

Accumulation of Mirex-¹⁴C in the Adult Blue Crab (*Callinectes sapidus*)

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Carrier-solubilized mirex is absorbed from a disperse aqueous system by juvenile (Lowe et al. 1971), and larval stages (Bookhout et al. 1972) of the blue crab. Since in both cases only whole-body residues were determined, it was thought to be of interest to establish the actual distribution of mirex in the tissues.

Experimental

Adult blue crabs were exposed to mirex-¹⁴C (Mallinckrodt Inc.)¹ having a specific activity of 6.34 mCi/mM in a final concentration of 0.05-0.25 ppb and 0.3% polyethylene glycol 200 in filtered sea water that was diluted with distilled water to give 10 ppt salinity. All tests were conducted in battery jars containing 3ℓ of solution at 25°C. Exposure time ranged from 15 minutes to 16 hours.

Tissue samples were counted in the following manner. Hemolymph serum was obtained by centrifuging the clotted hemolymph. About 0.5 g of hepatopancreas, 0.2 g brain and thoracic ganglion, 0.5 g muscle, and 1.0 ml of hemolymph serum were each added to 2.0 ml Soluene 100 (Packard Instrument Co.) and digested at 40°C overnight. Ten ml of scintillation fluid (5.5 g PPO, 0.1 g dimethyl POPOP, 667 ml toluene, and 333 ml triton X-100) were added with 1.0 ml hexane for clarification, and the amount of mirex-¹⁴C determined with a Packard Tri-Carb Scintillation Spectrometer. Any quenching was compensated for by means of an internal standard.

Results and Discussion

Uptake of mirex-¹⁴C by organs from solutions that contained 0.22 ppb (measured) of mirex-¹⁴C was as follows:

Hemolymph serum (10 crabs)	0.24 - 0.69 µg/ℓ
Muscle (2 crabs)	0.65 - 1.1 µg/kg
Brain and thoracic ganglion (5 crabs)	0.75 - 19 µg/kg
Hepatopancreas (6 crabs)	1.6 - 31 µg/kg

¹ Mention of commercial products or trade names does not constitute endorsement by the U. S. Environmental Protection Agency.

Mirex-¹⁴C is, I believe, absorbed through the gills because the hemolymph serum showed traces of mirex-¹⁴C after 5 minutes of exposure, the hepatopancreas after 15 minutes. No difference was noted between male and female crabs. Response to the toxicant usually progressed through increased aggressiveness to decreased aggressiveness; followed by loss of equilibrium and death, although some crabs recovered. Crabs in 1% Carbowax 200 solutions showed no behavioral differences from those in solutions without it.

The rate of uptake and the distribution of mirex-¹⁴C in the blue crab is similar to that observed for pink shrimp (Penaeus duorarum) exposed to Aroclor® 1254. (Nimmo et al. 1971).

References

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