

## Bioaccumulation of Mercury in Different Population Of Fish from the Bolivian Amazon

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**Abstract:** Three different populations of four fish species were collected in the Mamoré, Itenez and Madre de Dios river basins from the Bolivian Amazon. Fish species used for this study are the migrant species *Colosoma macroponum*, and *Pseudoplatystoma fasciatum* and the sedentary species: *Pygocentrus nattereri* and *Cichla monoculus*. A regional comparison of the Hg bioaccumulation in flesh according to length, weight and age (otoliths or vertebrae) in these three major tributaries of the Madeira River is presented.

For each population of the different species Hg concentration in flesh vs. length and age were modelled according to linear or curvilinear correlations. For *Cichla monoculus*, a linear model is used with statistical comparison of regression lines between locations. For the three other species presenting a curvilinear Hg accumulation according to length, quadratic polynomial regression with indicator variable is used for comparison of populations from the different locations. Evaluation of the shape and elevation of the curve and estimation of the mean Hg concentration corresponding to defined standard length are used to make the regional comparisons.

The herbivore *Colosoma macroponum* (5-124 ng.g<sup>-1</sup> w.w.) is the only specie showing a notable influence of growth rates on Hg bioaccumulation. Difference in growth rates between the Itenez and the Mamoré Rivers explain why older specimens have the same Hg accumulation in the three locations even if young specimens show different Hg concentrations. This convergence in Hg bioaccumulation in old specimens is mainly due to the difference in growth rates between populations. Populations of *Pseudoplatystoma fasciatum* (23-583 ng.g<sup>-1</sup> w.w.) have the same growth rate but the populations from the Madre de Dios contains more Hg than populations from Mamoré and Itenez. *Cichla monoculus* (30-255 ng.g<sup>-1</sup> w.w.) and *Pygocentrus nattereri* (12-398 ng.g<sup>-1</sup> w.w.) show regular growth rates, with a higher growth rate for the Madre de Dios populations. For *Cichla monoculus* Hg concentrations in flesh follow the sequence Mamoré>Madre de Dios>Itenez and for *Pygocentrus nattereri*: Madre de Dios>Mamoré>Itenez.

With this study we demonstrate the importance to follow growth rates for the interpretation of Hg accumulation in different fish populations from the Amazon. Quadratic polynomial regression modelization appears to be a very useful tool to interpret Hg bioaccumulation in commercial fish populations across the Amazonian region. Globally, fish populations from the Mamoré contain more mercury than the populations from Madre de Dios and Itenez river basins, but the concentrations measured in all these populations are lower than Hg concentrations observed in populations of the same species in Tapajós and Negro river basins from the Central Amazon.

**Key words:** mercury, Amazon, fish, growth, diet