Retentate from Reverse Osmosis Stimulates Degradation Potential of Bioaugmentation Candidate Aminobacter sp. MSH1

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Retentate from Reverse Osmosis Stimulates Degradation Potential of Bioaugmentation Candidate *Aminobacter sp.* MSH1

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BACKGROUND & SUMMARY

- **Groundwater is an important resource** in drinking water production, but is threatened by recalcitrant pollutants, such as the pesticide residue 2,6-dichlorobenzamide (BAM)[1].
- **We aim to combine** retentate from membrane separation and bioaugmentation as a novel biotechnology for removal of micropollutants **(BOX 1)**.
- **Here we show results (BOX 3)** from batch experiment(s) , using a BAM-degrading bacteria, *Aminobacter* sp. MSH1, in untreated and retentate water **(BOX 2).**

SCIENTIFIC QUESTIONS

- **How is BAM degradation** potential of *Aminobacter* sp. MSH1 affected in different membrane retentates versus untreated water?
- **Is there an optimal** retentate with respect to BAM degradation?
- **Is MSH1 population** negatively affected in the retentates?

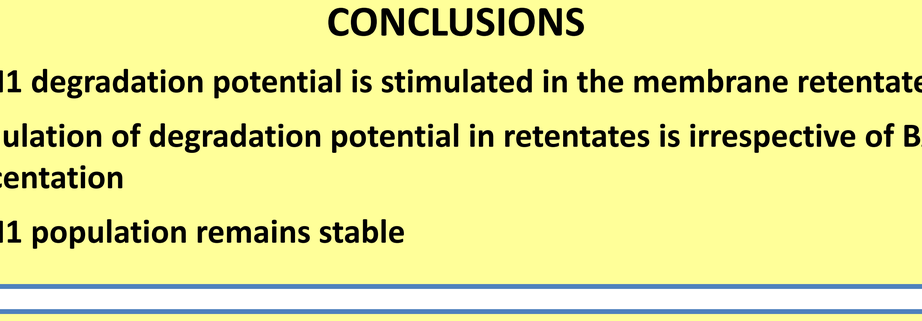
CONCLUSIONS

- **MSH1 degradation potential is stimulated in the membrane retentates**
- **Stimulation of degradation potential in retentates is irrespective of BAM concentation**
- **MSH1 population remains stable**

PERSPECTIVES

- **Retentate from membrane separation could act as stimulating feed for bioaugmented sand filters in drinking water production – prolonging the stability of introduced degrader strain**
- **Giving way for a novel environmentally friendly biotechnology for eliminating micropollutants during water purification**

BOX 1 – CONCEPT & HYPOTHESIS



(www.mem2bio.dk)

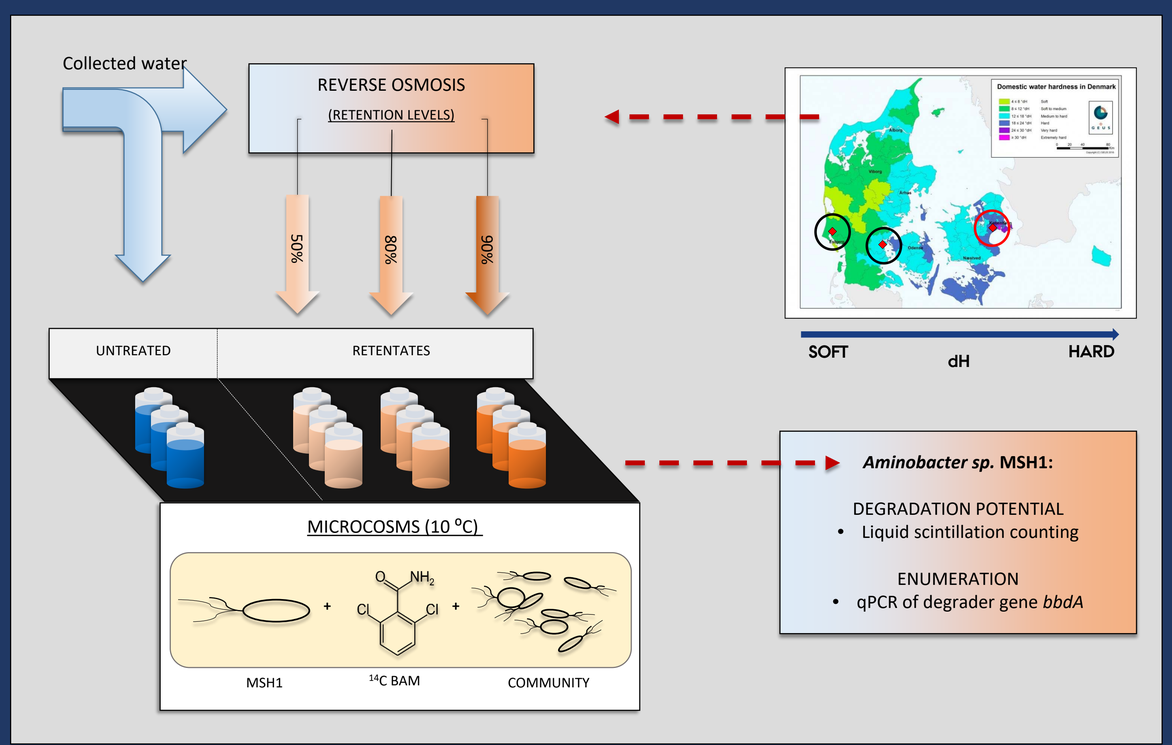
One of the main challenges in sand filter bioaugmentation is low pollutant concentrations as this can result in loss of degrader population and/or activity over time, due to starvation[2].

Membrane separation will increase concentration of target pollutant in retentate, which in turn could act as feed for a sand filter, dedicated to bioaugmentation.

Hypothesis: increased pollutant concentration should stimulate activity and enhance overall fitness of degrader bacteria.

1. Ellegaard-Jensen, L., et al., *Groundwater contamination with 2,6-dichlorobenzamide (BAM) and perspectives for its microbial removal.* Appl Microbiol Biotechnol, 2017. **101**(13): p. 5235-5245.
2. Albers, C.N., et al., *Degradation of trace concentrations of the persistent groundwater pollutant 2,6-dichlorobenzamide (BAM) in bioaugmented rapid sand filters.* Water Res, 2015. **83**: p. 61-70.

BOX 2 - EXPERIMENTAL SETUP & WORKFLOW



BOX 3 - RESULTS