Levels of Total Mercury and Methylmercury in Fish Tissues of the Billings Reservoir between 2014 and 2015, Sao Paulo, Brazil

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1. OBJECTIVES

This study was carried out to estimate the levels of Total Mercury and Methylmercury in fish samples (*Hoplias spp.*) of the Billings Reservoir located in Sao Paulo, Brazil between 2014 and 2015. Previous monitoring studies showed the presence of total mercury in sediments.

2. MATERIAL AND METHODS

2.1 Study Area

The Billings reservoir located in the metropolitan region of the city of São Paulo was selected for this study. Fish samples (*Hoplias spp.*) for methylmercury determination were collected (*EPA - Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories - Volume 1 - Fish Sampling and Analysis - Third Edition*) in five different sampling sites distributed were chosen as an exploratory study (Figure 1).

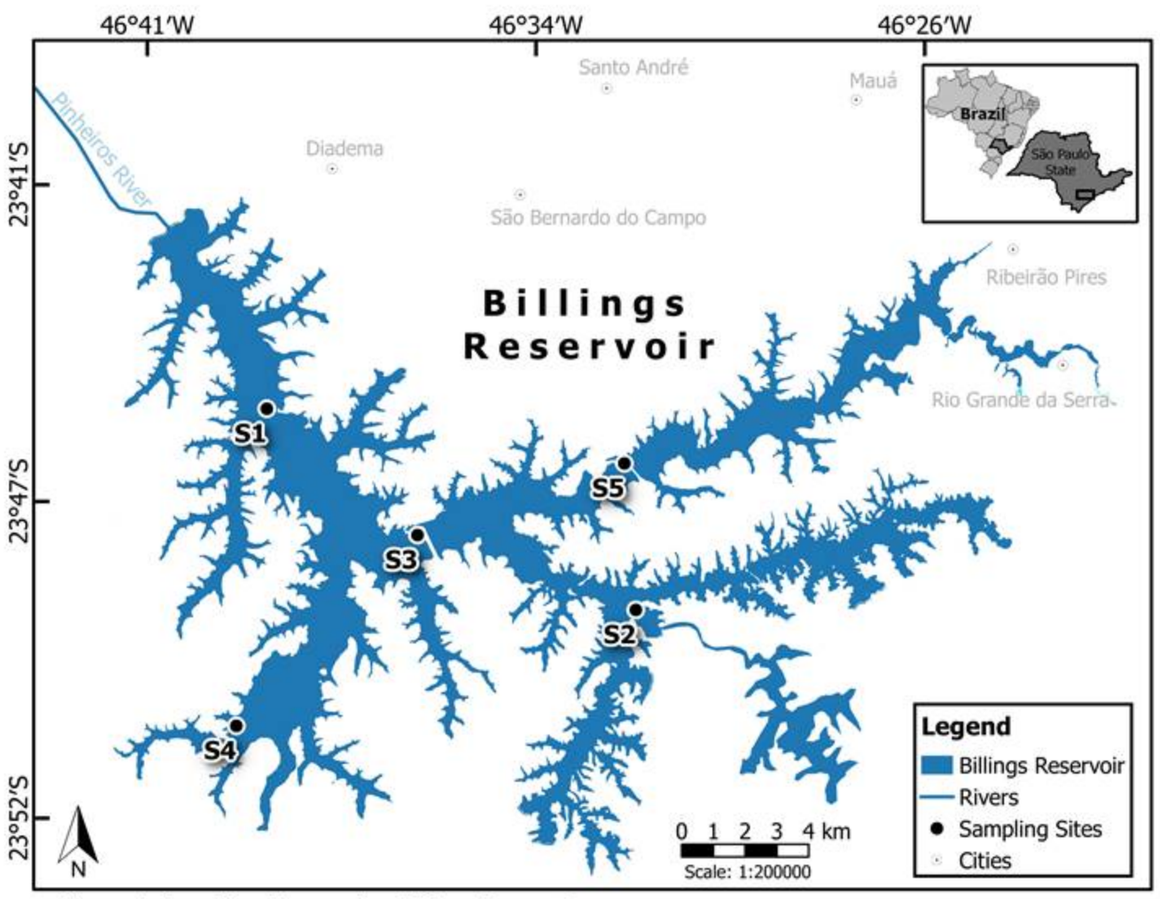


Figure 1. Sampling Sites on the Billings Reservoir.

2.2. Methods for Total Hg and Methylmercury in Fish Tissues

In this study method US FDA: Elemental Analysis Manual: Section 4.8: HPLC-ICP-MS Determination of Methylmercury and Total Mercury in Seafood was used. Total Mercury was determined by Milestone's DMA-80 is a direct mercury analyzer. See figures below for CH_3Hg method.

Figure 2. Biometry

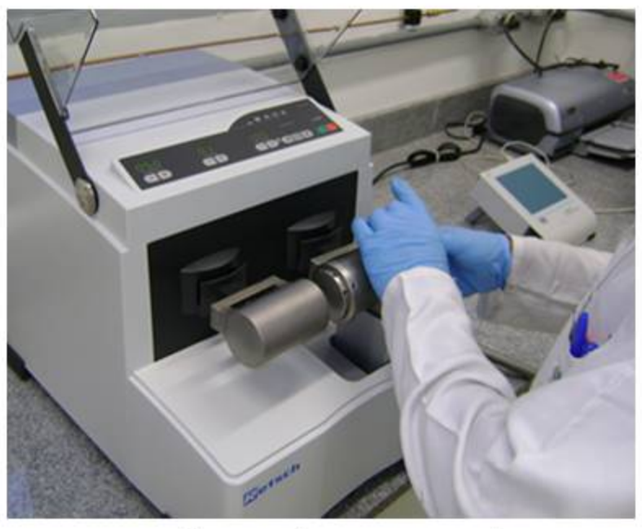


Figure 3. Retsch (Germany) - Cryogenic Grinding.

Figure 4. Ground Fish (<5 µm).

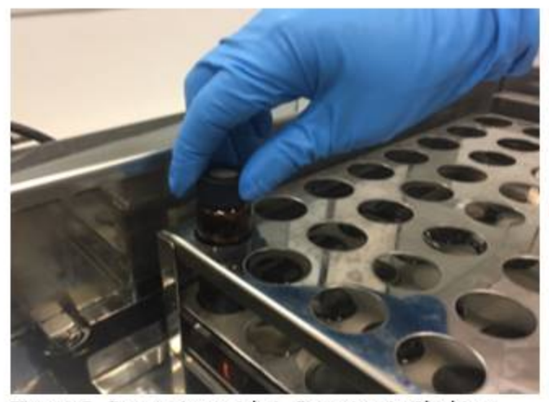
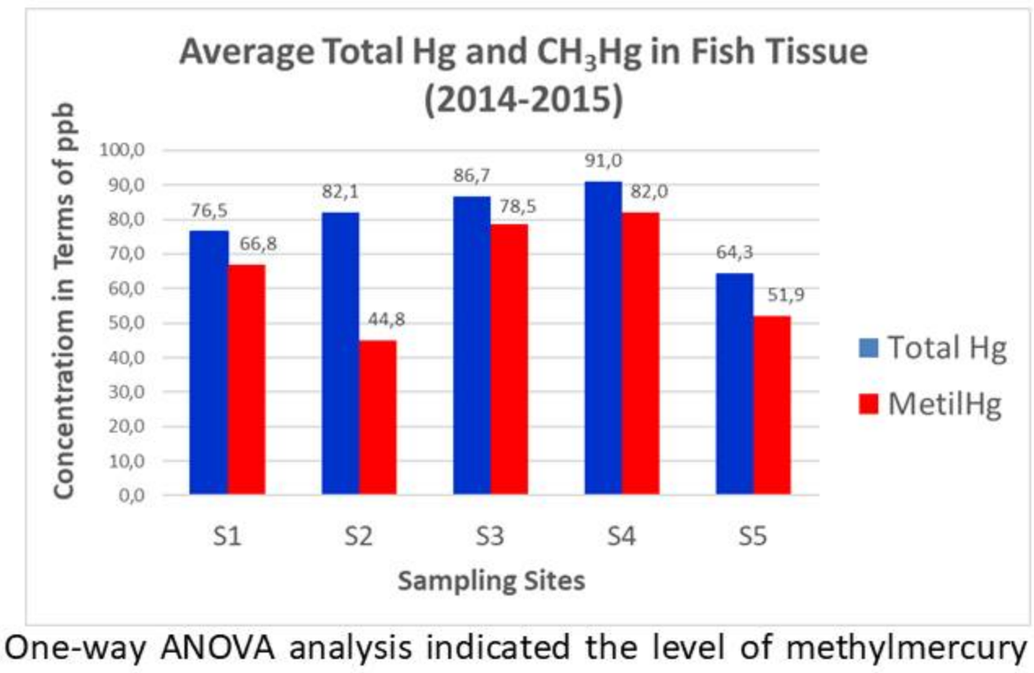


Figure 5. Extraction with L-Cysteine in Shaking Water Bath 60 ± 4 °C (2 hours).

Figure 6. High performance liquid chromatography (HPLC) connected to Agilent 8800 Triple Quadrupole for Mercury Speciation. Phenomenex Sinergy Hydro-RP (C-18) 150 x 4,6 mm, 4 µm) Column was used.

3. RESULTS AND DISCUSSION



One-way ANOVA analysis indicated the level of methylmercury were statistically different among sampling sites ($p < 0.05$). The overall concentrations showed site 5 with lowest concentration of Total Hg and CH_3Hg due to low anthropogenic influence in that area. Furthermore, this exploratory study demonstrated that 81% -91% of the total Hg present in fish samples (*Hoplias spp.*) is in the form of CH_3Hg.

REFERENCES

CETESB. **Serie Relatorios**. Available <http://cetesb.sp.gov.br/publicacoes-relatorios/> CETESB, São Paulo, 2020. ISBN 978-65-5577-012-4.

US FDA: Elemental Analysis Manual: Section 4.8: HPLC-ICP-MS. **Determination of Methylmercury and Total Mercury in Seafood**. Version 1 (June 2008).