 0.693*k^{-1}) were calculated (Fig. 1).

If we could have obtained more measurements, especially during the first month following the accident, we would have observed an exponential decrease in radioactivity. The biological half-life of 63 days we found is not considerably greater than the 40 days obtained for ^{137}CS in mussels exposed to radioactivity in the Irish Sea (CLIFTON, 1983). Furthermore, a ^{137}Cs biological half-time of 75 days has been reported for a marine clam maintained under field conditions (HARRISON, 1973). On the other hand, WHITEHEAD *et al.* (1988) reported a biological half-life of 300 days in the slow component in mussels exposed to Chernobyl fallout in the northwestern Mediterranean. Clearly, ^{137}Cs depuration rates in Mediterranean mussels are variable and likely depend on several key parameters such as salinity, temperature, and growth, to mention a few.

Fig. 1. Depuration of Chernobyl-derived ^{137}Cs from mussels living in the natural environment.



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