

NATURAL, INCIDENTAL AND MANUFACTURED NANOPARTICLES IN THE ENVIRONMENT: BEHAVIOR, FATE, BIOAVAILABILITY, RISK ASSESSMENT AND HEALTH EFFECTS

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The distinctions between naturally occurring, incidental, and manufactured NPs are often blurred. Naturally occurring NPs are ubiquitous, distributed throughout the atmosphere, oceans, soil systems, terrestrial water systems, and in most living organisms. They are even present in the deep Earth, and throughout the solar system and interplanetary space. The number of simple and complex manufactured nanomaterials (NMs), and their uses, have been growing tremendously in last years. Incidental NP inputs to the environment have risen dramatically since the beginning of the Industrial Revolution due to manufacturing emissions and the combustion of fossil fuels. For example, incidental CNTs and other fullerene-related nanocrystals have been reported to originate from propane stoves, wood fires, burning tires, and other sources, and fullerene C60 has been found in geologic deposits, candle soot, and meteorites. Large-scale production of engineered NMs presents the possibility that organisms and ecosystems may be exposed to new levels and qualities of substances with unknown consequences. It is essential to manage risks associated with different nanoparticles exposure to differentiate the relative importance of manufactured, natural, and incidental sources of NMs at each step of the material's life cycle and understand the processes that govern NM transport, persistence, bioavailability, and toxicity. So, the aim of this paper is to illustrate the fate and interactions of nanomaterials in complex environmental contexts to assess exposure and possible harm, also in order to assess the specific effects of NPs in the workplace.

Keywords: nanoparticles, ecotoxicity