LEVELS OF MERCURY AND METHYLMERCURY IN FISH (*PROCHILODUS MAGDALENAE)* FROM SWAMP AYAPEL (COLOMBIA)

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OBJECTIVE.

Assess the levels of total mercury and methylmercury in Bocachico (Prochilodus Magdalenae) from the Ayapel swamp , gas chromatography with electron capture detector and direct mercury analyzer (GC -ECD and DMA), to assess the potential risk associated health.

MATERIALS AND METHODS

Stratified random sampling Prochilodus magdalenae species (Figure 2) was performed. forty specimens were selected according to the weight and size. The total mercury and methylmercury, is determined by a direct mercury analyzer (DMA) and gas chromatography with electron capture detector (GC-ECD), respectively. Methylmercury and total mercury were determined using the PNUMA / FAO / IAEA methods (1) and EPA 7473 (2)

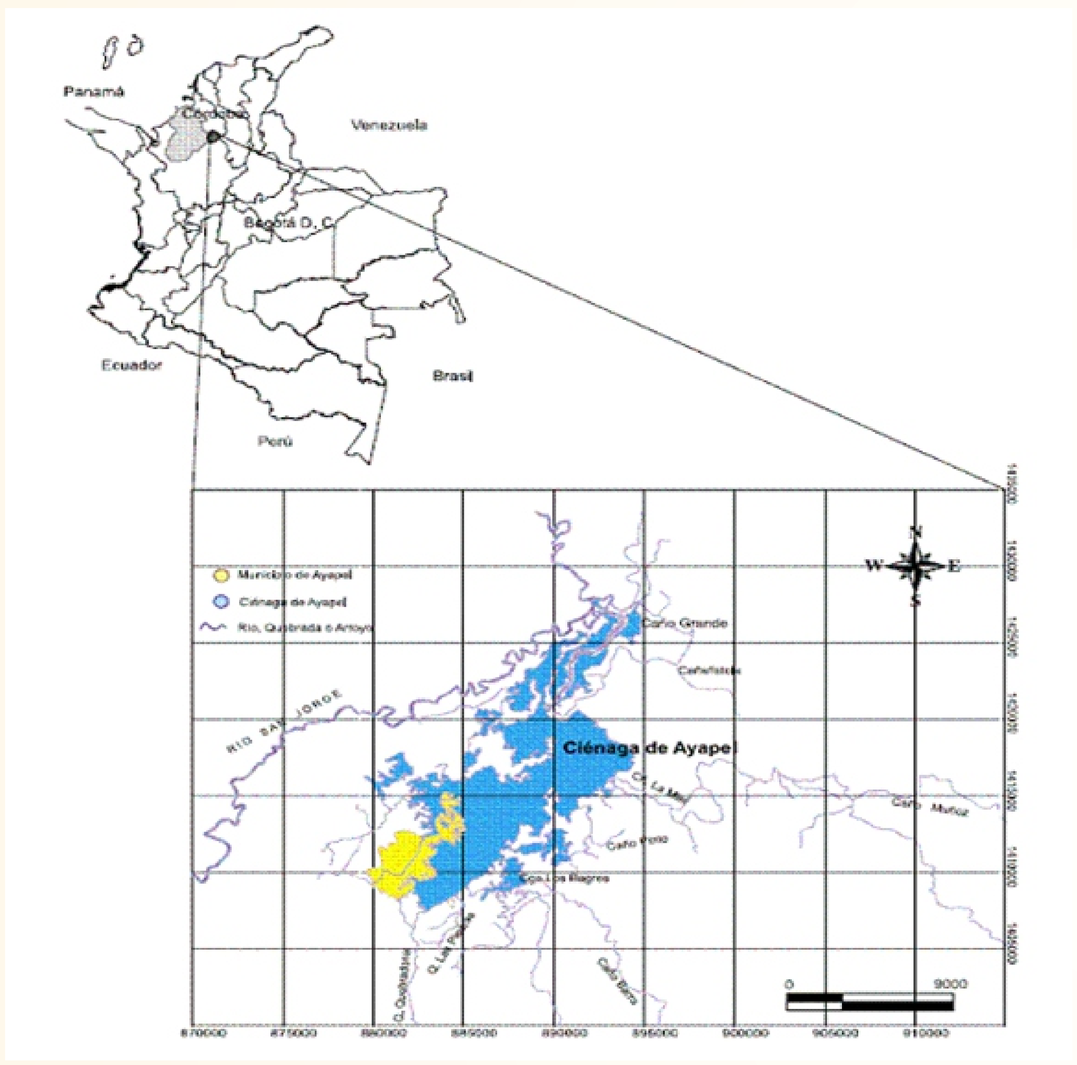

Figure 1: Study area (3).

Figure 2: *Prochilodus magdalenae*

Table 2. Mercury and methyl mercury levels (µg/kg)

	Length cm				Weight g			
	25.0 to 30.0		30.5 to 40.0		175 to 295		296 to 420	
	T-Hg	MeHg	T-Hg	MeHg	T-Hg	MeHg	T-Hg	MeHg
Average	108.60±38.78	79.99 ±41.04	230.35±49.24	189.34±33.84	108.60±38.78	79.99 ±41.04	230.35±49.24	189.34±33.84
n	24		16		24		16	

Table 3. Minimum and maximum values for HI by Hg -T and Me- Hg in children.

IR g	BW kg	Minimum value	Minimum value	RFD $\mu g.kg^{-1}day^{-1}$	$\bar{X}$ HI Adults	HI RF Adults
148	34.5	1.73	12.97	0.1	6.43	1.00

Where:
IR: Ingestion race
BW: Body weight
RfD: Reference Dose
HI: Hazard Index

Table 4. Minimum and maximum values for HI by Hg -T and Me- Hg in adults.

IR g	BW kg	Minimum value	Minimum value	RFD $\mu g.kg^{-1}day^{-1}$	$\bar{X}$ HI Adults	HI RF Adults
148	60	0.99	7.40	0.1	3.70	1.00

RESULTS

T-Hg concentrations are between 50.7 to 302.3 mg kg^{-1} and Me-Hg between 40.28 and 243.29 mg kg^{-1}. Relations Me-Hg /T-Hg range from 0.46-0.95 increasing depending on the size and weight of the fish. Hazard Indices (HI) for children are between 1.73 to 12.97 and 0.99 to 7.40 adult, for T-Hg and Me-Hg respectively. Twenty-five percent of the analyzed samples exceed the limits established by WHO (200 mg kg^{-1}) for T-Hg in vulnerable groups such as pregnant women, individuals under 15 years, and frequent fish consumers (4). There are significant differences between the concentrations of T-Hg and Me-Hg compared to the sizes and weights of fish ($p<0.05$).

Risk assessment, based on the HI indicates that consumption of 0.148 kg of fish per day increases the risk to the health of consumers frequent *Prochilodus magdalenae.* HI of both pollutants exceed the unit indicating the willingness of these pollutants poisoning. Also they indicate the high risk health to the most vulnerable population (children) who are at high risk. Should be more intensive studies of environmental health by Colombian control authorities.

CONCLUSIONS

The population most affected by consumption of *Prochilodus magdalenae* are children, because that concentrations exceed the limit established by WHO (200 mg kg^{-1}) for total mercury.

HI, for adults and children, exceed unity, indicating the willingness of poisoning by these contaminants in frequent consumers of *Prochilodus magdalenae.*

ACKNOWLEDGMENTS

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