Preliminary experiments on uptake and loss of ^{65}Zn by larvae of the shrimp *Leander squilla**

by

ERNST H. SCHULTE

Laboratorio per lo Studio della Contaminazione Radioattiva del Mare, CNEN-EURATOM, Fiascherino La Spezia (Italy)

Uptake of radioisotopes by aquatic organisms may result from water or/and from food. In order to investigate the importance of food in uptake-experiments the uptake-kinetics of ^{65}Zn were studied in *Artemia salina* nauplii serving as food organisms for *Leander squilla* larvae. According to the results nauplii didn't reach an equilibrium with the medium during 4-5 days (death after 5 days, when unfed), because they grew continuously, and therefore the total amount of ^{65}Zn increased continuously in the population.

Accumulation of ^{65}Zn by shrimp larvae from water (without food) and from food *(Artemia salina)* was studied for 4 days (life time of shrimp larvae without food : 4-5 days). The results showed that newly hatched *Leander squilla* larvae accumulated ^{65}Zn rather from food than from water. After 4 days the content of ^{65}Zn in shrimp larvae accumulating ^{65}Zn from water only, amounted only to 10 % of that gained by specimens accumulating the radioisotope from food.

Leander larvae, feeding on *Artemia* nauplii, reached a concentration factor of $\sim$ 300 in radioactive sea water (50 μ Ci/l ^{65}Zn; specific activity : 18.0); while *Artemia* concentrated ^{65}Zn up to $\sim$ 2 700 times already after 12 hours exposure. After 48 hours the concentration factor amounted in shrimp larvae to $\sim$ 1 000 and in *Artemia* nauplii to $\sim$ 9 000 times. These rapid uptake rates may be due to the very fast metabolism and the high relation between surface to volume of small growing organisms like larvae.

In order to eliminate interferences of the amount of ^{65}Zn continuously changing in *Artemia* nauplii during the experiment caused by growth of the specimens, the nauplii were precontaminated separately 24 hours before being used as food for shrimp larvae.

Leander squilla larvae, living in radioactive sea water (25 μCi/l ^{65}Zn, specific activity : 6.5) and feeding on *Artemia* nauplii, precontaminated for 24 hours in an equal concentration of ^{65}Zn, accumulated ^{65}Zn up to $\sim$ 300 times within 24 hours and up to $\sim$ 1 000 times after 48 hours exposure.

In order to maintain the content of radiozinc in the food organisms constant for each day, precontaminated *Artemia* nauplii were used for 24 hours only, and then substituted by new ones. During the experiment (15 days) the specific activity in the medium containing the shrimp larvae, as well as in the solution used for precontamination of *Artemia* nauplii didn't change considerably.

The results showed that the uptake of ^{65}Zn by *Leander squilla* larvae approximately tripled when precontaminated food with a constant level of radioactivity was used, considering the different specific activities used.

During uptake experiments with *Leander* larvae considerable losses in radioactivity were observed in the larvae. This was most probably caused by the moulting of the specimens. In a semilogarithmic plot (CF/time) the uptake-curve will show steps or interruptions which coincide with a moult to the nex larval stage. Hence the observed uptake of the radioisotope is smaller than the expected one. Further experiments studying the influence of moults on the uptake of ^{65}Zn are under way.

Loss experiments with *Leander squilla* larvae which have been labelled with ^{65}Zn for 15 days showed that specimens living in non-radioactive sea water and feeding on non-radioactive *Artemia* nauplii lost $\sim$ 50 % of the radiozinc within 6 days, that has been accumulated partly from water and from food.

* Work carried out under the Association Contract CNEN-EURATOM.

Rapp. Comm. int. Mer Médit., **23**, 7, p. 141 (1976).