Community Studies of Fluoride Removal from Drinking Water in Ethiopia

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Outline

• Problem
• Ethiopia Project
• Fluoride Removal Research
  – Technology
  – Health Behavior Change
• Future Work
Problem: Elevated Fluoride

World Health Organization Standard is 1.5 mg/L

Affected:
200 million – world
14 - 16 million - Ethiopia
Health Concerns

Why is fluoride in drinking water important?
Media Studied

Bone Char
Specific Surface Area = 80 – 110 m²/g
Activation Temperature = 500°C

Activated Alumina
Specific Surface Area = 155 m²/g
Charring Temperatures

- 400 and 500°C have the best fluoride removal capacity
Aluminum coated fish bone char (Al FBC) outperformed fish bone char (FBC) in fluoride removal. Approximately 6.6 mg/g versus 4.4 mg/g, respectively.
Batch Tests

- Aluminum Coated Bone Char is also more effective than activated alumina
Partners

- Addis Ababa University
- Catholic Relief Services
- CARE - Ethiopia
Focus of Study

Lab Research

Field Research
Aluminum Coated Bone Char is the most effective at fluoride removal.

Bed volumes to 1.5 standard:  
- AA – 46  
- FBC – 101  
- Al FBC - 176
Field Column Study

More than just technology...
### Field Survey Methods

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- Awareness of fluoride issues in water
- An Interest in “town” water solutions
- Inconsistent treat water availability
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Lessons Learned:
- Need to have interviews conducted by local people
- It is difficult to avoid the impression that you will “fix” any problems that are discussed
Future Work

• Laboratory Work
  • Additional surface coating studies (SEM, XRD)
  • Column Studies

• Implementation Studies
  • Investigate social entrepreneurial business model
  • Continue community health behavior change studies
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Questions