

















**Table S1.** Summation of the main advantages and disadvantages of proposed methods for MPs isolation

MPs SEPARATION AN IDOLATION TECNIQUE	BRIEF DESCRIPTION OF THE TECHNIQUE	ADVANTAGES	DISADVANTAGES	REFERENCES
FILTRATION	The last step in sample preparation for analyzing MPs and a method for sample concentration.	Rapid and effective technique for MPs insolation from waters with low total solids content (tap and bottled water, WWWTp effluents, etc.)	Limiting factors are the size of filter pores and the choice of filter material.	[85, 109, 111-115]
DENSITY SEPARATION	Method for separating MPs from suspended solids based on the difference in intrinsic density.	Currently the only available, effective and relatively inexpensive method for separating MPs from matrices containing mineral substances.	Time- consuming. Some fractions of microplastic particles, such as PET/PVC, cannot be separated and require additional processing as their density ranges overlap. For the isolation of higher density MP fibers, higher density salt solutions should be used, which are usually expensive and hazardous. Incomplete isolation of particles present in the form of agglomerates.	[28, 118-130, 132, 134-136]
ORGANIC DIGESTION	Methods based on the use of various digestion agents (acids, bases, oxidizing agents, enzymes, etc.) to dissolve organic compounds from the sample matrix.	Using appropriate concentration of digestion agent and carrying the experiment under controlled conditions (time and temperature) most of the organics can be digested.	For a for samples with a complex matrix, it is necessary to perform several digestions or to use a combination of different digesting agents to completely remove the organic species present. The complete removal of organics the use of different enzyme mixtures.  There is always a possibility that particles are damaged during digestion (especially using alkaline and acid solutions).	[125, 126, 139, 142-143, 146, 148-150, 152, 154]
ADVANCED TECHNIQUES – OIL EXTRACTION PROTOCOL	Method for direct separation of MPs from sample matrix based on the oleophilic properties of polymers.	Inexpensive technique requires a minimal amount of reagents and simple laboratory equipment. Compatible with IR and Raman spectroscopy.	Individual particles with a partially hydrophilic character may remain in the aqueous phase. Sample containing surface-active substances result in partial emulsification of the oil.	[125]

**Table S2.** Health and safety aspects for the salts used in density separation method

Reagent.	Pictogram	GHS Hazard Statements	Precautionary Statement Codes	Health aspects	Safety
Sodium chloride, NaCl (CAS number 7647-14-5)		H319	P264+P265, P280, P305+P351+P338, and P337+P317	Acute effects: an eye irritant, toxic after ingestion of large amounts. Chronic effects: N.A. (ORL-RAT LD <sub>50</sub> : 3000 mg/kg)	The chemical has been verified to be of low concern based on experimental and modeled data.
Sodium bromide, NaBr (CAS number 7647-15-6)	 	H319, H360	P203, P264+P265, P280, P305+P351+P338, P318, P337+P317, P405, and P501	Acute toxicity, oral and dermal. Causes eye irritation: serious eye damage or irritation. May be harmful if swallowed or in contact with skin (H303+H313). (ORL-RAT LD <sub>50</sub> : 3500 mg/kg)	Wear protective gloves, protective clothing, and eye protection. Wash hands thoroughly after handling.
Sodium tungstate dihydrate, Na <sub>2</sub> WO <sub>4</sub> * 2 H <sub>2</sub> O (CAS number 10213-10-2)		H302	P264, P270, P301+P317, P330, and P501	Causes eye irritation. May cause skin irritation. May be harmful if absorbed through the skin. May cause respiratory tract irritation upon inhalation. (ORL-RAT LD <sub>50</sub> : 1.453 mg/kg)	Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Wear protective gloves, protective clothing, and eye protection. Wash hands thoroughly after handling.
Sodium polytungstate, 3 Na <sub>2</sub> WO <sub>4</sub> * 9WO <sub>3</sub> * H <sub>2</sub> O (CAS number 12141-67-2)	 	H302, H318, H412	P261, P273	Acute effects: harmful if swallowed, inhaled, or absorbed through skin. May cause irritation. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.	Wear the protective personal clothing as stated in section 8. Do not allow in sewage systems, lakes or rivers. Before removal wet the material respectively cover with wet inert material or absorb on sand or vermiculite. Wash spill site after material pickup is complete. Place material in closed and lock able containers for disposal. Label containers. Ventilate area.
Calcium chloride, CaCl <sub>2</sub>		H319	P264+P265, P280, P305+P351+P338, and P337+P317	Inhalation causes irritation of nose and throat. Ingestion causes irritation of mouth and stomach. Contact with	The chemical has been verified to be of low concern based on experimental and modeled data.

(CAS number 10043-52-4)				eyes (particularly by dust) causes irritation and possible transient corneal injury. Contact of solid with dry skin causes mild irritation; strong solutions can cause marked irritation, even a superficial burn. Chronic effects: N.A. (ORL-RAT LD <sub>50</sub> : 1000 mg/kg)	
Zinc chloride, ZnCl <sub>2</sub> (CAS number 7646-85-7)	  	H302, H314, H318, H335, H400, H410	P260, P261, P264, P264+P265, P270, P271, P273, P280, P301+P317, P301+P330+P331, P302+P361+P354, P304+P340, P305+P354+P338, P316, P317, P319, P321, P330, P363, P391, P403+P233, P405, and P501	Acute effects: Toxic, corrosive (Irritation eyes, skin, nose, throat; conjunctivitis; dyspnea, cyanosis; skin burns). Chronic effects: Possible mutagen. (ORL-RAT LD <sub>50</sub> : 350 mg/kg)	Handle and open container with care. Avoid dust formation. Clear contaminated areas thoroughly. Wear protective gloves, protective clothing, and eye protection. Wash hands thoroughly after handling.
Zinc bromide, ZnBr <sub>2</sub> (CAS number 7699-45-8)	  	H302, H314, H317, H318, H400, H410, H411	P260, P261, P264, P264+P265, P270, P272, P273, P280, P301+P317, P301+P330+P331, P302+P352, P302+P361+P354, P304+P340, P305+P354+P338, P316, P317, P321, P330, P333+P317, P362+P364, P363, P391, P405, and P501	Inhalation of dust may irritate nose and throat. Ingestion can cause irritation or corrosion of the alimentary tract; if large amount is swallowed and not thrown up, drowsiness and other symptoms of bromide poisoning may occur. Contact with eyes or skin causes irritation. ( ORL-RAT LD <sub>50</sub> : 1,047 mg/kg)	Handle and open container with care. Avoid dust formation. Clear contaminated areas thoroughly. Wear protective gloves, protective clothing, and eye protection. Wash hands thoroughly after handling.
Sodium iodide, NaI		H315, H319, H335, H372, H400	P260, P261, P264, P264+P265, P270, P271, P273, P280, P302+P352, P304+P340,	Acute oral toxicity. Causes skin and serious eye damage, corrosion or	Handle and open container with care. Avoid dust formation. Clear contaminated areas thoroughly. Wear

(CAS number 7681-82-5)	 	P305+P351+P338, P319, P321, P332+P317, P337+P317, P362+P364, P391, P403+P233, P405, and P501	irritation. (ORL-RAT LD50: 4340 mg/kg)	protective gloves, protective clothing, and eye protection. Wash hands thoroughly after handling.
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