13

Manufacturing facility for activated carbon and ceramic water filters at the Songhai Center, Benin

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People, Prosperity and the Planet

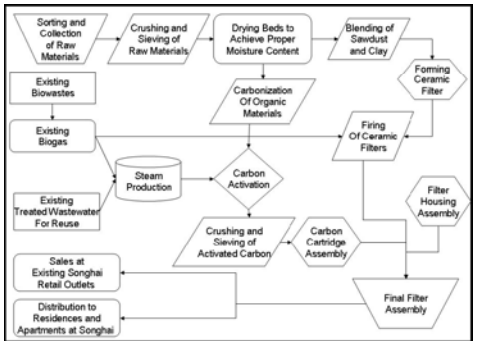
- 3.25 million people in Benin do not have access to potable water.
- Under-Five Mortality Rate is 167/1,000
- Typical life expectancy in Benin is 51 years.
- Primary water contaminants:
  - Particulates/Sediments
  - Bacteria/Parasites/Viruses
  - Nitrates/Phosphates/Lead

CEG students in Azové, a future project implementation site

Filtrón Filter with Potters for Peace label

Objectives

- Provide the people of Benin with an efficient and sustainable manufacturing plant to produce effective point of use water filtration systems.
- Determine the Filtrón removal efficiency for anthropogenic and biological contaminants.
- Design a kiln for firing the ceramic filter elements and producing activated carbon.
- Produce activated carbon from coconut shells and compare surface characteristics of commercially available activated carbon with activated carbon produced on-site.
- Incorporate activated carbon into Filtrón design to meet WHO Drinking Water Standards.



Filter manufacturing process overview

Results

Table 1: Contaminant Removal Efficiency of Integrated Filter System

Contaminant	Units	Synthetic Water	Filtered Water	Average Removal
Fecal Coliforms	MPN/100ml	2575 1300	<2 0	>99.92%
Total Coliforms	MPN/100ml	6233 5967	<2 0	>99.97%
E. Coli	MPN/100ml	200±0	<2 0	>99.0%
Pathogens (H_2S producing bacteria)	MPN/100ml	637±169	<2 0	>99.7%
Streptococci	MPN/100ml	<20±0	<2 0	NA
Amoeba	MPN/100ml	>7,000,000	37,000 115,000	99.5%
Lead	µg/L Pb	5±2	1 1	73%
Nitrate	mg/L NO^{3-}-N	18.3±1.0	11.9±1.5	35.1%
COD	mg/L	72±17	25±11	66%

Back row :James Shamrell, Phil Spuler, Sushil Shenoy, Joe Stippel, Andy Elder, Front Row: Ben Lemkau, Julia Young, Blake Johnson, Krystal Stanek, Kim Remick Not pictured: Amanda Vernon, Sam Atwood, Jake Dial

Sustainability

- Filter reduces pathogen exposure to improve health
- Stimulates economy through use of local skills, labor and materials
- Minimal resource consumption vs. bottled water and water boiling
- Songhai Center provides local credibility, educational support and regional distribution

Project Partners

- We acknowledge the EPA P3 Program for project funding
- Songhai Center, Benin
- Engineers Without Borders-USA
- Potters For Peace

Danon Blaise, Songhai engineer and child in Porto Novo

Conclusions and Recommendations

- Affordable, sustainable Filtróns modified with activated carbon will improve water quality, reduce exposure to disease and help to increase longevity and quality of life in Benin.
- Phase 2 work for this project will focus on the minimization of environmental impacts, as well as the development of educational materials and market strategies.