



A review of methods for detecting microplastics in aquatic and terrestrial ecosystems

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Currently research in microplastics becoming more and more important and a large amount of studies dealing with this topic are available. Contentwise the studies are wide-ranging and cover the detection of microplastics in various aquatic and terrestrial environments including different sample material (water, sediments, biological tissues etc.). The problem, however, is that all these studies are difficult to compare since different methods were used, both for sampling and analysis. Thus, to assess all the questions around the amount, the distribution, the impacts of microplastics in and on the environment it is absolutely necessary to review the literature due to the used methods for sampling and detection.

Thus, in this study about 700 publications were reviewed in respect of the used sample material, sampling collection and laboratory analysing methods. For this review the data base of Web of Science were searched for all studies which contain the keyword microplastic. The search request contains all publications which are published to the 31th December 2018. All searched publications were filtered and classified by different parameters like analysis method, analysis device, sample preparation, sample material, study area, environmental conditions, size of the detected microplastics, amount of detected microplastics, quantification approach or composition of the detected microplastics.

The results show that the evaluated studies cover a wide range of used methods for sampling, preparation and analysis. For detection seven different lab methods were identified including only visual detection of bigger particles, stereo microscope, raster electron microscope, Fourier Transform Infrared spectroscopy, Raman spectroscopy and fluorescence spectroscopy. This study underlines that a standardization of the methods for sampling, preparation and analysing are varying greatly. This leads to the fact, that a high amount of these reviewed studies are not readily comparable. Therefore, a comprehensive assessment of the impacts of microplastics on the aquatic and terrestrial environment is complicated.