

Mercury Biomonitoring in Antigua and Barbuda

SEAFOOD



Quick Notes

➤ Collaborative Projects

Biodiversity Research Institute (BRI) partnered with Basel Convention Regional Centre-Caribbean (BCRC-Caribbean) on the projects *Fish Mercury Biomonitoring in the Caribbean Region* and the *Development of Minamata Initial Assessments in the Caribbean* (Antigua and Barbuda, Dominica, Grenada, Saint Vincent and the Grenadines). Fish and marine invertebrates were sampled from seven countries including Antigua and Barbuda to help provide important information to fishermen and consumers about the potential risks of mercury exposure associated with human consumption of seafood.

➤ Consumption Guidelines

Meal frequency guidelines by the *Great Lakes Fish Advisory Workgroup* are based on the U.S. EPA reference dose of 1×10^{-4} mg of Hg/kg of body weight/day, a body weight of 132 pounds (60 kg) for an adult female person, and a fish meal size of about 6 ounces (170 grams).



Antigua and Barbuda

Why Use Fish as Bioindicators?

The world's oceans and waterways are key sources of mercury (Hg) found in fish and wildlife. A variety of species are used as bioindicators to provide important information on the impacts of mercury pollution and potential risks related to human health. For example, young fish can reflect rapid changes of environmental mercury loads; long-lived predatory fish may indicate concern for human health.

What are the Risks to Human Health?

Frequent consumption of certain types of seafood* is the primary pathway for methylmercury (MeHg) exposure

in humans. Continuous exposure to MeHg, the organic and more toxic form of mercury, is known to affect neurological development in children and is also linked to cardiovascular disease in adults.

Some larger species of fish and marine mammals may contain mercury concentrations that exceed safe levels for human consumption. This is of particular importance to vulnerable populations including children, pregnant women, and indigenous communities that rely on seafood as a major protein source.

*Seafood includes marine and freshwater fish, shellfish, and marine mammals.

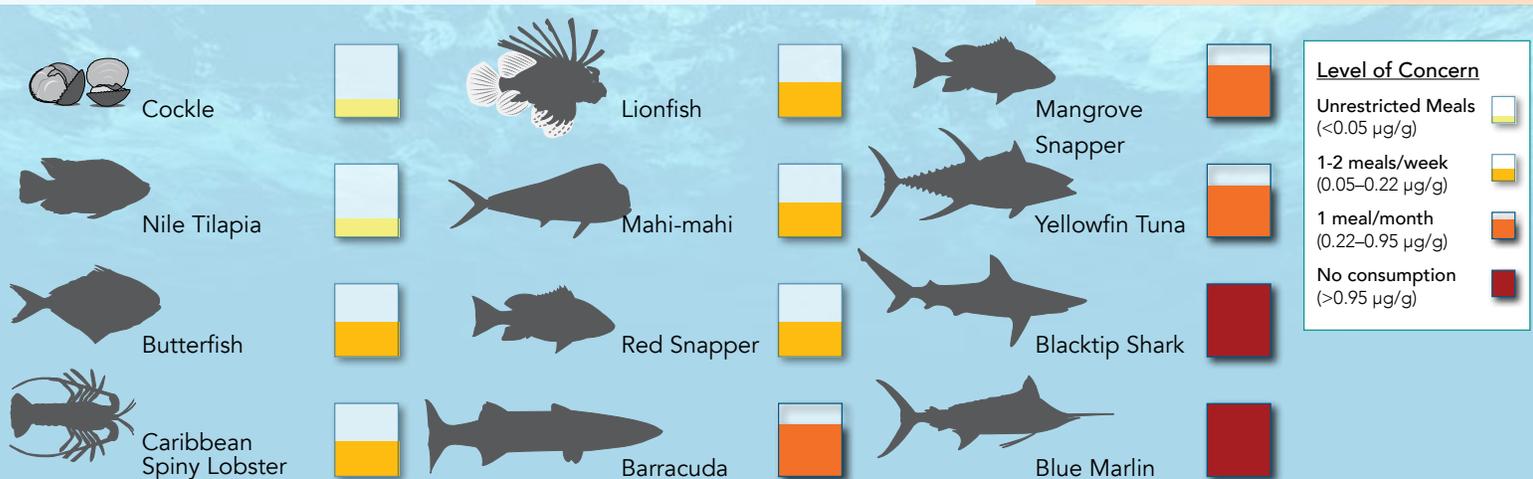


Figure 1. Level of concern for mercury in seafood commonly consumed in Antigua and Barbuda (based on global Hg averages, which may differ from local Hg concentrations). The infographic may not match all focal species sampled for mercury. Consumption thresholds are determined by the Great Lakes Fish Advisory Workgroup.

Mercury Biomonitoring in Antigua and Barbuda

Biomonitoring is the process of assessing the health of organisms and ecosystems and tracking changes over time.

1. Antigua and Barbuda sent Biodiversity Research Institute (BRI) 68 muscle samples from 16 different species of fish and marine invertebrates consumed locally.
2. Samples were analyzed for total mercury (THg) at BRI's Wildlife Toxicology Lab, and results were compiled into a report submitted to government representatives.
3. THg concentrations in seafood from Antigua and Barbuda are considered moderate. Sixty-three percent of samples analyzed had concentrations below the GLC guidelines¹ for human consumption.
4. THg concentrations varied between species along a trophic-level gradient. Predatory fish (e.g., barracuda, blue marlin) have higher mean THg concentrations than lower trophic-level species (e.g., Nile tilapia, Caribbean spiny lobster).
5. There were no significant differences in mean THg concentrations between locations in Antigua and Barbuda where samples were obtained.

¹ Great Lakes Fish Advisory Workgroup. 2007. *A Protocol for Mercury-based Fish Consumption Advice*. 30 pp. (available online at: http://www.in.gov/isdh/files/Mercury_Protocol.pdf).

6. Next steps:

A more detailed assessment of THg concentrations in commonly consumed species in Antigua and Barbuda would help to provide important information to fishers and consumers about the risks associated with consuming different species.

Benefits of Biomonitoring in Antigua and Barbuda

- Biomonitoring efforts build Antigua and Barbuda's capacity for complying with the Minamata Convention on Mercury, which in Article 19 states that "Parties shall endeavour to cooperate to develop and improve... monitoring of levels of mercury and mercury compounds in... fish, marine mammals, sea turtles and birds..."
- Biomonitoring provides information on spatial patterns of mercury exposure in Antigua and Barbuda, including the ability to identify any areas of high exposure representing a risk to human or ecological health.
- Antigua and Barbuda's country specific data was included in a global database of mercury content in seafood and freshwater fish. These additional data will help with understanding the global scope of mercury contamination in food sources.
- The relevant government entities in Antigua and Barbuda were informed of exposure risks from the frequent consumption of seafood by the general public and regular consumers (including vulnerable populations) of seafood. Fish consumption is the primary pathway for mercury exposure in humans.



Cover photo © Mark Summerfield, Alamy Photo. Fish infographic by Erin Covey-Smith. Yellowfin tuna photo (above) © Jeff Muir. © BRI Science Communications Series 2019-05, May 2019

BRI Science Communications

BRI's publications help advance environmental awareness and inform decision makers. For example:

Local, Regional, and Global Biomonitoring:
Updated 2018



Available online: www.briloon.org/hgpubs

Additional Resources



A global network committed to a toxic-free environment:
www.ipen.org



List of Alternatives to Mercury-added Products (available in 2019):
www.unep.org

Related Web Links

- Minamata Convention on Mercury: www.mercuryconvention.org
- United Nations Development Programme: www.undp.org
- United Nations Environment: www.unep.org/chemicalsandwaste
- United Nations Industrial Development Organization: www.unido.org
- World Health Organization: www.who.int



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region

www.bcrc-caribbean.org

Facebook: Basel Convention Regional Centre – Caribbean



BIODIVERSITY RESEARCH INSTITUTE
www.briloon.org/hgcenter