

Chapter 10

The Impact of Nanomaterials in Aquatic Systems

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Abstract

Owing to the unique properties of nanomaterials (NMs), they have generated significant research interest in various fields. The wide use of NMs has led to concerns about their environmental fate and the potential for toxicity to living organisms, including humans. Nanomaterials enter aquatic environments through effluents from manufacturing operations, and deliberate and natural breakdown of larger materials. Upon entering the environment, they are mobilized through wind, rain, urban run-off, and rivers. From there they interact with organisms via food, water, and dermal contact, and subsequently penetrate cell walls and affect cell physiological processes. Because of the many variables involved, the ecological risks associated with the fate and behavior of NMs are scarcely known and difficult to predict. Toxicology data are normally generated under experimental conditions, which do not adequately mimic real-life situations. There is a need to investigate toxicity under more realistic conditions in order to extrapolate the data to real-life situations. This chapter aims at evaluating the impact of nanomaterials in aquatic systems. The objectives are to: (1) determine the sources of NMs in aquatic environments, (2) evaluate the transport and fate of NMs, and (3) synthesize the literature on the toxicity of NMs, and provide future research directions.