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NEUTRON ACTIVATION ANALYSIS APPLIED TO THE DETERMINATION OF HEAVY METALS AN

OTHER TRACE ELEMENTS IN BOTTOM SEDIMENTS FROM SEPETIBA BAY, RIO DE JANEIRO

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Sepetiba Bay, located about 60 km south of the city of Rio de Janeiro, Brazil, is one of the most imp
fishery areas in the State of Rio de Janeiro. A large harbor brought up a lot of industrial investment in that area.
the 1970's, the Sepetiba region has undergone fast industrial expansion, leading to high levels of pollution by m
For the last two decades, an industrial park composed of about 400 industrial plants, basically metallurgical,
established in the Sepetiba bay basin, releasing its industrial waste either straight into the bay or through local
Contamination in the bay for some metals, such as zinc, has already exceeded acceptable levels. Some authors
studied the distribution and behaviour of heavy metals in the bay, but only few elements have been focused (Cd, C
Fe, Mn, Ni, Pb and Zn). This is due mainly to the fact that the analytical technique most employed has been a
absorption spectrometry, which is not a multi-elemental technique. In this work, Instrumental Neutron Activ
Analysis (INAA) was applied to the determination of the elements As, Ba, Br, Ce, Co, Cr, Cs, Eu, Fe, Hf, La, Lu
Rb, Sc, Sm, Ta, Tb, Th,U, Yb and Zn in 28 bottom sediment samples from Sepetiba bay. Samples were irradiated
research nuclear reactor IEA-R1 of IPEN. The measurements of the induced gamma-ray activity were carried ou
GMX20190 hyperpure Ge detector (Canberra). The multichannel analyser was a 8192 channel Canberra S-100 plu
card in a PC computer. The accuracy and precision of the method were verified by the analysis of National Institu
Standards and Technology (NIST) Standard Reference Material (SRM) 2704 Buffalo River Sediment and the re
presented standard deviations and relative errors lower than 10%. The elements As, Co, Cr, Fe and Zn presented si
behavior, showing higher concentration along the northern coast of the bay, in a depositional area of fluvial sedim
These results indicate that their main source is the industrial park. Rare earth elements, Sc, U and Th are prob
associated with the neighboring lithology, presenting a natural dispersion in the bay. Ba and Hf presented h
concentrations along the northwest coast of the bay, a marine sediment depositional area, indicating that the
associated with the marine influence.