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Mercury Speciation and Functional Gene Markers in Amazonian River Biofilms

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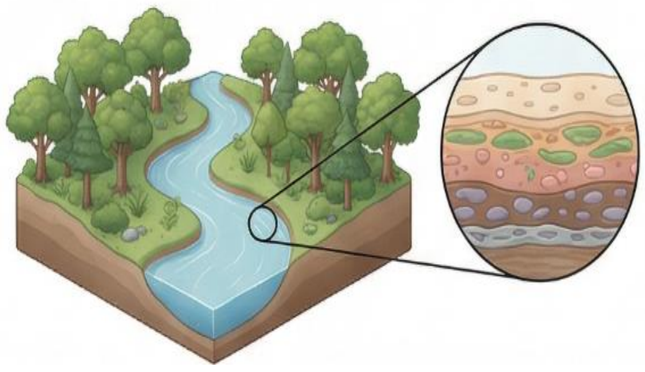
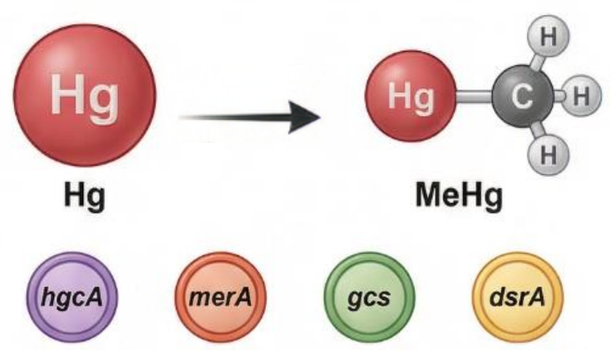
Introduction

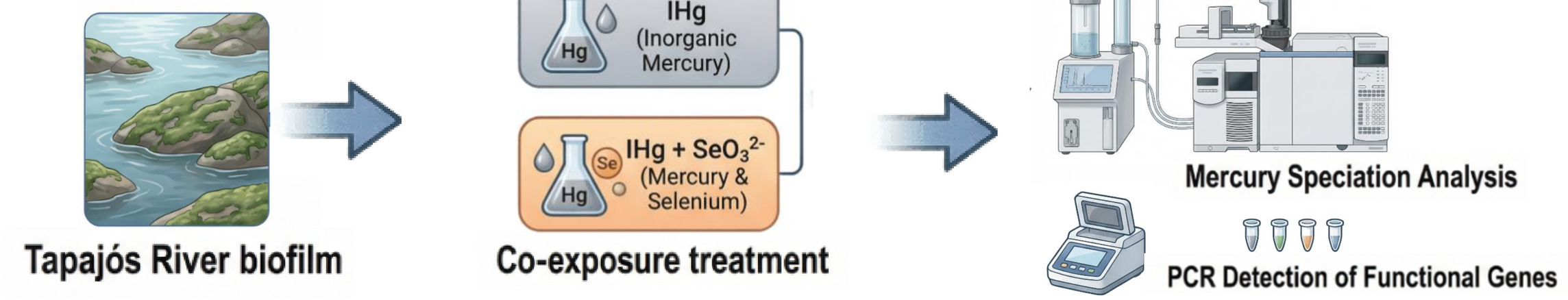




Mercury transforms into toxic MeHg, and river biofilms act as hotspots controlling Hg cycling.

This study evaluates Hg speciation and functional genes under IHg and IHg + SeO_3^{2-} exposure.

Methodology



Results and Discussion

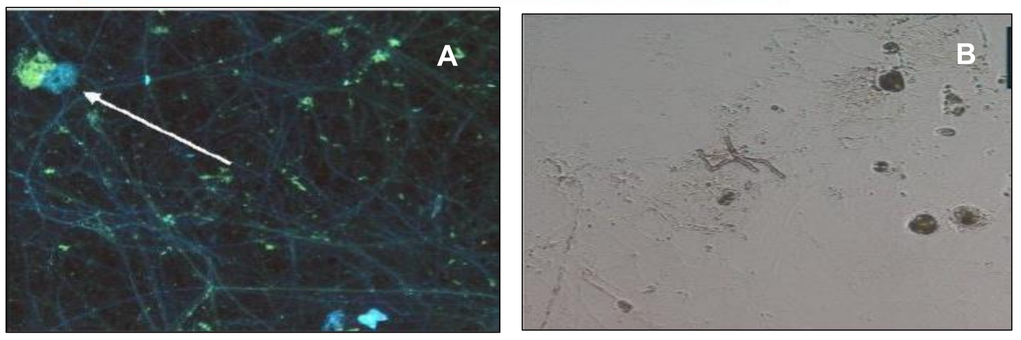


Figure1 . EPS-rich biofilm structure showing filamentous matrix (A, DAPI) and associated particles within the biofilm (B, bright-field**).**

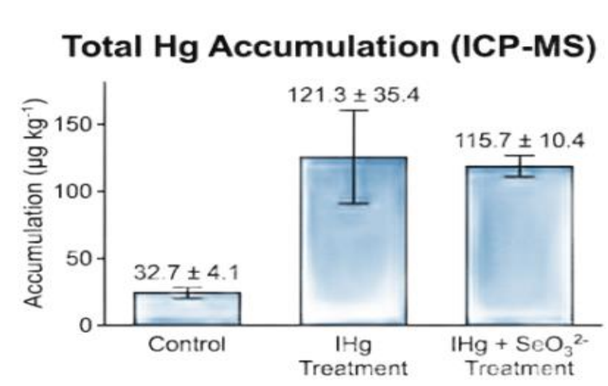


Figure 2. Total Hg concentration (ICP-MS) showing increased Hg in IHg treatments and comparable total Hg under IHg + SeO_3^{2-} exposure.

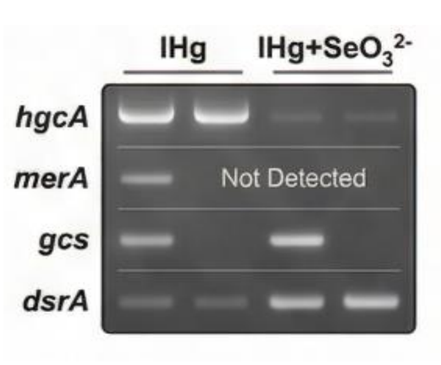


Figure 3. Qualitative PCR Analysis of Hg-Related Functional Genes in Biofilm Treatments

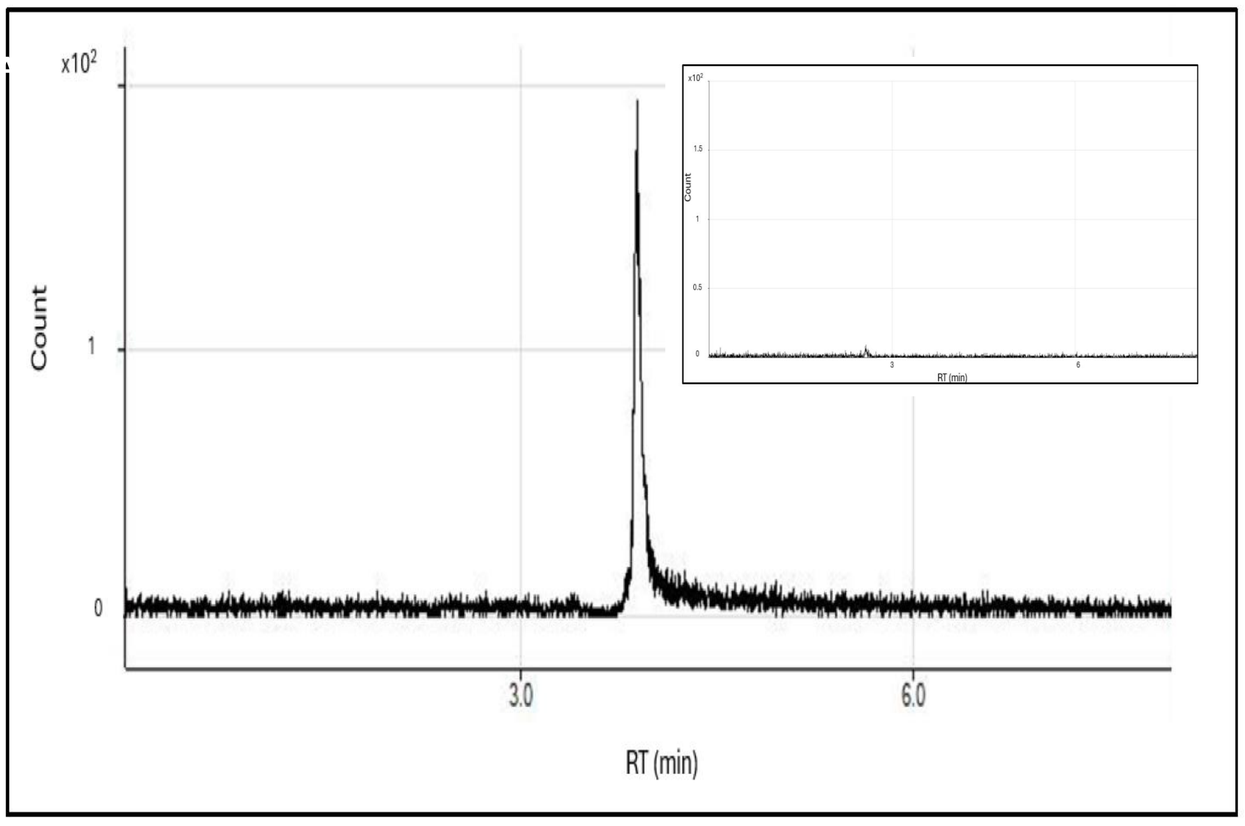


Figure 4. Chromatograms showing Hg speciation in biofims. A pronounced IHg peak is observed in the Hg-only treatment, while the inset chromatogram (Se-only condition) shows no detectable Hg species.

"Extracellular Polymeric Substance (EPS)-rich biofilms retained Hg, while Se reduced methylation potential, suggesting lower MeHg risk."

Conclusion

Selenium stabilized Hg in EPS-rich biofilms, suppressing methylation potential without reducing total Hg. This suggests a protective role of Se in mitigating methylmercury risk in Amazonian ecosystems

Acknowledgments

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