

Development of a compact, disposable filter to reduce the discharge of pharmaceutical waste into the sewer

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What was done?

We developed a practical, compact, disposable filtration system that can be used on-site to reduce the amount of pharmaceutical residue in wastewater of our pharmaceutical laboratory. We tested and optimized the composition of the filter to effectively collect organic substances from locally produced wastewater (influent). We monitored filter performance and durability during 4 months by analysis of filtrates (effluent).

How was it done?

Laboratory wastewater was collected during 1 month to yield 10L influent. Portions of influent were filtered through 9 different types of filter packing and the effluents collected for analysis. The influent reference and effluent samples were analyzed using an iontrap LC/MS screening method using diazepam-D5 as an internal standard. The signal abundance of 12 relevant substances was used to evaluate the level of reduction for each filter type. Based on these analyses, the optimal filter packing was determined. A prototype filterbox system was build and put in use in the laboratory.

What has been achieved?

- Filter packing optimized: In the effluent of the best performing filter packing, the abundance of 9 substances was reduced by 91,5-99,9% and 3 substances was below detection limit.
- Application proven: by practical use of the prototype in a working environment.
- Durability proven: the filter in the filterbox proved effective filtration >95% for a 4 month period.
- Estimated amount of collected residue: 468 grams.

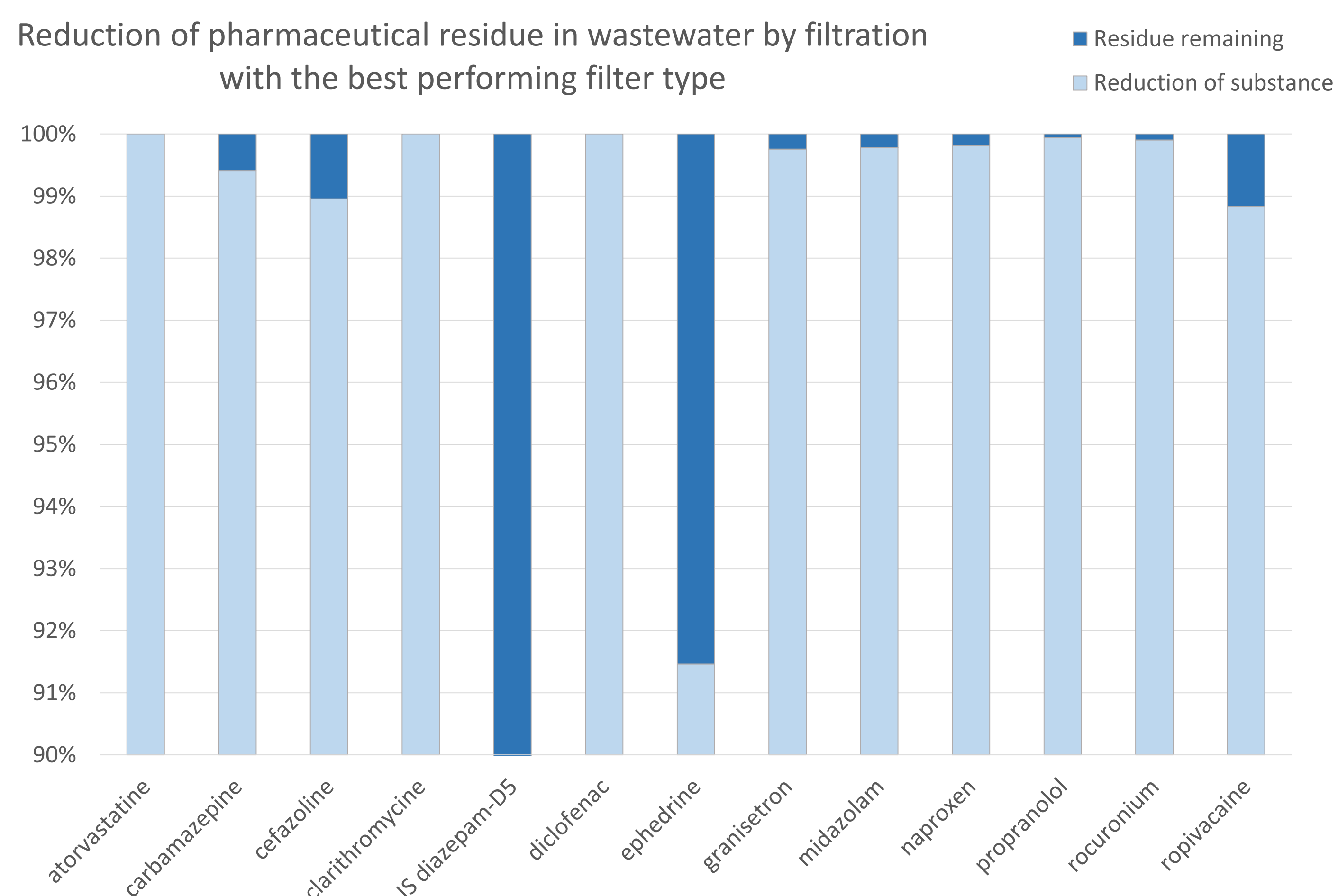


Figure 2: Reductions of abundance in the best performing filter.

Why was it done?

Hospital pharmacies and their laboratories produce wastewater containing medicine residue. When this wastewater is discharged into the sewage, it will contribute to pollution of surface-, ground and drinking water. To reduce this load, waste can be collected and transported to a processing facility for incineration and deactivation or alternatively treated locally. Our goal was to develop a practical method to effectively reduce the pharmaceutical sewage load locally, at the source.

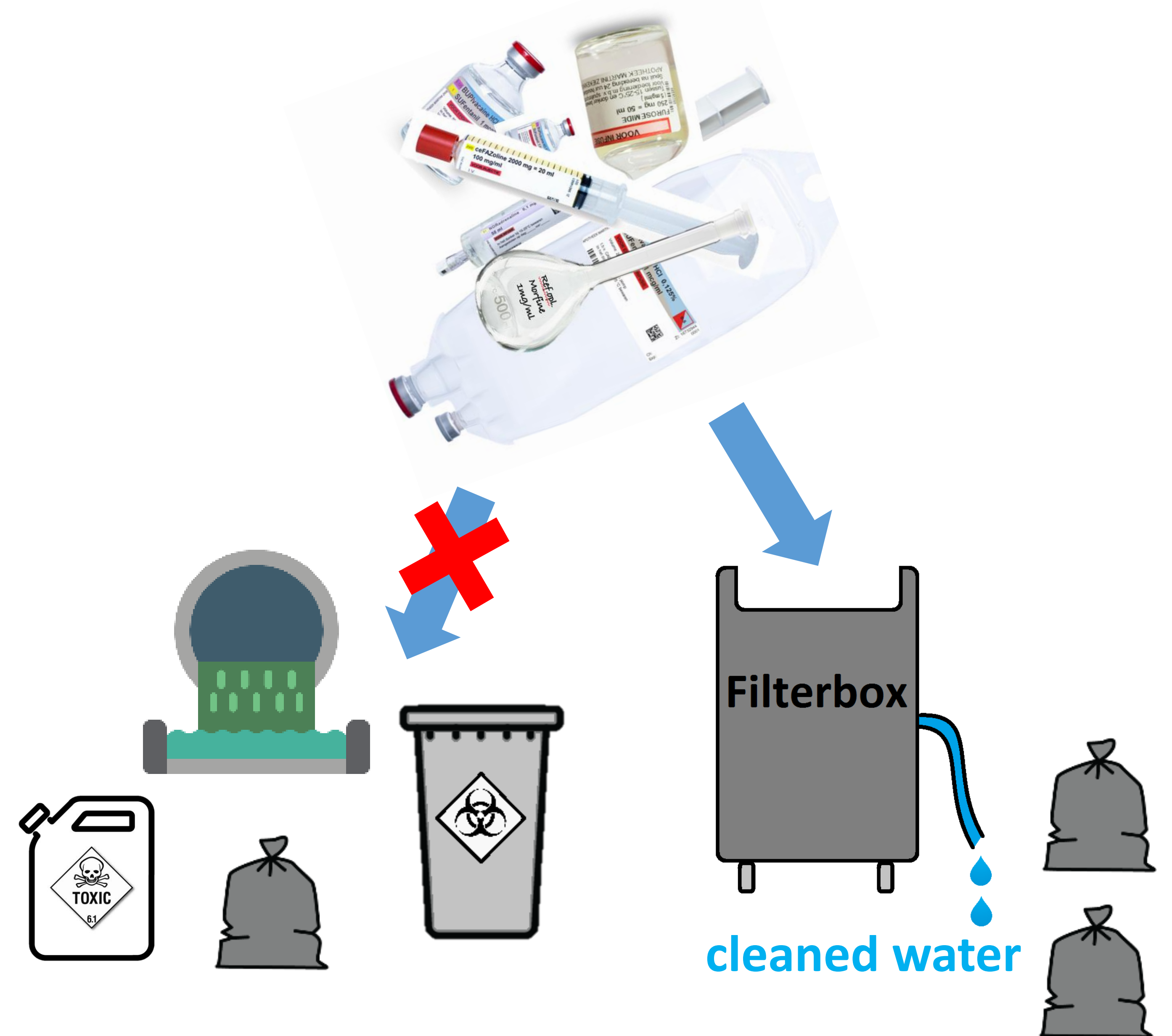


Figure 1: Disposal options of wastewater containing pharmaceuticals

What next?

The possibility of placing more filterboxes for wastewater collection in other wards in the hospital will be investigated. Cost effectiveness and sustainability compared to alternative waste collection methods will be evaluated.



Figure 3 (left): filterbox in use.

Figure 4 (right): Inside the Filter Box, clockwise by part: Fluid pump, disposable filter packages, reservoir tank.

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