

Abstract:

The level of plastic pollution in the environment is steadily increasing. Tiny plastic particles called microplastics are ubiquitous in the environment and pose a threat not only to the environment but also to human health. To monitor and understand the behaviour of microplastics, methods for their detection have been developed. This thesis deals with microplastics including their sources, transport in the environment and their toxicity. It describes the most commonly used methods of sampling, separation of microplastics from them and finally the analytical methods used to identify and quantify them. The main objective is to summarise and critically evaluate the possibilities of methods for the detection of microplastics, which include imaging, spectroscopic or thermoanalytical methods. All have their specific advantages and limitations, which are presented and discussed. To comprehensively analyse microplastics and understand their fate in the environment, it is crucial to obtain information on the physical properties, chemical nature and number of particles of different sizes. This becomes more difficult, even impossible, as particle size decreases. Technological innovation is therefore needed to address this issue. Obtaining all types of information is not possible by a single method and therefore multimethod approaches seem appropriate. The paper also highlights the shortcomings of studies dealing with the determination of microplastics, such as the lack of a standardised methodology, the use of non-uniform classification of micro and nano-plastic dimensions or the use of insufficient numbers of representative samples. Among other things, the paper finally highlights the need for technological innovation and the development of a unified procedure to help improve the accuracy and reliability of microplastic determination.