Mercury levels in tuna remain nearly unchanged since 1971, study says

February 21 2024

Credit: Pixabay/CC0 Public Domain

Tuna is one of the most popular seafoods worldwide. But this protein-rich fish can build up high levels of methylmercury from feeding on contaminated prey, like smaller fish or crustaceans. Despite efforts to reduce mercury emissions into the environment, researchers report in ACS' *Environmental Science & Technology Letters* that levels in tuna appear to be unchanged since 1971. They warn that more aggressive

emission reduction targets are needed to start nudging down tuna mercury levels.

Environmental protection policies have helped reduce mercury pollution from human activities like burning coal and mining worldwide. However, people can still be exposed to methylmercury, and unborn babies and young children are at highest risk of harm.

Methylmercury is a particularly toxic chemical that affects the nervous system and is expected to be the primary form of mercury in reference to tuna contamination. So, researchers set out to determine whether lower atmospheric emissions resulted in lower concentrations of mercury in the oceans, specifically the methylmercury found in food sources that sit at the top of the food chain like tuna.

Anne Lorrain, Anaïs Médieu and David Point worked with an international team of researchers to investigate trends of mercury in tuna over the past 50 years. They also wanted to simulate the impact of different environmental policies on oceanic and tuna mercury levels in the future.

The researchers compiled previously published data and their own data on total mercury levels from nearly 3,000 tuna muscle samples of fish caught in the Pacific, Atlantic and Indian Oceans from 1971 to 2022.

They specifically looked at tropical tuna—skipjack, bigeye and yellowfin. These three species account for 94% of global tuna catches. Because they don't undergo transoceanic migrations, any contamination found in the animals' muscles likely reflects the waters they swim in.

After standardizing the data to allow for comparison across decades and regions, the researchers observed stable tuna mercury concentrations worldwide from 1971 to 2022, except for an increase in the

northwestern Pacific Ocean in the late 1990s. However, over the same period airborne mercury decreased globally.

The team theorized that the static levels in tuna may be caused by upward mixing of "legacy" mercury from deeper in the ocean water into the shallower depths where tropical tuna swim and feed. The legacy mercury could have been emitted years or even decades prior and doesn't yet reflect the effects of decreasing emissions in the air.

The researchers' mathematical models that simulate three progressively more restrictive environmental policies support their theory. The models predict even the most restrictive emission policy would take 10 to 25 years to influence oceanic mercury concentrations, and then drops in tuna would follow decades later.

While the researchers recognize their forecasting does not consider all variables in tuna ecology or marine biogeochemistry, they assert their findings point to a need for a worldwide effort to more aggressively reduce mercury emissions and a commitment to long-term and continuous mercury monitoring in ocean life.

More information: Stable Tuna Mercury Concentrations since 1971 Illustrate Marine Inertia and the Need for Strong Emission Reductions under the Minamata Convention, *Environmental Science & Technology Letters* (2024). DOI: 10.1021/acs.estlett.3c0094

Provided by American Chemical Society