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Identification of hazardous nanoparticles present in the Caribbean Sea for the allocation of future preservation projects (Article)

Silva, L.F.O.^a [✉](#), Lozano, L.P.^a, Oliveira, M.L.S.^{a,b}, da Boit, K.^a, Gonçalves, J.O.^c [✉](#), Neckel, A.^d [🔍](#)^aDepartment of Civil and Environmental, Universidad de la Costa, CUC, Calle 58 # 55–66, Barranquilla, Atlántico, Colombia^bDepartamento de Ingeniería Civil y Arquitectura, Universidad de Lima, Avenida Javier Prado Este 4600, Santiago de Surco, 1503, Peru^cChemical Engineering Department, Federal University of Santa Maria, UFSM, Roraima Avenue, 1000, Santa Maria, RS 97105–900, Brazil[View additional affiliations](#) [v](#)

Abstract

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The deposition of remaining nanoparticles in the Caribbean Sea generates the formation of potentially dangerous elements, which influence at the imbalance of ecosystems. The detection of nanoparticles is not simple and the use of conventional methods is difficult application, which is why we highlight the immediacy and importance of this research for the areas of marine biology, urbanism, engineering and geosciences, applied in the Caribbean Sea. The general objective of this study is to evaluate the use of advanced methods for the determination of toxic nanoparticles, which can directly affect the development of marine organisms in the aquatic ecosystem in waters of the Caribbean Sea, favoring the construction of future international public policies with the elaboration of projects capable of mitigating these levels of contamination. The morphology and structure of nanoparticles were analyzed by emission scanning electron microscope with a high-resolution electron microscope. The nanoparticles smaller than 97 nm were identified in different proportions. The morphological analyses indicated nanoparticles' presence in the form of nanotubes, nanospheres, and nanofibers, which were shown in an agglomerated form. The presence of potentially hazardous elements, such as As, Cd, Pb, Mg, Ni and V were verified. In addition, the presence of asbestos in the form of minerals was confirmed, and that of titanium dioxide was found in large quantities. The results provide new data and emphasize the possible consequences to the in the Caribbean Sea, with the identification of dangerous elements (As, Cb, Pb, Hg, Ni and V), harmful to the marine ecosystem. Therefore, there is a need for strict control to reduce contamination of the Caribbean Sea and avoid risks to the ecosystem and public health, through suggestions of international public policies, through constant monitoring and the application of environmental recovery projects in this marine estuary. © 2021 Elsevier Ltd

Author keywords

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[Aquatic ecosystems](#) [Asbestos](#) [Health risks](#) [Marine biology](#) [Marine pollution](#) [Nickel](#)
[Scanning electron microscopy](#) [Titanium dioxide](#) [Yarn](#)

Engineering uncontrolled terms

[Caribbean Sea](#) [Conventional methods](#) [Environmental](#) [Geosciences](#) [Marine organisms](#)
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🔍 Silva, L.F.O.; Department of Civil and Environmental, Universidad de la Costa, CUC, Calle 58 # 55-66, Barranquilla, Atlántico, Colombia; email:lsilva8@cuc.edu.co

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