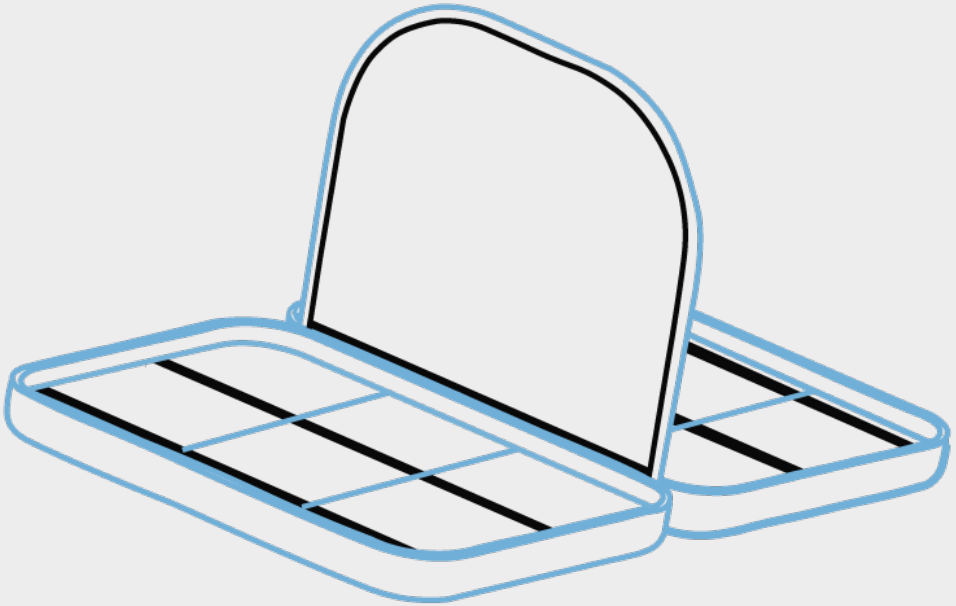

FAIRCAP
Portable Lab



E. COLI TESTING KIT

Faircap CIC, UK
Contact us at info@faircap.org

CONTENT

BACKGROUND

Access to safe drinking water and sanitation was declared a human right by the United Nations in July 2010. However, nowadays 2.1 billion people lack access to potable water, which means that 3 out of 10 people do not have water resources available at home and 4.5 billion lack access to sanitation. Therefore, 6 of every 10 people in the world are constantly exposed to diseases related to water consumption (OMS, 2017).

Drinking water and access to sanitation depend directly on the income level of the population. In developing countries almost half of the population suffers water-related health problems and polluted water is the second leading cause of death in children; 4,500 children die every day (UNICEF, nd).

During humanitarian emergencies low-income people are the most affected since they do not have the necessary resources to rebuild the infrastructure; 40% of the deaths of people displaced to refugee camps occur because they drink unsafe water (Chittaranjan and Ravi, 2014).

ABOUT US

Faircap is a social enterprise that believes that everyone in the world should have access to clean drinking water. That is why we work every day to develop new technologies to provide clean drinking water at an affordable price. The Faircap Mini and Faircap Family are instant purification devices that do not require additional energy or chemicals to produce clean drinking water.

The portable filters use the latest membrane technologies, such as hollow fibers placed in very small form factors, which maintain an optimal flow rate while eliminating pathogens such as bacteria, protozoa, cysts and even viruses.

Faircap water filters are developed to provide clean and safe drinking water during emergencies. They are also suited for people who experience similar challenges in more stable environments in developing countries, due to increasing populations and the limited resources municipal governments have to improve their water supply infrastructure.

This is why WHO, aware of the limitations, has proposed point-of-use purification devices for hard-to-reach populations who cannot access a treated water supply (WHO, 2020).

FAIRCAP

FAIRCAP E.COLI TESTING KIT

One of the ways to know if water is safe to drink is by testing fecal contamination in water. Testing water quality parameters in humanitarian settings is often difficult and expensive. Microbiological water quality tests may require access to a lab nearby or specialized equipment that is heavy, bulky and that can cost well over $1000.

We have developed a simple, low cost, portable and lightweight testing kit to test for fecal contamination in water samples anywhere in the world. The kit includes a USB powered incubator to store and incubate lightweight plastic pretri dishes containing a dried chromogenic agar. If water samples contain coliform bacteria or E.coli these bacteria will reproduce and become visible over the course of 14-16 hours at a 38-42 C temperature provided by a low powered 5V (2.5Wh) heating pad.

After this incubation period the bacteria colonies will show in the chromogenic agar as either blue or red/purple dots in the petri dishes. Blue colonies represent E.coli bacteria while purple colonies represent Coliform bacteria. The colonies can be counted by the naked eye representing the contamination present in the water sampled.

As we aim to make these test kits widespread to prevent gastrointestinal diseases and over 1.8 million deaths each year, the testing kit equipment will cost less between $35 and $50 with each bacterial test costing around $1.5.

BENEFITS

Portable and Lightweight

The compact design allows easy transport to any emergency. The entire kit fits in a small backpack.

Low Powered

The portable incubator consumes just 2.5 watts/hour and can be powered by a USB powerbank, car, wall or small solar charger.

Easy to use

Anyone can learn how to conduct a water test following simple graphic instructions and a video tutorial.

Reusable

The kit has been designed for using the least amount of imported consumables (i.e. petri dishes, membrane filters).

Reliable

The Faircap E.Coli Testing Kit assures precise and accurate testing (E.coli and coliform colony count CFU/100ml)

TECHNICAL FEATURES

Faircap's portable lab for testing fecal contamination in water is made out of a portable, lightweight, USB powered incubator, a small reusable plastic concentrating disk, 0.45micron/50mm diameter paper filters and E.coli and Coliform compact dry plastic petri dishes. You will also need a 50ml syringe, a pen, alcohol, tissues and tweezers.

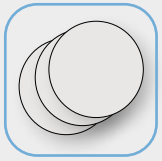
1. Digital Temperature Control
2. Electric Heating Pad
3. USB Charging Port

The portable incubator keeps E.coli compact dry plates at an average temperature of 38-42 degrees celcius for 14-16 hours for E.coli and Coliform colonies to become visible to the naked eye.

REQUIRED MATERIALS

FAIRCAP

Reusable Concentrating Disk



0.45 Micron Paper Filters

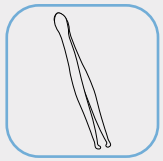
Plastic E.coli and Coliform Compact Dry Petri Dishes

50ml Plastic Syringe

Pen

Tissues

Alcohol



Tweezers

IDEAL FOR

Emergencies

Education

Rural Areas

Researchers

TECHNICAL SPECIFICATIONS

PRODUCT	FAIRCAP PORTABLE INCUBATOR
Size	26 cm x 18 cm
Weight	300 gr
Material	Polyester and Heat Absortion Liner
Capacity	18 plates
Temperature	38-42 degrees C
Power	5.5 v / 2.5 Watts per hour
Controller	Digital Thermostat (+/- 2 degrees)
Opertating Time	Unlimited
Life Time	Estimated 3 years

BULK SHIPPING

BOXES

40 x 40 x 32	10	3
Cm	Units/box	Kg/box

HOW TO USE

Testing fecal contamination in water samples is a simple procedure:

1.

WATER SAMPLES

1. You may test natural water sources or treated water to measure the level of contamination or disinfection in the water. Each sample should be of at least 100ml to follow international guidelines. You may test 1ml samples directly into the Compact Dry plates but low levels (1-20 CFU) of contamination may provide a false negative result.

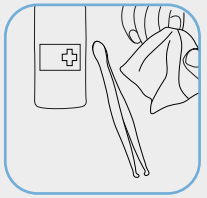
2.

DISINFECTION

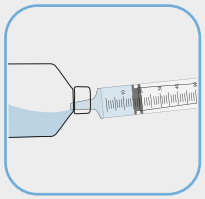
2. Wash your hands and clean the surface where you intend to conduct the water test.

Using a tissue with alcohol clean all the pieces that are needed to conduct the test:

3. Clean the inner surface of the plastic concentrating disk including the silicone ring seal.



4. Disinfect the tweezer.



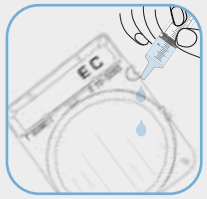
5. Fill the 50ml syringe with alcohol and empty it to let it dry. Submerge the small silicone tube in a bit of alcohol to disinfect it.

6. Clean your hands with the tissue and dry the alcohol from every piece with the tissue or let them dry in the air for a few minutes. Alcohol should evaporate fairly quickly.

3. CONCENTRATION

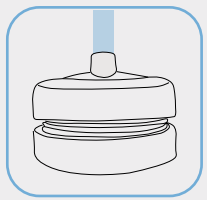
E.Coli colonies in water samples are internationally expressed per 100ml of water, so you need to concentrate the 100ml sample onto a filter paper to insert it into the petri dish.

To do this you must:

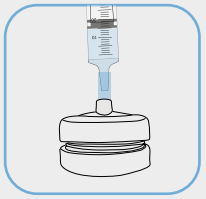


7. Take 50ml of water from the water sample with the disinfected syringe. Using the syringe place 1ml of water (about 15 drops) into a new compact dry plate to humidify it first.

8. Insert a 0.45micron filter paper into the disinfected concentrating plastic disk and screw the disk's lid to close it.



9. Connect the silicone tube into the concentrating disk inlet. Take the rest of the water inside the syringe and insert the water slowly into the concentrating disk by pressing the syringe.

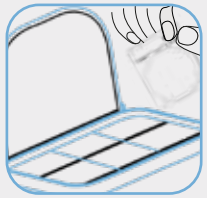


10. Repeat the last step to pass a total of 100ml thru the concentrating disk and paper filter

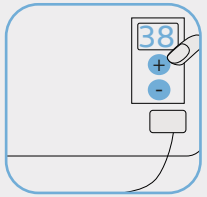
11. Open the concentrating disk and remove the paper filter with the clean tweezers. Insert the paper filter into the humidified compact dry plate. Remove any remaining water from the concentrating disk with a tissue and let it dry for future use.

12. Label the plate with the location and date of the sample.

4. INCUBATION



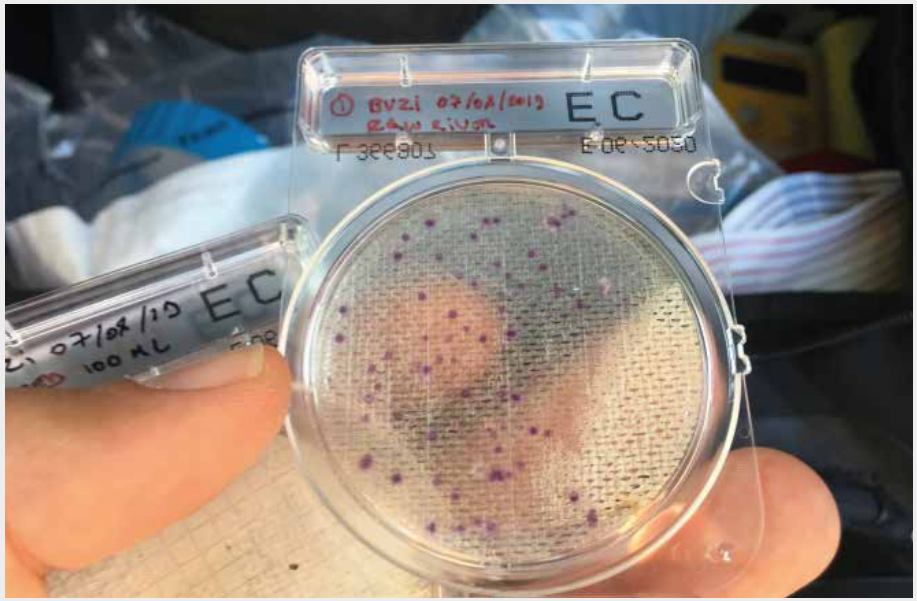
13. Insert the petri dish into the incubator. You should place the petri dishes with the lid down and be able to read the EC label correctly.



14. Turn on the power of the incubator by connecting it to a USB power source such as a powerbank, wall or car phone charger. Set the temperature to 38 degrees by pressing the set button for a couple of seconds and using the + and - signs to change the temperature. Let the incubator on for 14-16 hours.

15.

After the incubation period of 14-16 hours you can count each colony to quantity the contamination per 100ml. The red/purple dots represent coliform bacteria, which are not particularly a sign of fecal contamination as they could come out of the environment (dirt, etc), still coliform bacteria can be used to know the level of disinfection (if the water is being treated by chlorine or filtered with any device). The blue dots represent E.coli bacteria and that is a sign of fecal contamination. E.coli bacteria are not necessarily pathogenic but they are used to test that there is some contamination by feces in the water and feces bring other pathogens (bacteria, viruses) that can be harmful.



WARNING

Do not move around the plates or incubator during the incubation period as there might be some condensation of water droplets on the lid of the Compact Dry plates and moving the droplets around the petri dish might make the CFU marks look fuzzy.

When using the portable incubator in remote off grid locations we recommend to use Xiaomi powerbanks as they have a special low power mode option by pressing the on button twice. They will power the incubator for a couple of hours. Repeat this procedure if you don't have access to a power grid. Other powerbanks do not have a low power option and will turn off after a few minutes.

SUPPORTED BY

HIF humanitarian innovation fund

CONTACT

Mauricio Cordova
Info@faircap.org
Faircap CIC, UK
+34-619 271763