



# The Atkins Family

Jason, Emily, Savannah,  
Nathaniel, and Miriam

Serving in Guinea-Bissau with



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Our drinking water filter  
bacteria test results are  
encouraging!

## Good Filters! *by Jason*

Richard, the chemist from Healdsburg, CA, made another trip recently to check on the drinking water filter factory's progress. We spent several weeks working primarily on testing a batch of filters that the factory has produced in order to see how well the filters are (or aren't) working, and to zero in on the quality control checks that the workers will run each filter through. We want to be sure each filter we sell is working without having to actually test the bacterial removal abilities of every single one.

To date, the factory workers have formed about 2,500 filters. These include the many that broke in the kiln or didn't pass inspection and were destroyed. Each filter goes through quality checks, like a flow rate test and visual inspection, however it would double the cost of the filters to test each using live bacteria. So, it's important that the checks we perform do guarantee that the passed filters are actually blocking and killing all of the bacteria, without having to use the expensive live bacteria test on each one. Previously, we had tested a batch of filters using a test that gave a pass or fail for EPA-acceptable levels of E.coli. (That level, in case you're curious, is 1 bacteria colony in 3.5oz of water.) This trip, Richard brought a test that gave us an amount of E.coli, not just a pass/fail, which allowed us to get a much better idea of how our filters are working.



*Recording the results of a batch of filter flow tests.*

The filters actually have two ways of getting rid of bacteria. They clean the water by having a specific pore size that bacteria doesn't fit through, but then also are treated with an anti-microbial silver coating that kills bacteria. These tests are done without the silver, so we know that after that treatment is done, the filters will be doubly effective. In order to perform the test, we needed to find a source of contaminated water, pass it through the filters, and then see how much of the bacteria the filters managed to remove.

(Un)fortunately, we knew right where to go looking for contaminated water. The amount of E.coli in our house's well varies by the day, but is around 300 and sometimes as high as 1,000. We have a good commercial water filter, but its \$275 price tag puts it out of the reach of our neighbors, who are also drinking from the well—which is why this project is so important! We loaded up 55 gallon drums of water from the house well and took them out to the factory. We were able to test 40 filters, including some that we were pretty sure shouldn't work because of a small crack or other imperfections, to try to get a clear picture of which defects affect a filter's ability to work, and which don't.



*Setting up the E.coli removal tests at the factory.*



*It's exciting to see filters in receptacles for testing, looking like something ready for your kitchen!*

## Good Filters! (cont'd) by Jason

The results are very exciting! Though we did find some filters that were only stopping 80% of the bacteria (and again, without the silver!), we also found many of the filters effective at 98%, 99%, and even a few 99.9%! This is extremely encouraging, as it means we're making mostly good filters and can now zero in on exactly what we need to improve to make even more of the filters come out working at levels like that.



*Richard's lab for the fortnight didn't have A/C and wasn't exactly a clean-room, but we got the job done!*

## Politics in Guinea-Bissau by Emily

In our 12 years here in Guinea-Bissau we've lived through our share of coups and instability, and around 2014 things started to look much more stable. Sadly after just one year the president fired the Prime Minister shutting down the Parliament and setting off a political stalemate that's shut the government down for almost three years. Imagine that, when the U.S. government shuts down for a day things get tense!

Just last week, after mounting pressure by surrounding countries, it seems that the President and the Parliament have finally settled on a new Prime Minister and new heads for 18 government ministries. From this country's independence in the 1970's to the coup that forced our evacuation in 2012, every major political problem has led to bloodshed, and we are so thankful that intervention by international coalition troops has kept that from happening over the past 5 years. We are praying that the appointments stick this time and the Parliament can finally reconvene so that the country can function again.

## Chicken Eggs to Baby Sharks—Home School Fun by Emily

The kids and I have done a few extra hands-on school activities this month. A few streets away from us there is a little compound with a small orchard of fruit trees and around 250 chickens. They sell chickens and eggs, and while I don't enjoy all of the work that goes into butchering live birds, I do love fresh eggs. So, when I went to buy my weekly 3 dozen, (we go through a good amount of eggs around here) I took the kids along. The guy who takes care of the chickens is a brother of one of my good friends (small town life) so he showed us all around and taught the kids all kinds of things about how they take care of the chickens and the eggs.



*If Emily leaves the house with a purse, Miriam has to match, even if we're just going to check out some chickens.*

We eat a variety of fish and ocean creatures here, and they all come to our house whole (frequently still alive). The kids are used to checking out interesting sea life. We did have a new one this week though. Jason took Savannah to the fish market and they came home with three small sharks. The kids had a great time feeling their weird skin and looking at their tiny, but incredibly sharp, teeth.



*♪ Baby shark, doo doo do-doo dah doo. ♪*



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