

EFFECTS OF ELEVATED CONCENTRATIONS OF Ca, Zn AND Cd IN SEA WATER
ON THE ACCUMULATION OF ¹³⁷-Cs IN MYTILUS GALLOPROVINCIALIS, LAM.

by

Olga JELISAVČIĆ

Center for Marine Research, "Rudjer Bošković" Institute
Rovinj, Yugoslavia

ABSTRACT:

The present investigation was carried out to determine the effects of elevated concentrations of Ca, Zn and Cd in sea water on the accumulation of ¹³⁷-Cs in Mytilus galloprovincialis, Lam.

The range of Cs concentrations used (100-600 ppm), no visible effects on the accumulation ¹³⁷-Cs in the mussels. The lowest Zn concentrations (0.01, 0.03, 0.1 ppm), enhanced the accumulation of ¹³⁷-Cs, but higher Zn concentrations (1 and 3 ppm) significantly suppressed the ¹³⁷-Cs accumulation in the mussels. The concentration from 0.25 ppm of Cd used slightly enhanced the accumulation of ¹³⁷-Cs (10%), while at higher cadmium concentrations (1, 1.5, 2 and 3 ppm) a marked suppression (-27%) of ¹³⁷-Cs accumulation.

At the same time the zinc from 3 ppm concentration, induced spawning in the mussels: with sperm being released 18 hours after the start of the experiment, and eggs 10 hours later. In all groups range of cadmium concentrations induced spawning (the mussels released sperm first 4 hours, followed by eggs 8 hours).

In the concentration from 3 ppm zinc, mussels started to die, with only 70% surviving at day 15. Early mortality was observed in almost all cadmium groups, and only at 0.25 ppm did all specimens survived until the end of the experiment, (mean survival time was: 10 days at 1 ppm, 5 days at 1.5 ppm, 3.5 days at 2 ppm, and 2.5 days at 3 ppm).

2. Jelisavčić O. - Effects of elevated concentrations of Ca, Zn and Cd in sea water on the accumulation of ^{137}Cs in Mytilus galloprovincialis Lam.

Discussion

Fowler S.W. (IAEA, Monaco): How often did you change your labelled test solution ?

Jelisavčić O.: During the experiment I didn't change medium.

Fowler S.W. (IAEA, Monaco): In light of several recent studies, leaving organisms in static sea water systems can lead to complexation of the ionic constituents by exometabolites excreted by the organisms. Very often these complexed elements are thus rendered unavailable for uptake. The best practice is to change the solution frequently or keep the biomass/water volume ratio very low (comment).

Lapique G. (France) : I would like to know the basic idea of this study, and why these pollutants have been preferred to others.

Jelisavčić O. : The basic idea was to investigate the accumulation of ^{137}Cs in different organisms, within a single species, taking in to account the possible interference of different concentrations of several heavy metals usually present in the environment. We used large concentrations to demonstrate more clearly their interrelationships during accumulation processes.

Guegueniat P. (France) : Do you know of any change in the chemistry of Cd from low concentrations to 3 ppm ?

Jelisavčić O. : We did not find any change in Cd concentration in experimental aqu^ariums, so we think no changes in physico-chemical state of investigated heavy metal take place.

Schulte E.H. (Italy) : Did you feed your animals during the experiment ?

Did you control if algae or bacteria grew on the surface of container walls ?

Jelisavčić O. : No, we did not.

No bacteria control was made; I did control only particles larger than 45 μ .

