MERCURY LEVELS AND TROPHIC INTERACTIONS AMONG SHARKS OF THE COLOMBIAN PACIFIC AND RISKS TO HUMAN HEALTH

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INTRODUCTION

• Sharks are the top predators of marine ecosystems and are responsible for regulating the TOP-DOWN processes (Baum and Worm, 2009).

• Main threats of sharks populations (Duivy et al., 2014):
  - Finning
  - Habitat degradation
  - Overfishing
  - Artificial fishing

• Fins have a high cost and strong demand in the Asian markets, specially in Hong Kong, whose traditional dish is the shark fin soup (Clarke, 2004).

• Colombia is the 3rd country that emits more Hg to the ocean mainly by gold mining activities in the Colombian Pacific coast (1), which can contribute to the bioaccumulation and biomagnification (2) of this metal in the tissues of sharks (Trystram, 2017).

OBJECTIVES:

1) Identify the concentrations of mercury in fins and muscle, and the differences between tissues.
2) Identify if there is any risk to human health by consuming the fins of these species.
3) Analyze the trophic ecology using stable isotopes δ13C, δ15N and Hg.

RESULTS AND DISCUSSION

- High overlap in coastal habitats due to the high carbon values. It seems that most of these sharks are juveniles.
- Coasts habitats contain higher values of δ13C than pelagic habitats (Chouvelon et al., 2012).
- A. pelagius and S. lewini tend to be pelagic in their adult stage (Hobday et al., 1993).
- Low trophic levels for all the species in comparison of its adults stages suggests also that the individuals are juveniles.

PHASE 1: Sampling

PHASE 2: Laboratory

PHASE 3: Analysis of data

METHODOLOGY

• Sampling: Conducted by Natalia Véliz in the port of Barranquilla, Colombia.

• Confiscation of illegal catches: 135 fins and 45 muscles 2009-2013

• Samples preparation: dried, pulverized and delipidated

• Total mercury (Hg) Analysis

• Atomic absorption spectrometer (AAS-250)

• Isotopic Analysis (isotope mass spectrometer Isotopic analyser)

• Conversion of data

• One way ANOVA (Differences between species)

• Two way ANOVA (Differences between tissues)

• Risk Evaluation: Fins and Tissue

• A. pelagius and S. lewini, being the most threatened species in the Colombian Pacific (Caballero et al., 2012), have the highest [Hg] in fins.

• Muscle contains Tissue, which binds strongly with Hg (Pethybridge et al., 2010)

• Concentrations of Hg vary according to species and tissue.

• The consumption of any of the tissues of A. pelagius and S. lewini can be harmful to human health.

• These results suggest that species were captured in coastal areas and fed of low trophic level preys.

CONCLUSIONS

• There is a risk when consuming fins and muscle of A. pelagius and S. lewini.
• Children are the most vulnerable when consuming these shark tissues.
They consume 3-4 times more food in proportion to their body size than adults (USEPA, 2008).
• Muscle is the tissue that presents the greatest risk for human health.

RECOMMENDATIONS:

- Avoid the consumption of these predators since the consumption of both muscle and fins can generate risks for human health.
- Have extra variables such as sex or the size of the individual.
- Identify the exact location of each individual’s extraction.

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REFERENCES:

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