MERCURY ANALYSIS IN MANAGED ARAPAIMA (ARAPAIMA GIGAS) FROM TWO AREAS OF THE MIDDLE SOLIMÕES: ONE NEAR GOLD MINING AND ONE REMOTE

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RESUMO

Mercury contamination in aquatic ecosystems poses a significant threat to the health of ecosystems and human populations reliant on fish consumption. In the Amazon basin, gold mining activities are major source of mercury pollution, leading to elevated levels of mercury in fish species, including the Arapaima (*Arapaima gigas*), a large predatory fish of great ecological and socio-economic importance. Understanding the distribution and concentration of mercury in Arapaima populations is crucial for assessing the risks posed to human health and for implementing effective management strategies. This study focuses on two fish management areas in the Middle Solimões region of the Amazon, located at different distances downstream from gold mining activities. The names of the fishing agreements have been omitted to preserve their identities. Group A is situated far from mining sites, while group B is closer, potentially exposing their catch to higher mercury levels. This study aims to investigate whether there was mercury in the Arapaima in these locations, the average level, compare the mercury concentrations in the fish of these two areas and explore the factors influencing mercury accumulation in these fish. Muscle samples were collected in the field, subsequently freeze-dried at the Mamirauá Institute for Sustainable Development, and analyzed for mercury content at São Paulo University (USP). The average mercury concentration in Arapaima meat samples was 2.1 µg/g (± 1.0), exceeding the maximum tolerable limit of 1 µg/g set for predatory fish in Brazil. Surprisingly, the area farther downstream from the gold mining activity, Group A, had significantly higher mercury levels (2,7 ± 0,9) compared to the closer area, from Group B (1,4 ± 0,3; $p < 0.01$), contradicting the expectation that proximity to mining areas increases mercury concentration. This result may be due to the location of the downstream area closer to the river mouth, where the mercury accumulation could be higher. Additionally, a marginally significant increase in mercury concentration was observed in larger Arapaima individuals ($t = 1,9$; $p = 0,09$), with those above 170 cm and 45 kg showing higher concentrations. This finding, however, may be influenced by the limited sample size of this initial study. Overall, this study highlights the importance of monitoring mercury levels in Arapaima and suggests the need for further research to understand the complex factors influencing mercury distribution in Amazonian ecosystems.

PALAVRAS-CHAVE: sustainable management, heavy metals, fishing, one health, food security

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