

GEOCHEMISTRY OF FAECAL STEROLS IN A CONTAMINATED ESTUARY IN SE BRAZIL

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Domestic sewage contamination in Iguaçú River and Sarapuí Channel, located in the north-western sector of Guanabara Bay, Rio de Janeiro, was investigated by using sterols and elemental composition (C and N) of organic matter in suspended particles and sediments, and ancillary data. For determination of sterols gas chromatography/mass spectrometry was applied. Water/suspended particles (7 stations) and sediments (10 stations) were collected in March and September/2004 along a transect initiated 6 km up the river mouth and extending 4 km into the bay. An additional sample of bulk sewage was also collected at a sewage treatment plant close to the studied area.

Faecal sterols predominate over phyto-sterols in suspended matter and sediments. Among the 14 sterols quantified, coprostanone (5β -cholestan- 3β -one), epicholestanol (5α -cholestan- 3α -ol) and coprostanol (5β -cholestan- 3β -ol) were found in higher concentrations (1.3 to 6.0 mg gC⁻¹). In general, there is a decreasing gradient from the river to the bay in sterol concentration, associated with the location of diffuse sewage sources. Seasonal variation also influenced sterols distribution. The presence of epicholestanol (reported here for the first time in Guanabara Bay) in relatively high concentrations in suspended matter and sediments (as well as in raw sewage), the differences in sterol composition between raw sewage and suspended matter/sediments, and the values obtained for selected sterols source-diagnostic ratios, suggested the occurrence of significant microbial alteration of organic matter, with implications on the geochemistry of sterols.

The study proved elevated degradation of environmental condition in the region and indicated that system dynamics as well as pre- and post-depositional processes must be carefully taken into consideration for a comprehensive evaluation of sewage derived contamination in the system.