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Properties and fate of microplastics entering drinking water treatment plants

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Microplastics (MPs) are being detected in aquatic environments worldwide, including seawaters and freshwaters. Moreover, some scarce studies have also reported the presence of MPs in potable water, both in water from public water supply and in bottled water. Despite any potential adverse effects on human health are not known yet, the occurrence of MPs in drinking water raises considerable attention. Drinking water treatment plants (DWTPs) pose a barrier for MPs to pass from raw water to treated water intended for human consumption; thus, the fate of MPs entering DWTPs is of a great interest. In order to encapsulate current knowledge in this regard, and so as to identify research needs in this field, more than 100 studies were reviewed to provide concise conclusions. Focus was laid on: (i) summarizing available information on MP abundance and character in water resources and in drinking water; (ii) combining research results on MP contents at the inflow and outflow of DWTPs and on MP removal by distinct treatment technologies; (iii) comparing MPs to other common pollutants, the removal of which is commonly addressed at DWTPs; and (iv) providing an insight into the fate of MPs at waste water treatment plants (WWTPs), that act as a barrier for transition of MPs from waste to the nature, thus, have an “opposite” position than DWTPs. Additionally, the topic of (v) fate of MPs in DWTP and WWTP sludge was also put forward. This review brings together valuable information regarding the MP occurrence, character, and fate in freshwater aquatic environments in relation to the MP appearance at water treatment facilities, i.e. DWTPs and WWTPs, that may act as both sink and source of this emerging pollutant. Thus, the “cycle” of MPs between natural water bodies and “water in use by humans” is proposed.