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<td><strong>Author(s)</strong></td>
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Evaluation of biochar as a filter medium in pre-treatment of water

Background

• Conventional biofilters (sand and compost) have limited effectiveness in removing bacteria\(^1\).
• Biochar can remove hazardous substances and non-problematic dissolved organic matter\(^1\).
• Biochar has to be tested if it can handle a complex mixture like stormwater\(^2\).

Objective

• To study the effectiveness of biochar as a filter media relative to sand

Methodology

• Geomedia:
  - Biochar
    - (0.1 –1.0 mm)
  - Ottawa sand
    - (0.6 –0.8 mm)
  - 70% Sand + 30% Biochar

Flow rate = 6 ml/min

Fig 1: Experimental Setup. All 3 filter columns in a setup are filled with the same media. 3 setups, each filled with a different media, are conducted simultaneously.

Parameters

Microbiological
Bacteria (R2A), Fungi (PDA), Algae (RFU)

Water quality
Turbidity, pH, ORP, Cl\(^-\), NH\(_4\)\(^+\), NO\(_3\)\(^-\)

Results

Microbiological

Fig 2: Bacteria and algae removal. Biochar (>96 and 99%); Sand (>81 and 89%); Mixed (>90 and 95%). No fungi detected in the raw untreated water.

Water quality

Fig 3: Changes in water quality. Reduction in turbidity - Biochar (40%), Sand (30%), Mixed(30%). No considerable changes in pH, ORP, Chloride, ammonium and nitrate.

Conclusion

- Biochar was the most effective filter medium compared to sand and mixed geomedia in improving bio-geo-chemical quality of water.

Future direction

- Other factors e.g. flow rate should be tested for their influence on removal efficiency.

References