Microplastics in the Dutch marine environment with special emphasis on analytical methodologies and environmental and human health aspects

by Professor Dick Vethaak
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About Professor Dick Vethaak

Prof Vethaak works as a water quality specialist / advisor at the scientific Institute Deltaires in Delft, The Netherlands. He is also a professor of Ecotoxicology / Water Quality and Health at the VU University Amsterdam. Prof Vethaak is a (marine) biologist and toxicologist by training. He has more than 30 years experience in the field of ecotoxicology, water quality and environmental health issues, in particular related to our seas and oceans. His current research interests include fate and effects of emerging contaminants, chemical mixtures, and plastic debris of all sizes. Most of his recent work focuses on fate and exposure assessment and ecological and human health risks of micro- and nanoplastics. He is advising and briefing on risks of plastic pollution for national governments, NGOs, and international organizations, such as UN, industry, European Commission, Dutch Health Council, and Plastic Soup Foundation. He is participating in the recently started (March 2019) Dutch ZonMw programme on "Microplastics & Health". Prof Vethaak's work is frequently mentioned in national and international media.

Abstract

There is increasing scientific and public concern over the presence of microplastics in the natural environment. Deltaires, together with VU University, have been working on the topic of marine debris and microplastics for almost 10 years. Our expertise includes transport and fate modeling, experimental work, microbial analysis, ecological and ecotoxicological impacts, human health effects and stakeholder processes.

Here, I will present our recent work on the analytical methodologies for determining microplastics in water, sediment and biota using FTIR and Stimulated Raman Scattering (SRS) microscopy, and an international intercalibration Workshop on microplastics that will run until 2020. I will discuss sources, sinks and the transport of microplastics in the Dutch delta and the North Sea. Next, I will highlight experimental studies on physical and chemical effects of microplastics in marine invertebrates. The implications for the marine environment and humans that consume contaminated sea food products will be briefly assessed. Lastly, our work on microbiological hazards of plastic debris will be summarized.