
Although earlier circumstantial observations have suggested the presence of iron oxidizing bacteria (IOB) in groundwater-fed rapid sand filters (RSF), ferrous iron (Fe(II)) oxidation in this environment is often considered a chemical process due to the highly oxic and circumneutral pH conditions. The low water temperature (5-10 degrees C), typical of groundwaters, on the other hand, may reduce the rates of chemical Fe(II) oxidation, which may allow IOB to grow and compete with chemical Fe(II) oxidation. Hence, we hypothesized that IOB are active and abundant in groundwater-fed RSFs. Here, we applied a combination of cultivation and molecular approaches to isolate, quantify, and confirm the growth of IOB from groundwater-fed RSFs, operated at different influent Fe(II) concentrations. Isolates related to Undibacterium and Curvibacter were identified as novel IOB lineages. Gallionella spp. were dominant in all waterworks, whereas Ferriphaselus and Undibacterium were dominant at pre-filters of waterworks receiving groundwaters with high (> 2 mg/l) Fe(II) concentrations. The high density and diversity of IOB in groundwater-fed RSFs suggest that neutrophilic IOB may not be limited to oxic/anoxic interfaces.

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Corresponding author: Gülay, A.
Contributors: Gülay, A., Cekic, Y., Musovic, S., Albrechtsen, H., Smets, B. F.
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