

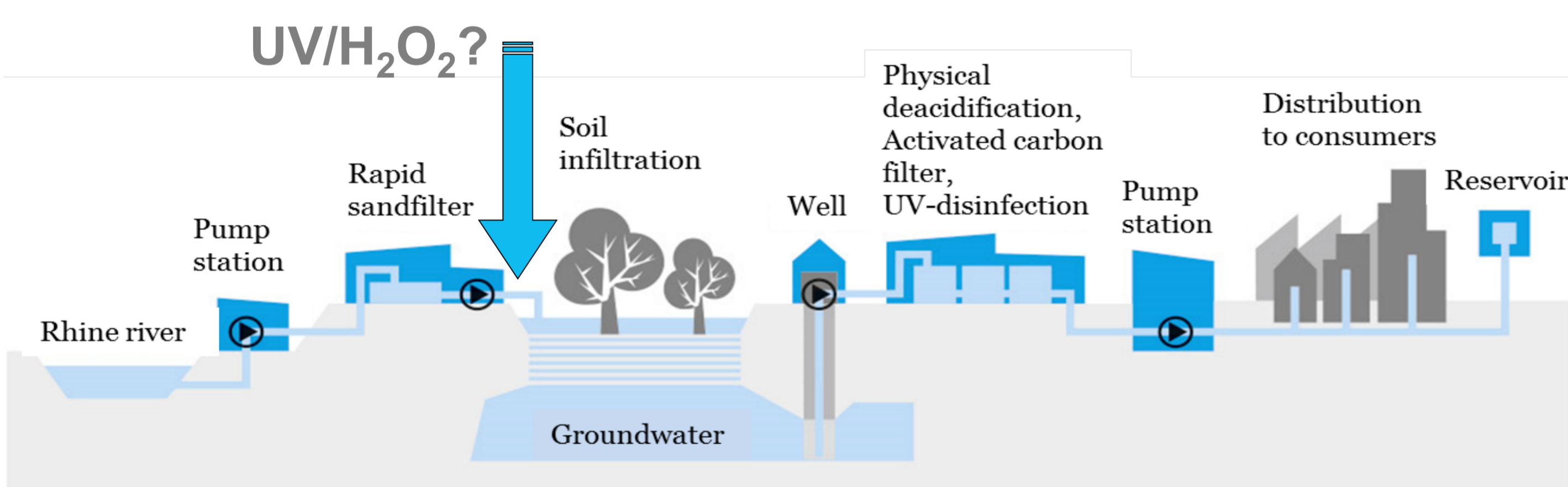
# Protecting drinking water resources from micropollutants: Potential of UV/H<sub>2</sub>O<sub>2</sub> treatment before soil infiltration

## Aim of the demonstration

Demonstrate the impact of UV/H<sub>2</sub>O<sub>2</sub> before soil infiltration on abatement of micropollutants and on microbiological parameters

## Challenges to managed aquifer recharge

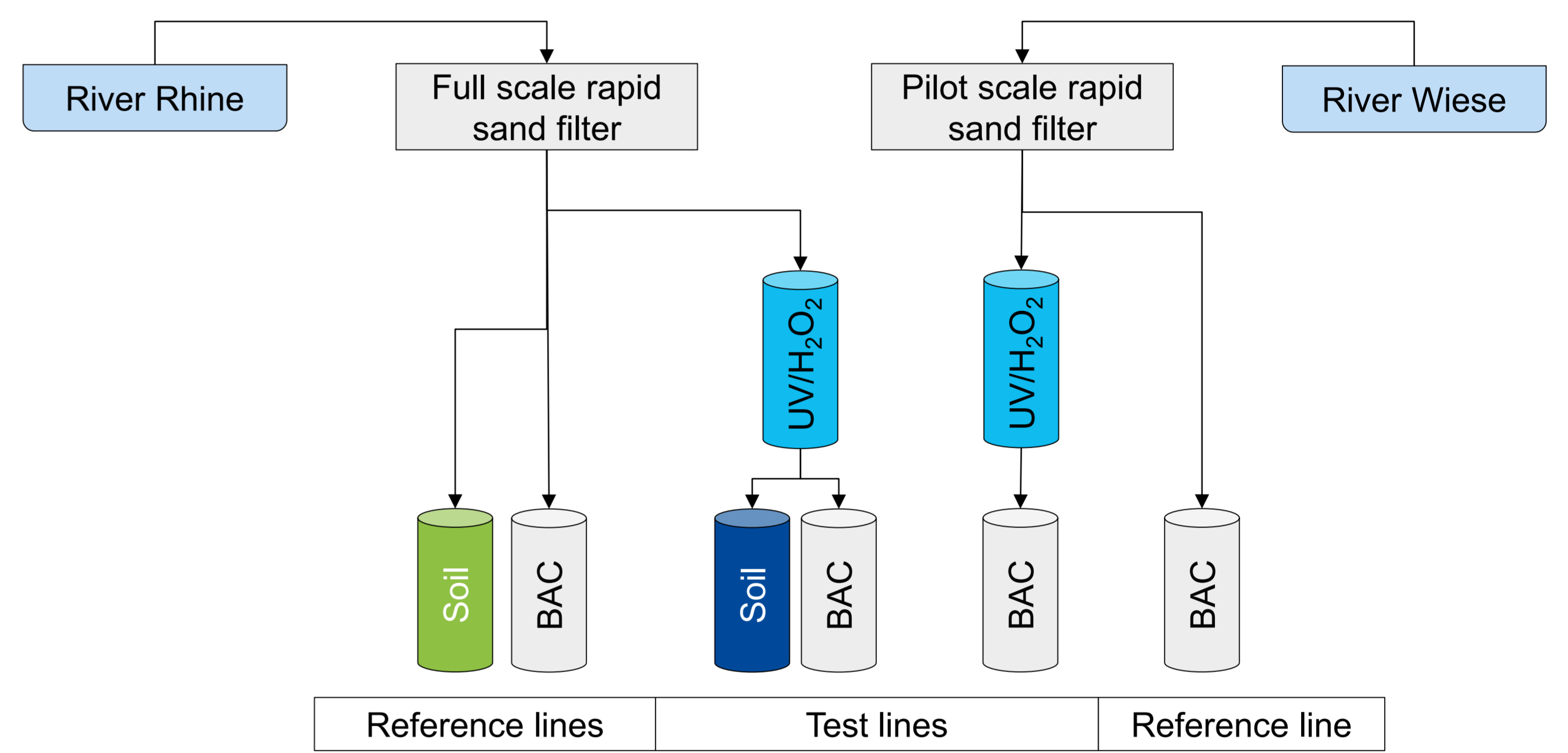
- Drinking water of the city of Basel is produced from artificially augmented groundwater
- **Persistent organic micropollutants** present in the Rhine are **not fully addressed** in the current production scheme
- UV/H<sub>2</sub>O<sub>2</sub> can be used to abate micropollutants



Drinking water treatment scheme of iwB site "Lange Erlen" (Basel, CH)

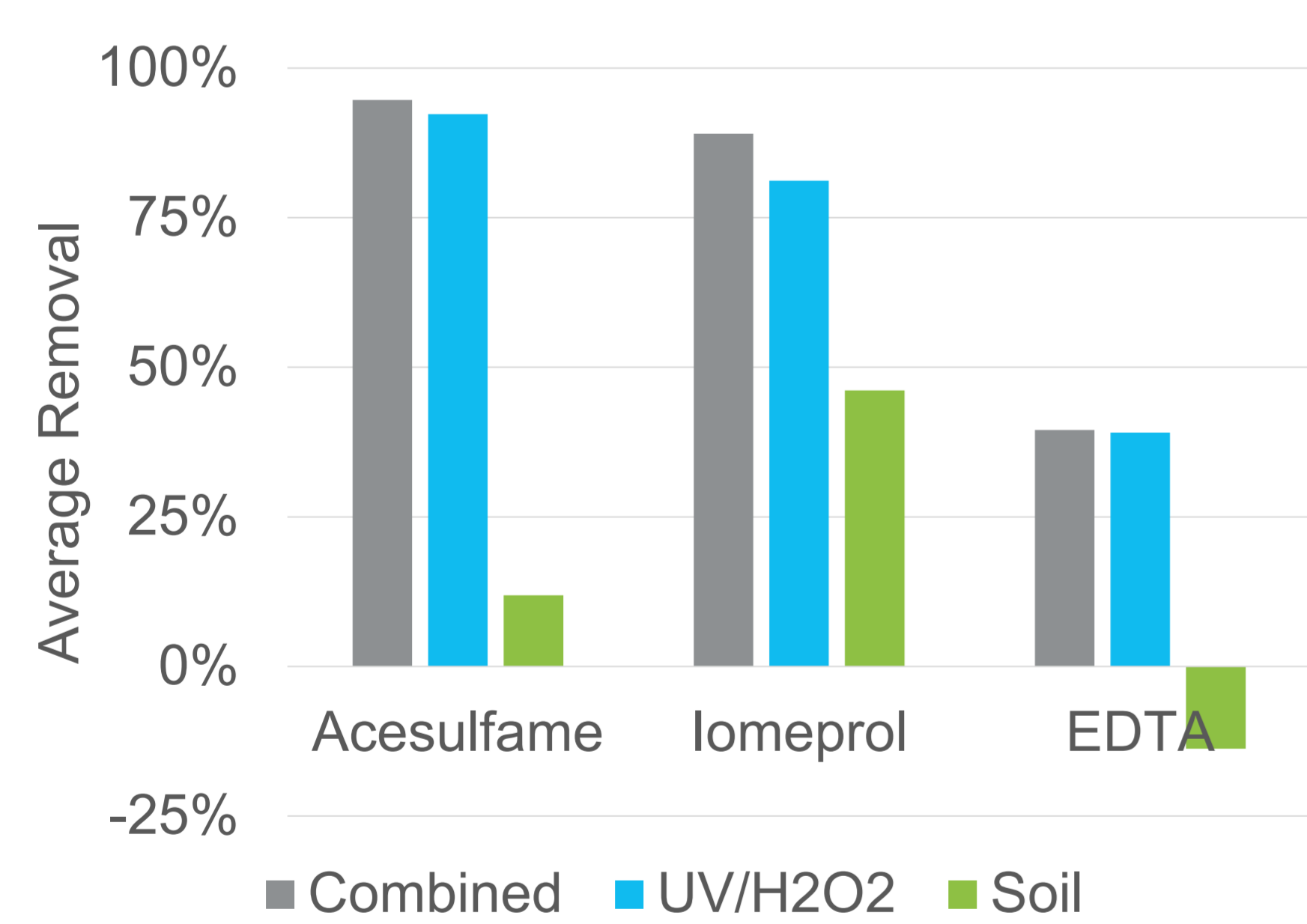
## Methodology

- Continuously operated pilot plant with two feed waters
- **Oxidation process: 0.5 m<sup>3</sup>/h, 4 mg/L H<sub>2</sub>O<sub>2</sub>, 6000 J/m<sup>2</sup>**
- **Soil columns: 1 m/d hydraulic load, 17 – 20 h mean residence time**
- Biologically activated carbon (BAC): 3.5 h empty bed contact time
- Laboratory analytics of selected TrOCs and microbiological parameters

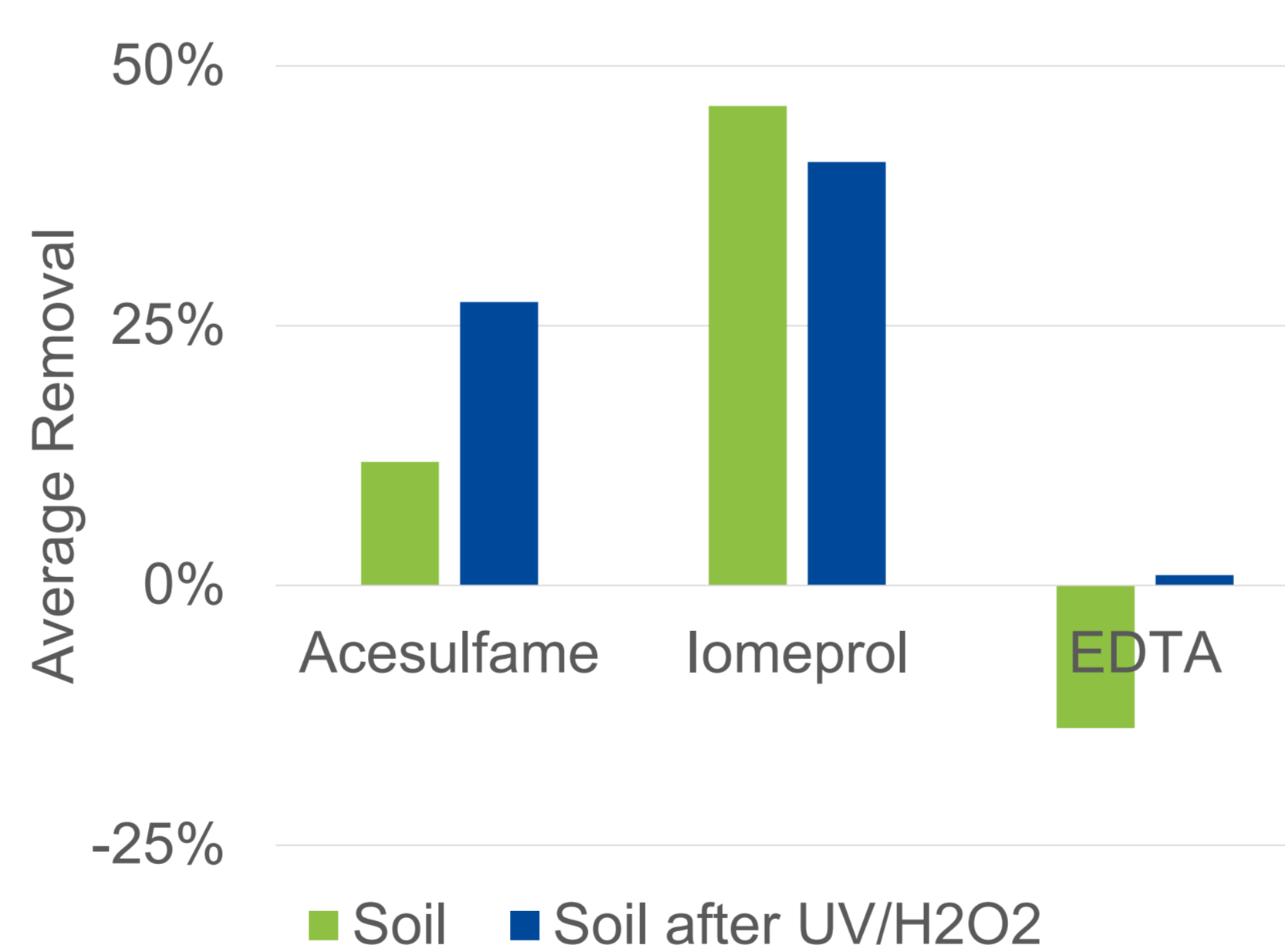


## Performance of the treatment trains

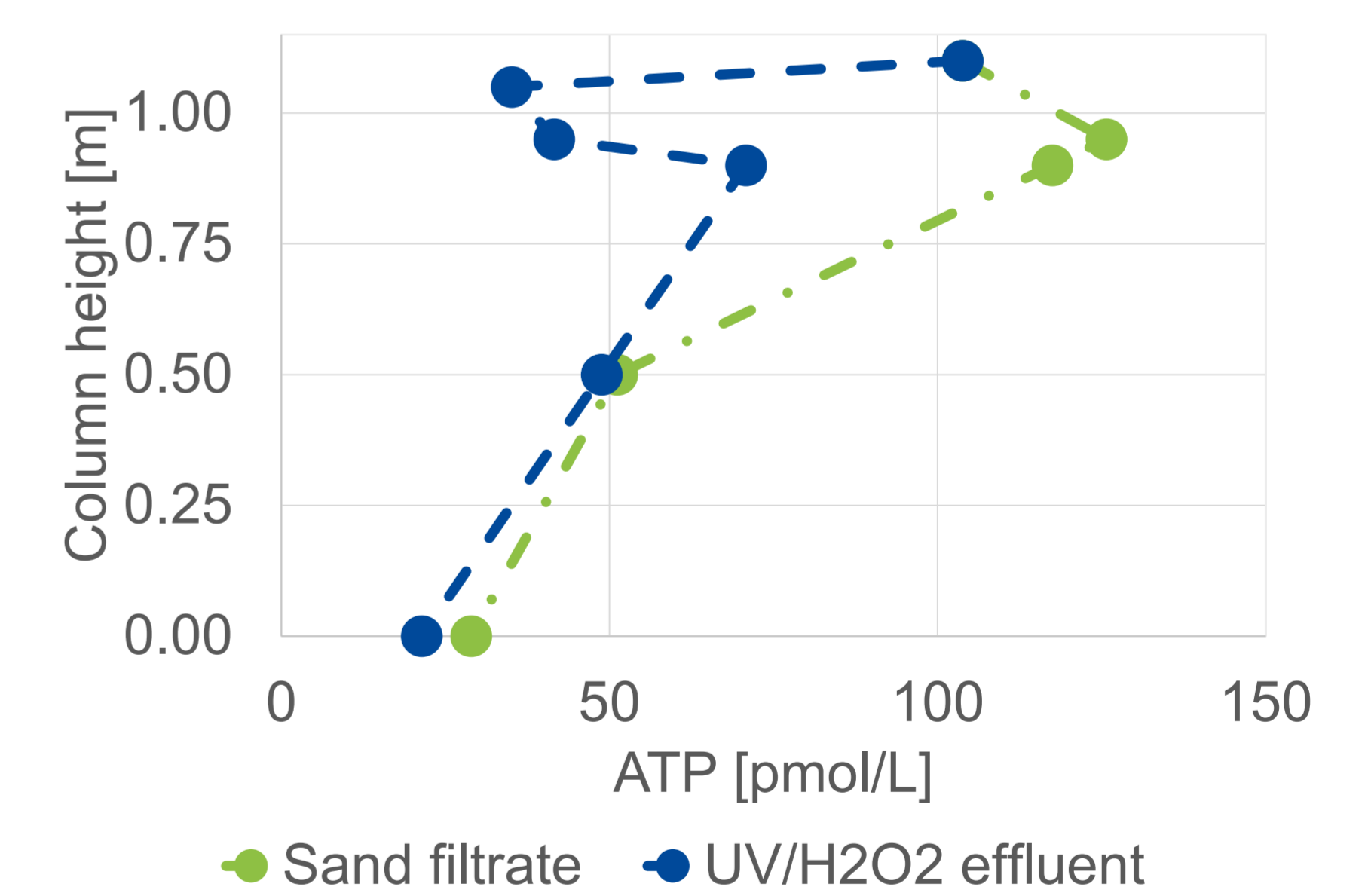
Combined system (UV/H<sub>2</sub>O<sub>2</sub> + soil treatment) shows a **better performance** in removal of micropollutants than single unit operations



**No significant synergistic effects** in their removal during subsequent soil passage detected



**Strong primary disinfection effect** of UV/H<sub>2</sub>O<sub>2</sub> detectable along the subsequent biological treatment columns



## Conclusions

- **Feasibility of process combination was demonstrated**
- No principal stumbling block was found that would exclude the realization of this process combination
- **No formation of toxic reaction products** detected in supplementary analysis
- UV/H<sub>2</sub>O<sub>2</sub> is an **easily scalable, well controllable and quickly adoptable** processes for an additional barrier against TrOC parent substances with **absent bromate formation problems** (potential carcinogenic substance, threshold: 10 µg/L)
- Biological availability of DOC increases by the AOP, as well as its hydrophilicity
- **Additional costs** for the implementation of the AOP treatment in full-scale: **0.03 €/m<sup>3</sup> – 0.04 €/m<sup>3</sup>**
- **More detailed discussion of results in a publication** (in preparation). Drop an email for updates!

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