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# Recovery rate as a measure of quality assurance in microplastic research

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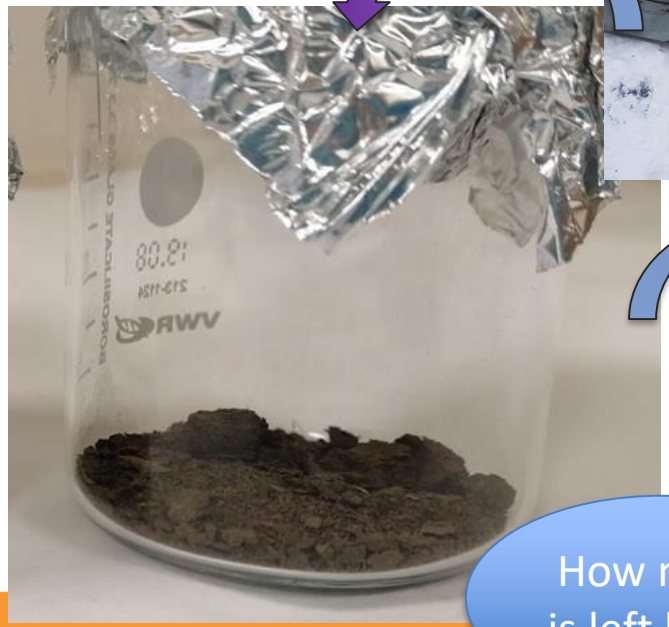
# What is the story about?

- In the environmental samples microplastics must be separated from organic and inorganic matter in order to be quantified and characterized;
- Treatment steps may cause the loss of microplastic particles due to material transfer and possible particles degradation;
- By adding standardised polystyrene beads to the blank samples, we evaluated a recovery rate of microplastic particles, hence imitating different sample treatment protocols.

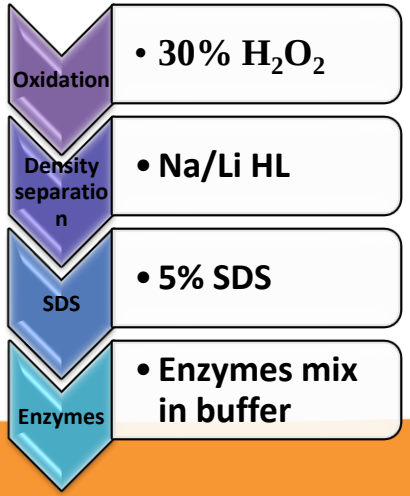
How much microplastics is there?



How much is left here?

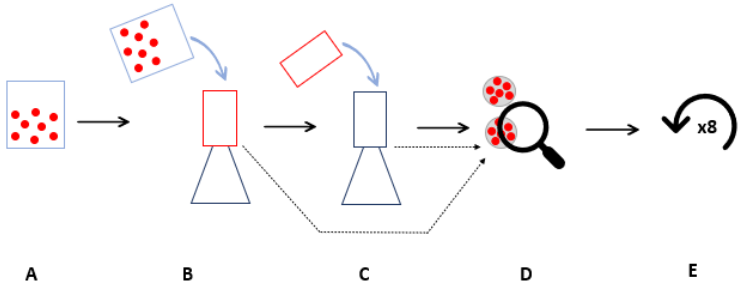
# Study design approach

- Sample treatment protocols with different number of treatment steps (up to 9) were tested. Replicate samples containing 100 polystyrene beads each were treated and beads left were counted after every treatment step




- Sample extraction methods – vacuum filtration apparatus (1) and stainless steel sieve (2) were tested by filtering (9X) several replicate samples with 100 polystyrene beads

1

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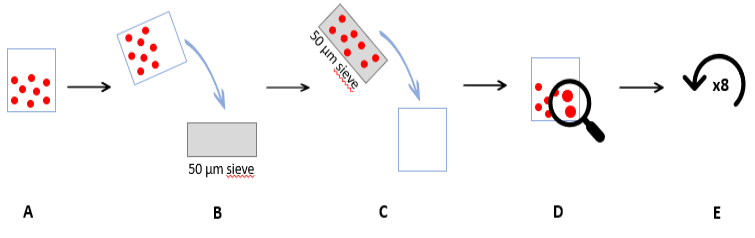


(Dimante-Deimantovica et al. in prep.)

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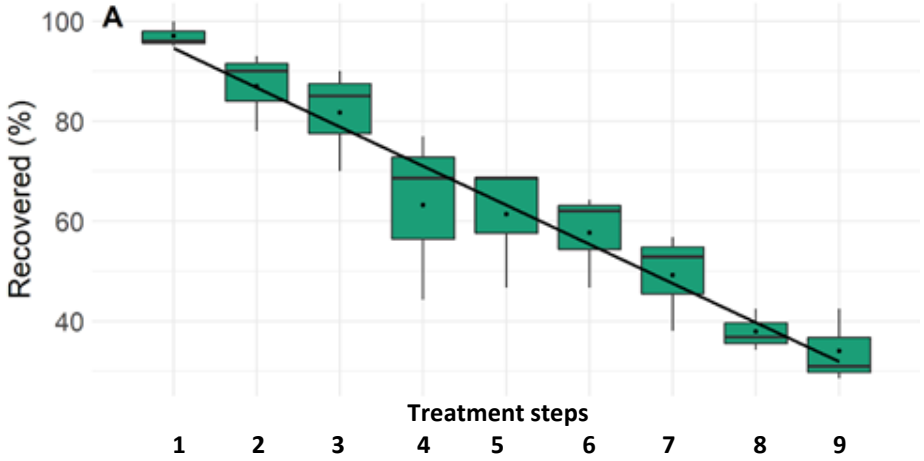
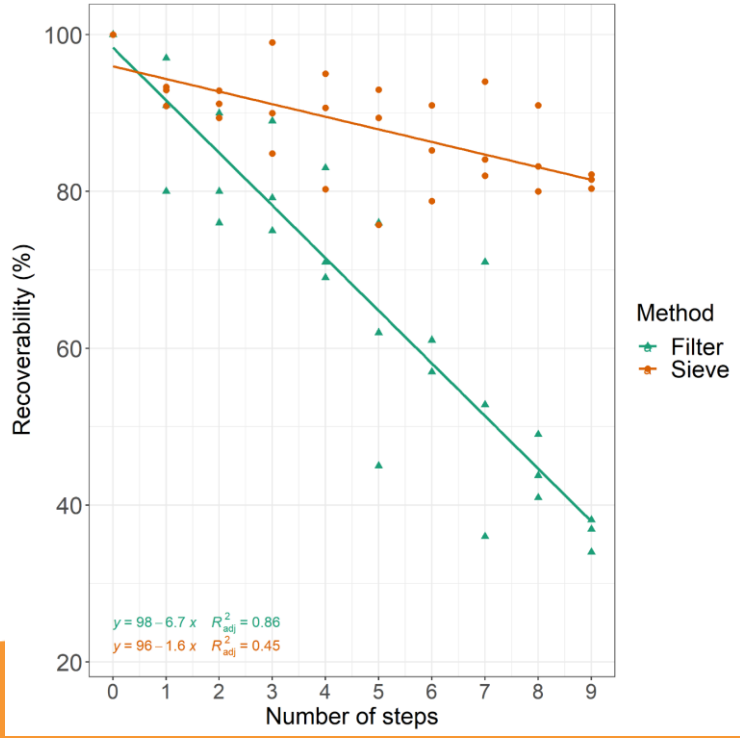
# Main findings




There is a significant difference in the methods. The filtration method exhibited a stronger negative slope correction compared to sieve method, what resulted in lower recoverability of beads.




Recoverability compared to the original number of beads showed a gradual decrease in intact beads similar to a gradual increase in deformed beads, which is consistent with the hypothesis that an increase in the number of processing steps causes a reduction of the total recoverability

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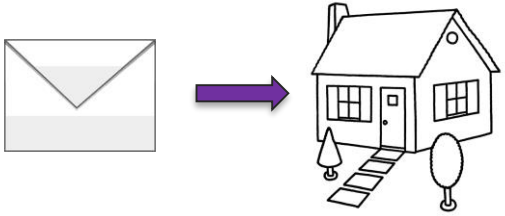
# The take-home message



- The overall recoverability (%) depends on the total number of processing steps (physical impact) rather than chemical impact;
- For quality assurance (different studies quality of being comparable) there should be recovery rate thresholds stated depending on number of sample treatment steps involved and filtering method used;
- There are no doubts microplastic particles found in real matrices differ a lot from standardized microbeads, hence this approach should not be used to correct produced data, it is rather for quality control of sample handling activities.

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