

Painel

Poluição de Ambientes Aquáticos

45 - METALS CONTENTS AND HUMAN CONSUMPTION IN FISH SPECIES FROM THE OLARIA RIVER SYSTEM (CANANEIA, SÃO PAULO, BRAZIL)

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INTRODUCCION

The human disturbances in coastal aquatic ecosystems can promote imbalances in fish health and be a risk, since fish can accumulate metals about the establish limits for human consumptions. The Olaria River System (ORS) is a small waterway that flows in the southern area of the Cananeia estuary (São Paulo, Brazil). Passing through the urban center of the Cananeia city, ORS eventually becomes contaminated with untreated domestic sewage (Silva et al., 2023). The aim of this study was to determine metals contents such as Pb, Cd, Ni, Cu, Zn and Mn in muscle tissue of fish species from the ORS.

METHODS

The surface water and fish sampling were made in August/October 2022 and April/June 2023, in the inner part of the ORS. In the water, temperature (T) was measured using a digital thermometer. Dissolved Oxygen (DO) were assessed by Winkler method (Grasshoff et al., 1983). pH was measured in accordance with Amiot & Chaussepied (1983). Salinity (S) was determined by inductive method using a Beckman® salinometer (RS-10). P-PO₄³⁻ was determined spectrophotometrically (Grasshoff et al., 1983). N-NO₃⁻ and N-NO₂⁻ were determined using a BranLuebbe® AutoAnalyzer II. N-NH₄⁺ was obtained following Solórzano (1969). Fish were collected using nets (0.40 mesh) lasting 1 hour and a total of 25 fish were obtained: *Spherooides testudineus* (n=5), *Diapterus rhombeus* (n=10), *Mugil curema* (n=4), *Mugil liza* (n=5) and *Centropomus undecimalis* (n=1). Fish

were identified (Figueiredo & Menezes, 1978) and dissected for muscle extraction. Tissues were kept at -20°C until metal analysis by Inductively Coupled Plasma Mass Spectrometer (Cd111, Pb208, Cu63, Mn55, Ni60) or Atomic Absorption Spectrometry (Zn). Results were expressed on wet weight basis. Limit of detection (LOD) were 0.143 ng g⁻¹, 0.016 ng g⁻¹, 0.574 ng g⁻¹, 0.550 ng g⁻¹, 0.005 ng g⁻¹ and 0.020 ng g⁻¹ to Pb, Cd, Cu, Mn, Ni and Zn, respectively.

RESULTS AND DISCUSSION

Considering the established limits for water quality (Class 1) by the Brazilian environmental legislation (Conselho Nacional do Meio Ambiente – CONAMA, 2005), in all sampling periods were observed DO levels below 5 ml L⁻¹ (Ago: 1.35 5 ml L⁻¹; Oct: 1.82 5 ml L⁻¹; Apr: 3.01 5 ml L⁻¹; Jun: 4.54 mL L⁻¹). In general, N-NH₄ levels (Ago: 161.69 µM; Oct:132.54 µM; Apr: 104.42 µM; Jun: 1.66 µM) and P-PO₄ (Ago: 13.95 µM; Oct:11.30 µM; Apr: 2.37 µM; Jun: 0.50 µM) contents were indicative of polluted sites, as well N-NO₂ levels (Ago: 3.19 µM; Oct: 2.00 µM; Apr: 6.89 µM). On the other hand, N-NO₃ had values below de established limit of 6.45 µM (Ago: 6.09 µM; Oct: 3.24 µM; Apr: 9.94 µM; Jun: 1.73 µM). As expected, salinity and pH values were indicative of continental influence in the inner area of the ORS (Salinity - Ago: 6.68; Oct: 1.71; Apr: 1.55; Jun: 19.07 / pH - Ago: 7.11; Oct: 7.21; Apr: 7.22; Jun: 7.11).

Regarding metals levels, the data obtained did not indicate a potential risk, since the values were

above the permissible limit established for fish by FAO/WHO (Cu: 30 mg Kg⁻¹; Pb: 1 mg Kg⁻¹; Cd: 0.2 mg Kg⁻¹; Zn: 30 mg Kg⁻¹). Mn and Ni were not compared since there is no found reference values in fish for these metals. Below, are shown the mean and standard deviation of the found values. Cd - *S. testudineus*: 0.176 ng g⁻¹/ *D. rhombeus*: 0.232±0.174/ *M. curema*: 0.344±0.035 ng g⁻¹/ *M. liza*:

CONCLUSION

The inner region of the Olaria River system has characteristic of polluted site, that can be associated with untreated domestic sewage disposal in this region. However, a priori, the evaluated metals (Cd, Pb, Cu, Mn, Ni, Zn) did not indicate a food risk, since the levels found in the muscle tissue of the fish species were below the limits permitted for human consumption. However, we recommend checking the daily intake according to individual weight to ascertain the actual dietary risk.

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