

Assessment of heavy metal contamination in core sediment samples in Gulf of Izmir, Aegean Sea, Turkey (by inductively coupled plasma-optical emission spectrometry (ICP-OES))

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Abstract

Heavy metal and radionuclide analysis studies are crucial in explaining biotic and abiotic interactions in ecosystems. This type of analysis is highly needed in environments such as coastal areas, gulfs or lakes where human activities are generally concentrated. Sediments are one of the best biological indicators for the environment since the pollution accumulates in the sediments by descent to the sea floor. In this study, sediments were collected from the Gulf of Izmir (Eastern Aegean Sea, Turkey) considering the accumulated points of domestic and industrial wastes to make an anthropogenic pollution analysis. The core sediments had different depths of 0.00-30.00 m at four different locations where Karsiyaka, Bayrakli, Incialti and Cesmealti in the Gulf of Izmir.

The purpose of the study was determining Cd, Co, Cr, Cu, Mn, Ni, Pb, and Zn concentrations in the drilling samples to assess their levels and spatial distribution in crucial areas of the Aegean Sea by inductively coupled plasma-optical emission spectrometry (ICP-OES) with microwave digestion techniques. The heavy metal concentrations found in sediments varied for Cd: <N.D., Co: 3.45-20.62, Cr: 36.07-203.8, Cu: 11.52-51.55, Mn: 163.4-795.9, Ni: 20.45-143.8, Pb: 3.69-18.72, and Zn: 83.33-177.2 [U+F06D] g/g. The results were compared with the average abundances of elements in the Earth's crust, and accordingly the sediments were relatively unpolluted. The potential ecological risk assessment was not found in Cesmealti while Karsiyaka and Inciralti had higher levels in parts of investigating heavy metals.

Keywords: Gulf of Izmir, heavy metals, ICP-OES, pollution, sediment.