

# Contaminated Water can be a Source of Disease and Death

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## Addressing the Water-Testing Challenge in Low-Income Countries

E. coli grows most rapidly near body temperature, 98°F / 35-37°C. In the absence of a suitable incubator, if ambient temperatures are <30°C that delay the appearance of positive tests, Colilert tubes can be placed in a small sack or sock, and Petrifilms can be placed between thin pieces of CARDBOARD to incubate both tests close to the body for results in 12-24 hours. The option of body incubation is a major advantage of these tests. For service providers testing in the distribution system, it avoids the requirement to get tests to an incubator in a central laboratory where gridlock traffic can make this a time-consuming challenge. In rural areas, Colilert and Petrifilm tests can be taken to villages where these tests can be inoculated and incubated within the village. This educates the community directly about the disease risk of drinking water sources. The development of a blue E. coli colony from an invisible cell on the Petrifilm provides striking visual evidence to communities that the drinking water source has bacteria from feces, and that water from that source must be avoided or treated all the time.

**Provide safe water and improve health:** [http://waterinternational.org/?page\\_id=289](http://waterinternational.org/?page_id=289)

## Accomplishments

Since 2000, we have been using the Portable Microbiology Laboratory as a teaching component & testing results demystifying microbiology at the community level, and lead to an understanding of the relationship between contaminated water & disease. This is critical, as in many areas with contaminated drinking water sources communities are unaware that microbes from feces are responsible for waterborne diseases. An example is our experience with 70,000 people in Lower Nyakach, Kenya, near Lake Victoria. Since 2012, we have worked with The Friends of the Old (FOTO) community-based organization to eliminate waterborne diseases in this area where there are only highly contaminated, unimproved drinking water sources. To do this, FOTO staff members were taught how to perform and interpret the Colilert and Petrifilm tests. They now take the testing and teaching to communities with monthly trainings. Before community testing and teaching, most people in Lower Nyakach thought that water was made "in the beginning" and couldn't cause disease. However, as a result of testing and teaching by respected members of their communities and observing the striking visual test results, the people in Lower Nyakach now understand that drinking water sources are contaminated with fecal bacteria and must be treated all the time.

For >1,000 of the 14,000 households in Lower Nyakach that have the simple Cookit solar cooker, sunshine can also be used to pasteurize water by heating to 149° F / 65° C, **using a reusable wax-based water pasteurization indicator (WAPI) to verify that the correct temperature has been reached making the water safe to drink.** Dr. Metcalf has also proven that water at 149°F will eliminate all disease harmful to humans within 3 seconds. There is no limit to size of water pot. (Safapour and Metcalf, 1999)

Given that >1 billion people are unaware that local drinking water sources are contaminated, the introduction of readily available water quality testing and monitoring methods that are easy to use and interpret could significantly contribute to a decrease in the global burden of waterborne diseases. The successful use of the PML in Lower Nyakach could be replicated in low-income communities worldwide.

## More extensive report

<http://www.imageevent.com/bobmetcalf/thegoaliszero>